CITY OF COLUMBIA
TENNESSEE

# AGENDA

The Columbia Municipal Planning Commission will meet on Wednesday, March 13, 2024 at 4:00 PM in Council Chambers in the basement of City Hall, 700 N. Garden Street. The Planning Commission will consider the following:

I. Organization

1. Call to Order
2. Roll Call
3. Welcome of Visitors/Rules of Conduct
4. Acknowledgement of Official Communications of the Columbia City Council on Annexation and Zoning.
5. Approval of Minutes
6. Review of Bonds and Letters of Credit

II. Consent

1. Request from TKC Architecture and Engineering LLC for Final Plat approval with surety in the amount of $203,000 for a revision to Open Space in Bear Creek Overlook Phase 1 off Merkel Road.
2. Request from Allen O'Leary for Final Plat approval with surety in the amount of $1,190,000 (Phases 1 and 2) for The Preserve at Drumwright Phase 1 consisting of 68 lots off Williams Ridge Drive.

III. Discussion Items

1. Request from Abigail Overstreet for Final Plat approval with surety in the amount of $645,000 for Hillcrest Village Subdivision Phase 1A consisting of 27 lots and three open spaces off Rolling Brook Drive at Tax Map 113 Parcel 80.50.

2. Request from Greg Gamble for approval of Annexation with a Plan of Services and zoning to PUD-R (Residential Planned Unit Development) under a Preliminary PUD Site Development Plan for an approximate 410 acre portion of property at 400 Bear Creek Pike being Tax Map 90 Parcel 12.01.
**THIS ITEM WAS DEFERRED FROM A PREVIOUS AGENDA**

3. Request from Greg Gamble for Annexation approval with a Plan of Services and zoning to CD-4C (General Urban Corridor Character District) for an approximate 3.27 acre portion of Tax Map 90 Parcel 12.01 located at 400 Bear Creek Pike.
**THIS ITEM WAS DEFERRED FROM A PREVIOUS AGENDA**

4. Request from TKC Architecture & Engineering, LLC for Preliminary Plat and Site Development Plan approval of a mixed use development consisting of commercial, mixed use, and 98 townhome lots off Harley Davidson Blvd.at Tax Map 93 Parcels 2 and 2.01.

5. Request from Corey Nelsen to Rezone properties at West 12th and Haley Streets, being Tax Map 100E Group F Parcels 25, 25.01, 25.02, and 25.03, from CD-3 (Neighborhood Character District) to CD-4 (General Urban Character District).

6. Request from Josh Rowland for Annexation with Plan of Services, a Comprehensive Plan amendment from Rural Countryside to Suburban Neighborhoods and Zoning to CD-3 (Neighborhood Character District) for 57.26 acres at 1748, 1768, 1770 and 1774 Bear Creek Pike, being Tax Map 72 Parcels 54, 54.01 and 54.02.

IV. Other Business

The Planning Commission of the City of Columbia welcomes your presence and participation at this meeting. If you wish to address the Commission regarding any item on the Agenda, please sign the sign-up sheet and indicate which agenda item you would like to comment on. You will have the opportunity to comment on an item when it comes up on the Agenda and before the Commission votes on the item. Once recognized, you may then come to the podium and state your name and address. Anyone requesting accommodation due to disabilities should contact the ADA Coordinator, Wanda McClain, at 931-560-1570 prior to the meeting. For other questions, please contact the Department of Development Services at 931-560-1560.

Organization

Item I.1. - **Call to Order**

Chairman Charlie Goatz called the February Planning Commission Meeting for the City of Columbia to order at 4:10 p.m.
The meeting was held in Council Chambers at City Hall.

Item I.2. - **Roll Call**

Chairman Charlie Goatz called for a verbal roll call. The quorum was established.

Members Present: Planning Commission Chairman Charlie Goatz, Planning Commission Member Councilman Danny Coleman, Planning Commission Member Dr. Christa Martin, Planning Commission Member James Shannon, Planning Commission Member James Sloan.

Absent Were: Planning Commission Member Mayor Chaz Molder, and Planning Commission Member Ray Pace.

Staff Present: Mr. Robert Archibald, Planner II; Mr. Austin Brass, Assistant Planner; Mr. Ryan Filipkowski, Wastewater Engineer; Mr. Glenn Harper, City Engineer; Mr. Paul Keltner, Director of Development Services; Mrs. Sandra Richardson, Secretary; Mrs. Melissa Sanders, Planner I; Mr. Tim Tisher, City Attorney; (Zoom); and Mr. Douglas Toney, Assistant City Engineer.

Item I.3. - **Welcome of Visitors/Rules of Conduct**

Chairman Goatz welcomed the new Board Member Mr. James Sloan, and he welcomed the guests and applicants to the meeting. The Chairman discussed the meeting rules of conduct and the process for speakers to be heard.

Item I.4. - **Acknowledgement of Official Communications of the Columbia City Council on Annexation and Zoning.**

Director Paul Keltner presented the detailed report of the Planning Commission items that were presented to the City Council. Mr. Goatz stated for clarification the Connect Columbia passed. Mr. Keltner confirmed yes.

Item I.5. - **Approval of Minutes**

Chairman Goatz moved to approve the minutes with Councilman Coleman seconding them. The motion to approve the minutes passed with a vote of five to zero.

Item I.6. - **Review of Bonds and Letters of Credit**

City Engineer Glenn Harper stated all letters of credit are in order or in the process of being updated.

Consent

There were no consent items.

Discussion Items

Item III.1. - **Request from Greg Gamble for approval of Annexation with a Plan of Services and zoning to PUD-R (Residential Planned Unit Development) under a Preliminary PUD Site Development Plan for an approximate 410 acre portion of property at 400 Bear Creek Pike being Tax Map 90 Parcel 12.01.**

**THE APPLICANT HAS REQUESTED A DEFERRAL TO THE MARCH 13TH CMPC MEETING.**

Charirman Goatz asked for this item to be moved up to the top of the list. The applicant has asked for a deferral on this item. Mr. Goatz moved to defer, and Councilman Coleman seconded the motion. The motion to defer passed five to zero.

Item III.2. - **Request from Greg Gamble for Annexation approval with a Plan of Services, Comprehensive Plan amendment to Urban Neighborhood, and zoning to CD-4 (General Urban Character District) for an approximate three acre portion of Tax Map 90 Parcel 12.01 located at 400 Bear Creek Pike**
**THE APPLICANT HAS REQUESTED A DEFERRAL TO THE MARCH 13TH CMPC MEETING.**

Charirman Goatz asked for this item to be moved up to the top of the list. The applicant has asked for a deferral on this item. Mr. Goatz moved to defer, and Councilman Coleman seconded the motion. Councilman Coleman inquired why the applicant was requesting the deferral. Mr. Keltner stated that this is a part of the same request, one part is a small parcel. He wanted those to run together. They requested the deferral because of some of the comments that they received with regard to utilities and sewer, which may affect the layout. The motion to defer passed five to zero.

Item III.3. - **Request from WES Engineers & Surveyors for Comprehensive Plan amendment to change the future land use classification of two parcels off Morningside Lane, being Tax Map 89E Group F Parcels 1.01 and 1.02, from Urban Neighborhood to Suburban Neighborhood and to Rezone the property from CD-3L (Large Lot Neighborhood Character District) to CD-3 (Neighborhood Character District).**

**THIS ITEM WAS REFERRED FROM CITY COUNCIL**

**THIS ITEM WAS DEFERRED FROM A PREVIOUS AGENDA**

Mr. McCarthy gave the details of the staff report. Mr. Gerald VIck, WES Engineering, was present to answer questions. Mr. Goatz stated for clarification with the rezone request, staff has to look at the bigger picture. That is our sewer plant, and our capacity can be handled there. Any improvements that have to be made will come along with the next phase. At that point, it will be determined whether to have pump stations or anything of that nature. Mr. McCarthy stated that is correct. He discussed the request. Mr. Goatz moved to approve and Dr. Martin seconded the motion. The motion to approve passed five to zero.

Item III.4. - **Request from Andrew Wiseman to approve partial revocation of the Villages at Carters Creek PUD Master plan with rezoning to CD-4C (General Urban Corridor Character District) at 2425 Nashville Highway.**

**THIS ITEM WAS DEFERRED FROM A PREVIOUS AGENDA**

Mr. McCarthy gave the details of the staff report. Mr. Collin Aufhammer was present to answer questions. He stated that he re-watched the previous month's session, and he really was trying to understand. He discussed the concerns that he heard. Discussion included communication with Mr. Tisher, preventing residential use, requirement, restrictive covenant, resolution from City Council, complimentary uses, options, and processing. Mr. Tisher stated that he did not suggest that. The gentleman was incorrect, saying that he suggested this. He said that he did say that he had no problem with them placing the restriction on the property, but the City could in no way be a party to the restriction in any form or fashion. Because of the problem, we have had to steer clear of any possible interpretation of the contract zone. Mr. Aufhammer apologized that he had misspoken. Mr. Tisher discussed the involvement. Mr. Goatz discussed the previous comments. Additional discussion included downsizing, residential, detention, detention pond, retaining wall, car wash, commercial, large retail facilities going in, PUD revision, commercial out buildings, changes, nature of things, financial profitability, market is changing, there is a plan ready to go, flexibility, and the new code book. Mr. Keltner discussed the ordinance and guidance for development. Councilman Coleman discussed presenting a solution as a Commission. Further discussion included simplifying things, full civil plans for the car wash, fitting the use within the guidelines, same use, variances, retail, car wash, three retail spaces out front, rezoning versus adhering to the PUD, precedence, it could be residential, and vested interest. Councilman Coleman stated that he heard the two issues, and he wanted to make sure that they were addressed. He also stated that he wanted to identify the points that they should stick to. Additional discussion included residential is a concern. Mr. Tisher stated that he had no problem with them placing the restriction on the property. He also stated that his problem is having City Council take that restriction off with a resolution. He also stated that he does not think that City Council needs to be involved in this, because if this property is rezoned to a category that does allow residential uses and then, subsequently some subsequent owner comes in there and wants to have residential uses and this property is already appropriately zoned residential, it is going to be very

dangerous for City Council to not allow a residential use on an agreement years before where this restriction was placed on there. That is the reason why he doesn't want the City Council involved, that plus the contract zoning. If they want to put this restriction on there it is perfectly fine, and if the Commission is satisfied with the restriction being sufficient to protect the property he has no problem with that. He also stated that he feel that the Council, and the Planning Commission should not be involved in removing a restriction because he thinks it puts the Commission in a bad position. Mr. Wolaver stated that he was wanting to give the City control over that, but he will pull that provision. It will be a restriction against residential development. Mr. Goatz discussed the criteria, and conforming to the PUD. Mr. Goatz moved to deny under 8.5.19.E, and Mr. Shannon seconded the motion. The motion to deny passed four to one, with Councilman Coleman voting Nay.

Item III.5. - **Request from Allen O'Leary for Preliminary and Final Plat approval of three lots at 1485 Bear Creek Pike and Lasea Road.**

Mr. Brass gave the details of the staff report. The request is zoned CD-4C. Mr. Gerald Vick was present to answer questions. Discussion included this request currently meets the underline zoning of CD-4C for the lot configuration, matching up, and right of way dedication. Mr. Goatz moved to approve subject to any Development Review comments, with Dr. Martin seconding. The motion to approve subject to Development Review comments passed five to zero.

Item III.6. - **Request from Colton Davis for Preliminary and Final Plat approval for properties at Tax Map 51 Parcels, 19, 20, and 20.01 at Nashville Highway and Greens Mill Road.**

Mr. Austin Brass gave the details of the staff report. He stated that the request is vested under the previous code within a Planned Unit Development. Discussion included this is one of the first steps to start street improvements, traffic signal, conforming, and the retaining wall will be removed and placed on the private property. Mr. Goatz moved to approve subject to any Development Review comments, and the motion was seconded by Dr. Martin. The motion to approve subject to Development Review comments passed five to zero.

Item III.7. - **Request from Development Services for consideration and recommendation to City Council regarding revisions to the text of the Zoning Ordinance at 8.5.19 (process and criteria for amendments to the official zoning map), and various sections of Articles 3 and 4 referencing Connect Columbia, the comprehensive plan.**

Mr. McCarthy gave the details of the report. Mr. Goatz moved to approve the amendments, and Councilman Coleman seconded. The motion to approve the amendments passed five to zero.

Other Business

Mr. Paul Keltner thanked the Commission for coming to the joint session. Mr. McCarthy stated that this body will have a special meeting on March 6th, and then the Joint Study Session will be the first Wednesday in May.

Adjournment

Mr. Goatz moved to adjourn, with Councilman Coleman seconding. The motion to adjourn passed five to zero. The meeting adjourned at 4:59 p.m.

_____ _____

Planning Commission Chairman, Charlie Goatz — Date

# Active Letters of Credit and Sureties

2/27/2024

| DEVELOPMENT/SUBDIVISION | DEVELOPER | AMOUNT | EXP. DATE |
|---|---|---|---|
| Colter Place Subidivison, Section 1 (rds/drainage) | Sterling Martin | $44,502.69 | 09/09/2016 |
| Armstrong Meadow, Phase 1, Section 3 (roadsd/drainage) | General Homes of Columbia, LLC | $203,500.00 | 05/05/2019 |
| Honey Farms Subdivision, Phase 2, Section 10 | Charles Raines Construction, LLC | $10,300.00 | 05/23/2020 |
| Greystone Subdivision | LPT, LLC | $16,650.00 | 03/07/2021 |
| Arlington Heights Subdivision, Phase 2, Section 2 | Arlington Heights General Partnership | $105,000.00 | 04/25/2021 |
| Arlington Heights Subdivision, Phase 1, Section 2 | Arlington Heights General Partnership | $106,000.00 | 05/09/2021 |
| Polk Place PUD Subdivision, Phase 1 (roads & drainage) | Columbia Properties, LLC | $28,000.00 | 05/23/2021 |
| Independence @Carter's Station, Section 3, Phase 1 | Pulte Homes Tennessee Partnership | $390,000.00 | 09/15/2021 |
| Savannah Cove Subdivision - roads/drainage | Campbell and Lovell Rentals | $45,000.00 | 09/28/2021 |
| Summerdale, Phase 1 ( roads & drainage) | P & L Development | $135,000.00 | 11/13/2024 |
| Elan Subdivision, Phase 2 (roads and drainage) | Shaw Enterprises | $142,000.00 | 01/04/2022 |
| Polk Place PUD Subdivsion, Section 2A (roads & drainage) | Columbia Properties, LLC | $55,000.00 | 02/03/2022 |
| Fieldstone Farms - Section 4 (roads & drainage) | Estate of Cyril Evers | $21,000.00 | 03/13/2022 |
| Summerdale Subdivision, Phase 4 (roads & drainage) | P & L Development | $64,000.00 | 03/19/2022 |
| Hatton Hills Subdivision ( roads & drainage) | J & B Estate | $32,000.00 | 03/22/2022 |
| Honey Farms Townhomes , Phase 2, Section 3 | Lennar Homes of Tenn, LLC | $50,000.00 | 04/05/2022 |
| Homestead at Carter's Station, Section 2, Phase 1B | FP TCI CCS, LLC | $6,500.00 | 03/17/2024 |
| Homestead at Carter's Station, 5.2 and 6.1 | Pulte Homes Tennessee Partnership | $254,000.00 | 04/16/2022 |
| Summerdale Subdivision, Phase 2 (roads & drainage) | P & L Development, LLC | $105,000.00 | 05/30/2024 |
| Taylor Bend Road - roads & drainage | Meritage Homes of Tenn., Inc. | $120,000.00 | 06/30/2024 |
| Taylor Landing Subdivision, Phase 5A (roads & drainage) | Meritage Homes of Tenn., Inc. | $48,000.00 | 06/30/2022 |
| Taylor Landing Subdivision, Phase 5B (roads & drainage) | Meritage Homes of Tenn., Inc. | $72,000.00 | 06/30/2022 |
| Taylor Landing Subdivision, Phase 4B, (roads & drainage) | Meritage Homes of Tenn., Inc. | $78,000.00 | 06/30/2022 |
| Cottages at Bear Creek , Phase 1 (roads & drainage) | Riverstone Homes, LLC | $165,000.00 | 07/19/2022 |
| Homestead @ Carter's Station Section 2 Phase 2B | FP TCI CCS, LLC | $11,100.00 | 04/20/2024 |
| Summerdale Subdivision, Phase 5 ( roads & drainage) | P & L Development, LLC | $55,000.00 | 10/12/2024 |
| Independence at Carter's Station, Section 6, Phase 2 | Pulte Homes Tennessee Partnership | $207,000.00 | 11/08/2022 |
| Polk Place , Phase 2B (roads & drainage) | Columbia Properties, LLC | $56,000.00 | 11/12/2022 |
| Homestead at Carter's Station Subm Section2 Phase 3 | FP TCI CCS, LLC | $19,000.00 | 03/17/2024 |
| The Ridge at Carter's Station, Phase 1A | Richmond American Homes of Tenn | $121,000.00 | 12/03/2022 |
| Independence at Carter's Station, Section 3, Phase 2 | Pulte Homes Tennessee Partnership | $372,000.00 | 12/06/2022 |
| Homestead at Carter's Station Section 2, Phase 1 | FP TCI CCS, LLC | $14,100.00 | 03/17/2024 |
| Homestead at Carter's Station, Section 2, Phase 2A | FP TCI CCS, LLC | $8,700.00 | 04/20/2024 |
| Armstrong Meadows Subdivision, Section 4 | Smith Douglas, LLC | $475,000.00 | 02/01/2023 |
| Cottages at Bear Creek , Phase II (roads & drainage) | Riverstone Homes, LLC | $156,000.00 | 03/18/2023 |
| Summerdale Subdivision, Phase 7 (roads & drainage) | P & L Development, LLC | $66,000.00 | 03/21/2023 |
| Ridge at Carter's Station, Phase 1B (roads & drainage) | Richmond American Homes of Tenn | $260,000.00 | 03/31/2023 |
| Vesper Court (completion of the work) | P-R Vesper, LLC | $18,500.00 | 04/18/2023 |
| Morgan Meadow Phase 2 (roads & drainage) | KCS Property, LLC | $13,500.00 | 12/06/2024 |
| Armstrong Street Subdivision ( roads & drainage) | Tennessee Regional Holdings, LLC | $75,500.00 | 05/14/2023 |
| Polk Place, Phase 3 , (roads and drainage) | Columbia Properties, LLC | $79,000.00 | 06/17/2023 |
| Independence at Carters Station Section6, Phase 3 | Pulte Homes Tennessee Partnership | $197,000.00 | 07/14/2023 |
| Bear Creek Overlook Place Phase 1 (roads and drainage) | CHR Land, LLC | $203,000.00 | 07/12/2024 |
| Bear Creek Glen, Phase 1 (roads and drainage) | CHR Land, LLC | $90,000.00 | 07/12/2024 |
| Homestead at Carters Station, Section 5, Phase 2 | Pulte Homes Tennessee Partnership | $149,000.00 | 07/29/2023 |
| Independence at Carters Section 3, Phase 3 | Pulte Homes Tennessee Partnership | $155,000.00 | 08/05/2024 |
| Quail Run Development, Phase 2 (roads and drainage) | Quail Run Development Co., LLC | $182,000.00 | 08/01/2024 |
| Quail Run Development, Phase 1B (roads and drainage) | Quail Run Development Co., LLC | $18,500.00 | 02/21/2025 |
| Drumwright, Phase 1 Townhomes Section (roads & drainage) | Lennar Homes of Tenn, LLC | $275,000.00 | 08/11/2023 |
| Drumwright, Phase 1 Family Section (roads & drainage) | Lennar Homes of Tenn, LLC | $890,000.00 | 08/11/2023 |
| Ridgeview Oaks, Phase 1 (roads and drainage) | A1 Home Builders, Inc. | $450,000.00 | 08/22/2024 |
| Ridge at Carter's Station, Phase 2 (roads & drainage) | Richmond American Homes of Tenn | $645,000.00 | 10/31/2024 |
| Taylor Landing, Phase 4A (roads & drainage) | Meritage Homes of Tenn., Inc. | $12,100.00 | 11/30/2024 |
| Summerdale Subdivision, Phase 3 (roads & drainage) | P & L Development | $97,000.00 | 12/22/2023 |
| Quail Run Development Phase 1 (roads & drainage) | Quail Run Development Co., LLC | $15,700.00 | 01/04/2025 |
| Summerdale Subdivision, Phase 3B (roads & drainage) | P & L Development, LLC | $17,000.00 | 01/27/2024 |
| Summerdale Subdivision, Phase 6 (roads & drainage) | P & L Development, LLC | $103,000.00 | 02/07/2024 |
| Morgan Meadow Phase 3 (roads & drainage) | KCS Property, LLC | $220,000.00 | 02/10/2024 |
| Morgan Meadows Subdivision (roads & drainage) | KCS Property, LLC | $24,200.00 | 07/14/2024 |

# Active Letters of Credit and Sureties

2/27/2024

| DEVELOPMENT/SUBDIVISION | DEVELOPER | AMOUNT | EXP. DATE |
|---|---|---|---|
| Vulcan Quary Site Restoration | Vulcan Construction Materials, LLC | $62,000.00 | 03/01/2024 |
| Ridgeview Oaks, Phase 2 (roads and drainage) | A-1 Home Builders, Inc. | $335,000.00 | 03/10/2024 |
| Summit at Carter's Station Phase 1 (roads & drainage) | Tamarack Land - Carter's Station LLC | $465,000.00 | 03/17/2024 |
| Baker Creek Place (roads & drainage) | SDH Nashville, LLC | $360,000.00 | 04/28/2024 |
| Taylor Landing - Phase 2 (roads & drainage) | Meritage Homes of Tenn., Inc. | $18,800.00 | 04/30/2025 |
| Taylor Landing Subdivision, Phase 3 (roads and drainage) | Meritage Homes of Tenn., Inc. | $11,700.00 | 07/31/2024 |
| Quail Run Meadows, Phase 3 | Quail Run Development Co., LLC | $185,000.00 | 05/18/2024 |
| Drumwright, Phase 2C | Lennar Homes of Tenn, LLC | $125,000.00 | 05/23/2024 |
| Drumwright, Phase 2A | Lennar Homes of Tenn, LLC | $200,000.00 | 05/23/2024 |
| Drumwright, Phase 2B | Lennar Homes of Tenn, LLC | $125,000.00 | 05/23/2024 |
| Drumwright TH, Phase 2D | Lennar Homes of Tenn, LLC | $265,000.00 | 05/23/2024 |
| Honey Lakes | Honey Lakes LLC | $295,000.00 | 06/14/2024 |
| Vesper Court (completion of the work) 2 | P-R Vesper, LLC | $10,000.00 | 06/16/2024 |
| Summit at Carter's Station Phase 2 | Tamarack Land - Carter's Station LLC | $175,000.00 | 06/14/2024 |
| Independence @ Carter's Station, Section 3, Phase 4 | Pulte Homes Tennessee Partnership | $140,000.00 | 07/13/2024 |
| Independence @ Carter's Station, Section 6, Phase 4 | Pulte Homes Tennessee Partnership | $160,000.00 | 07/13/2024 |
| Homestead South @ Carter's Station | Pulte Homes Tennessee Partnership | $125,000.00 | 07/13/2024 |
| Independence @ Carter's Station, Section 3, Phase 5 | Pulte Homes Tennessee Partnership | $35,000.00 | 07/19/2024 |
| Williamsport Landing, Phase 1 | KCS Property LLC | $310,000.00 | 08/17/2024 |
| Summit at Carter's Station West, Phase 1 | Pulte Homes Tennessee Partnership | $315,000.00 | 10/06/2024 |
| Drumwright Phase 3A | Lennar Homes of Tenn, LLC | $135,000.00 | 11/22/2024 |
| Drumwright Phase 3B | Lennar Homes of Tenn, LLC | $120,000.00 | 11/22/2024 |
| Drumwright Phase 3C | Lennar Homes of Tenn, LLC | $190,000.00 | 11/22/2024 |
| Rutherford Subdivision, Phase 1 | Regent Homes, LLC | $400,000.00 | 12/21/2024 |
| The Summit at Carter's Station, Phase 3 | Tamarack Land-Carter's Station, LLC | $610,000.00 | 12/20/2024 |
| Preserve at Drumwright, Phase 1 and Phase 2 | Lennar Corporation | $1,190,000.00 | 11/14/2024 |
| Hillcrest Village, Phase 1A | M/I Homes of Nashville, LLC | $645,000.00 | 01/19/2025 |
| | | | |

## PURPOSE NOTE

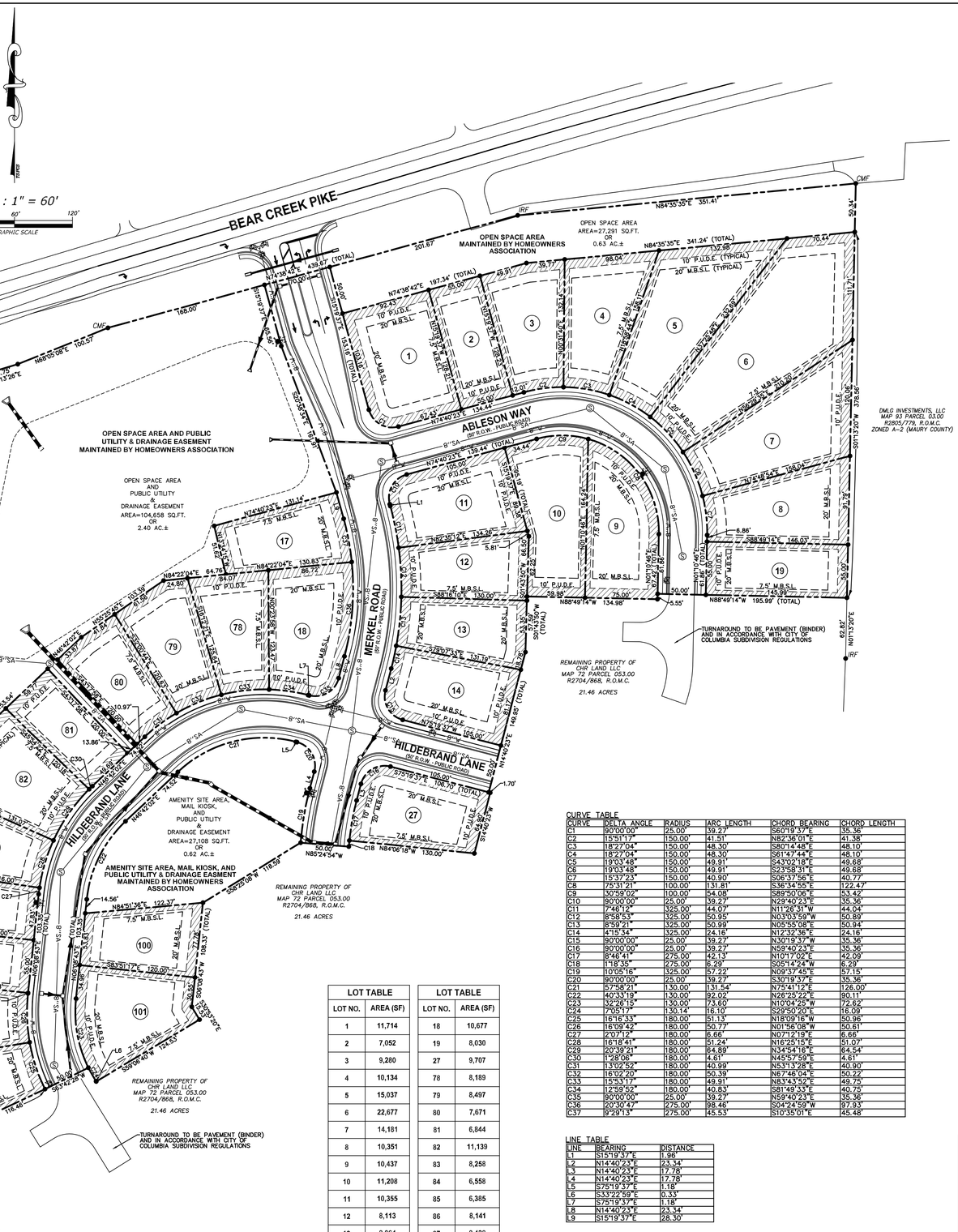
THE PURPOSE OF THIS PLAT IS TO CREATE 30 RESIDENTIAL LOTS, AND TO DEDICATE OPEN SPACE AREAS.

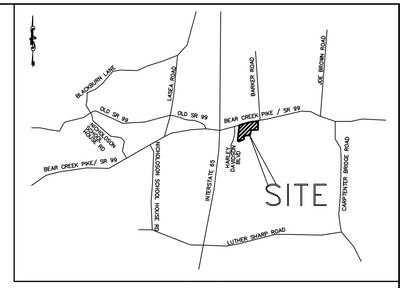
### Surveyor's Notes

1. The property shown hereon is located within the City of Columbia, Maury County, TN. All matters pertaining to construction, use, location of improvements, signage, parking, noise, vibration, emissions, fire hazards, radiation, illumination, setback provisions, etc., are subject to the City of Columbia's Zoning Regulations as interpreted and regulated by the Department of Development Services.
2. This property currently identified as a portion of Parcel Number 053.00 per Tax Map No. 72.
3. Deed reference: Record Book R2704, Page 868, Register's Office of Maury County, Tennessee.
4. Bearings based on: Tennessee State Plane, as determined by GPS observation.
5. This drawing was prepared in accordance with our field survey notes. It shows improvements as they exist to the best of our knowledge, but is not guaranteed to be correct in each and every detail.
6. This survey was prepared from current deeds of record and does not represent a title search or a guarantee of title, and is subject to any state of facts a current and accurate search may reveal.
7. Total area of property surveyed is 12.49 Acres ±.
8. New Right-Of-Way dedication: 2.10 Acres ±.
9. There is a 10 foot easement on property lines parallel to the public road for public utility and drainage easements. Additional requirements may apply based on actual field conditions.
10. Subject property does not lie in a FEMA/FIRM "Special Flood Hazard Area" as shown on Map 47119C0195E dated April 16, 2007.
11. Unless otherwise noted, all lot corners are marked with iron rods.

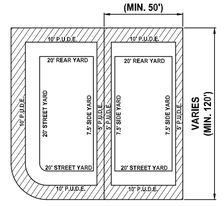
### Utility Notes

Stormwater appurtenances as depicted on this Final Plat shall be maintained as directed in the "Inspection and Maintenance Agreement of Private Stormwater Management Facilities" as recorded in Record Book _____, pages _____, in the Register's Office of Maury County, Tennessee.




VICINITY MAP
NOT TO SCALE




TYPICAL LOT CONFIGURATION
FOR LOTS 1–14, 17–19, 27, 78–87, & 100–101
P.U.D.E.=PUBLIC UTILITY AND DRAINAGE EASEMENT

▨ =P.U.D.E.

**Owner:**
CHR LAND, LLC
1081 CRANFORD HOLLOW ROAD
COLUMBIA, TN 38401

**Certificate of Ownership and Dedication**

I (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2704, Page 868, Maury County Register's Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

_____, 2024 _____
Date

_____
Title (CHR Land, LLC.)

**Certificate of Survey Accuracy**

I (we) hereby certify that to the best of my (our) knowledge and belief that this is a true and accurate survey of the property shown hereon; that this is a Class "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

2/15/24, 2024 Bobby G Moore 1039
Date Registered Land Surveyor Number
BOBBY G. MOORE, RLS
TENNESSEE RLS NO. 1039

**Certificate of Approval of Water System**

I hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled "Final Plat – Bear Creek Overlook – Phase 1" has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

_____, 2024 _____
Date Superintendent, Columbia Water System

**Certificate of Approval of Streets, Drainage, and Utilities**

I hereby certify that the streets, drainage, and utilities designated in Bear Creek Overlook – Phase 1 have been installed in accordance with City specifications, or a performance bond in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

_____, 2024 _____
Date City Engineer, Columbia, Tennessee

**Certificate of Approval for Recording**

I hereby certify that the subdivision plat shown hereon has been found to comply with the Columbia Subdivision Regulations, with the exceptions of such variances, if any, as noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register.

_____ _____
Secretary, Planning Commission Columbia, Tennessee Date

**Certificate of Approval of Subdivision Name and Street Names**

Subdivision name and street names approved by Maury County E-911,

_____, 2024 _____
Date Maury County E-911

**Certificate of Approval for Sewer System**

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

_____, 2024 _____
Date Superintendent, Columbia Wastewater System

**Certificate of Compliance**

I hereby certify that the subdivision plat shown hereon has been found to comply with the Columbia Subdivision Regulations and other adopted ordinances and policies.

_____ _____
City Engineer Columbia, Tennessee Date

BOBBY G. MOORE 1039 REGISTERED LAND SURVEYOR AGRICULTURE ZONING TENNESSEE STATE OF TENNESSEE 2/15/24

| LOT TABLE | |
|---|---|
| LOT NO. | AREA (SF) |
| 1 | 11,714 |
| 2 | 7,052 |
| 3 | 9,280 |
| 4 | 10,134 |
| 5 | 15,037 |
| 6 | 22,677 |
| 7 | 14,181 |
| 8 | 10,351 |
| 9 | 10,437 |
| 10 | 11,208 |
| 11 | 10,355 |
| 12 | 8,113 |
| 13 | 8,064 |
| 14 | 9,864 |
| 17 | 8,254 |

| LOT TABLE | |
|---|---|
| LOT NO. | AREA (SF) |
| 18 | 10,677 |
| 19 | 8,030 |
| 27 | 9,707 |
| 78 | 8,189 |
| 79 | 8,497 |
| 80 | 7,671 |
| 81 | 6,844 |
| 82 | 11,139 |
| 83 | 8,258 |
| 84 | 6,558 |
| 85 | 6,385 |
| 86 | 8,141 |
| 87 | 8,438 |
| 100 | 7,897 |
| 101 | 10,401 |

CURVE TABLE

| CURVE | DELTA ANGLE | RADIUS | ARC LENGTH | CHORD BEARING | CHORD LENGTH |
|---|---|---|---|---|---|
| C1 | 90°00'00" | 25.00' | 39.27' | S60°19'37"E | 35.36' |
| C2 | 15°51'17" | 150.00' | 41.51' | N82°36'01"E | 41.38' |
| C3 | 18°27'04" | 150.00' | 48.30' | S80°14'48"E | 48.10' |
| C4 | 18°27'04" | 150.00' | 48.30' | S61°47'44"E | 48.10' |
| C5 | 19°03'48" | 150.00' | 49.91' | S43°02'18"E | 49.68' |
| C6 | 19°03'48" | 150.00' | 49.91' | S23°58'31"E | 49.68' |
| C7 | 15°37'23" | 150.00' | 40.90' | S08°07'56"E | 40.77' |
| C8 | 75°31'21" | 100.00' | 131.81' | S36°34'55"E | 122.47' |
| C9 | 30°59'02" | 100.00' | 54.08' | S89°50'06"E | 53.42' |
| C10 | 90°00'00" | 25.00' | 39.27' | N29°40'23"E | 35.36' |
| C11 | 7°48'12" | 325.00' | 44.07' | N11°26'31"W | 44.04' |
| C12 | 8°58'53" | 325.00' | 50.95' | N03°03'59"W | 50.89' |
| C13 | 8°59'21" | 325.00' | 50.99' | N05°55'08"E | 50.94' |
| C14 | 4°15'34" | 325.00' | 24.16' | N12°32'36"E | 24.16' |
| C15 | 90°00'00" | 25.00' | 39.27' | N30°19'37"W | 35.36' |
| C16 | 90°00'00" | 25.00' | 39.27' | N59°40'23"E | 35.36' |
| C17 | 8°46'41" | 275.00' | 42.13' | N10°17'02"E | 42.09' |
| C18 | 1°18'35" | 275.00' | 6.29' | S05°14'24"W | 6.29' |
| C19 | 10°05'16" | 325.00' | 57.22' | N09°37'45"E | 57.15' |
| C20 | 90°00'00" | 25.00' | 39.27' | S30°19'37"E | 35.36' |
| C21 | 57°58'21" | 130.00' | 131.54' | N75°41'12"E | 126.00' |
| C22 | 40°33'19" | 130.00' | 92.02' | N26°25'22"E | 90.11' |
| C23 | 32°26'15" | 130.00' | 73.60' | N10°04'25"W | 72.62' |
| C24 | 7°05'17" | 130.14' | 16.10' | S29°50'00"E | 16.09' |
| C25 | 16°16'33" | 180.00' | 51.13' | N18°09'16"W | 50.96' |
| C26 | 16°09'42" | 180.00' | 50.77' | N01°56'08"W | 50.61' |
| C27 | 2°07'12" | 180.00' | 6.66' | N07°12'18"E | 6.66' |
| C28 | 16°18'41" | 180.00' | 51.24' | N16°25'15"E | 51.07' |
| C29 | 20°39'21" | 180.00' | 64.89' | N34°54'16"E | 64.54' |
| C30 | 1°28'06" | 180.00' | 4.61' | N45°57'59"E | 4.61' |
| C31 | 13°02'52" | 180.00' | 40.99' | N53°13'28"E | 40.90' |
| C32 | 16°02'20" | 180.00' | 50.39' | N67°46'04"E | 50.22' |
| C33 | 15°53'17" | 180.00' | 49.91' | N83°43'52"E | 49.75' |
| C34 | 12°59'52" | 180.00' | 40.83' | S81°49'33"E | 40.75' |
| C35 | 90°00'00" | 25.00' | 39.27' | N59°40'23"E | 35.36' |
| C36 | 20°30'47" | 275.00' | 98.46' | S04°24'59"W | 97.93' |
| C37 | 9°29'13" | 275.00' | 45.53' | S10°35'01"E | 45.48' |

LINE TABLE

| LINE | BEARING | DISTANCE |
|---|---|---|
| L1 | S15°19'37"E | 1.96' |
| L2 | N14°40'23"E | 23.34' |
| L3 | N14°40'23"E | 17.78' |
| L4 | N14°40'23"E | 17.78' |
| L5 | S75°19'37"E | 1.18' |
| L6 | S33°22'59"E | 9.33' |
| L7 | S75°19'37"E | 1.18' |
| L8 | N14°40'23"E | 23.34' |
| L9 | S15°19'37"E | 28.30' |

LEGEND

These standard symbols will be found in the drawing.

| | |
|---|---|
| ——— | STORM LINE |
| ———SA——— | SANITARY SEWER LINE |
| ———W——— | WATER LINE |
| | FIRE HYDRANT COMPLETE ASSEMBLY |
| | WATER METER VAULT |
| — — — | BUILDING SETBACK |
| - - - - - - - - | EASEMENT |
| | PROPERTY LINE |
| ● | IRON ROD (SET) (UNLESS OTHERWISE NOTED) |
| IRF | IRON ROD (FOUND) |
| CMF | CONCRETE MONUMENT (FOUND) |

# Final Plat
# Bear Creek Overlook - Phase 1

3rd CIVIL DISTRICT OF MAURY COUNTY, TN
CITY OF COLUMBIA, MAURY COUNTY, TENNESSEE

**SHEET 1 OF 1**

TAX MAP 72, P/O PARCEL 53.00
ZONED: MRC

SCALE: 1"= 60'
AREA: 12.49 ACRES±

~~DATE: JUNE 30, 2022~~
~~REVISED: JANUARY 12, 2024~~
REVISED: FEBRUARY 15, 2024


**H & H LAND SURVEYING, INC.**
612A FITZHUGH BOULEVARD
SMYRNA, TENNESSEE 37167
(615) 831-0756 (FAX) 355-6928
H & H Project No. 2022-0379

TKC ARCHITECTURE INTERIORS CIVIL SITE

818 SOUTH MAIN ST.
COLUMBIA, TN 38401
TKC-AE.COM
615.617.7477

February 19th, 2024

Development Service
City of Columbia

Project: 24-0025 - Overlook Subdivision Phase 1 Section 1

Subject: Revision to Recorded Final Plat for Phase 1

Mr. Archibald,

We are proposing a change to the approved and recorded final plat for Phase I of the Overlook Subdivision to allow for a neighborhood amenity site. The proposed change is between lot 100 and the intersection of Hilderbrand Lane and Merkel Road. The area of change was originally called an open space lot (Open Space Area and Public Utility and Drainage Easement) on the approved and recorded plat and we are now proposing to change the lot to an amenity area (Amenity Site Area, Mail Kiosk and Public Utility and Drainage Easement). The size of the area is remaining the same at 0.62 acres.

We have addressed the comments received from the 2/13/24 technical meeting and the responses are below:

Planning

1. Add open space note stating responsibility of maintenance.
    a. Note has been added
2. The lead staff person for this case is Planner II Robert Archibald; he will prepare the staff report for this item. Please contact rarchibald@columbiatn.com with question about the development review process or technical comments.
    a. Comment is noted
3. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, please simply not that the information has been acknowledged.
    a. Comment is noted

Engineering

1. LOC in the amount of $203,000 provided
    a. Comment is noted
2. Record/reference stormwater maintenance agreement
    a. Stormwater maintenance agreement is being recorded and the numbers will be written in prior to recording.

Fire

1. You will need to have a water availability letter before construction plans are submitted.
    a. Comment is noted and we are working with the Fire Marshall and IDG/CPWS to get the updated letter.

If you have any comments or questions please contact Cole Newton at TKC Architecture and Engineering at cole@tkc-ae.com or 615.617.7477

Thank you,

818 SOUTH MAIN ST.
COLUMBIA, TN 38401
TKC-AE.COM
615.617.7477

Cole Newton, PE
TKC Architecture and Engineering LLC
615.617.7477 (o)
931.797.3323 (c)
cole@tkc-ae.com

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, February 13, 2024

**ITEM NO.**
24-0025

**DESCRIPTION:** We are proposing a change to the approved and recorded final plat for the Overlook Subdivision to allow for a neighborhood amenity site. The proposed change is between lot 100 and the intersection of Hilderbrand Lane and Merkel Road. The area of change was originally called an open space lot (Open Space Area and Public Utility and Drainage Easement) on the approved and recorded plat and we are now proposing to change the lot to an amenity area (Amenity Site Area, Mail Kiosk and Public Utility and Drainage Easement). The size of the area is remaining the same at 0.62 acres.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

## Planning

1. Add open space note stating responsibility of maintenance.
2. The lead staff person for this case is Planner II Robert Archibald; he will prepare the staff report for this item. Please contact rarchibald@columbiatn.com with question about the development review process or technical comments.
3. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, please simply not that the information has been acknowledged.

## Engineering

4. LOC in the amount of $203,000 provided
5. Record/reference stormwater maintenance agreement

## Fire

6. You will need to have a water availability letter before construction plans are submitted

## Maury County E911

7. No comment at this time.

## Building

8. No comments.

## Police

9. No comments provided.

## Maury County Schools

10. No comment.

## Columbia Power

11. Columbia Power System does not have an ex1stmg power line near your proposed development and is not the service provider. DREMC will be the service provider for this area.

## Public Works

12. No comments.

## Duck River Electric Membership Corp

13. No comments.

## Maury County Highway Dept.

14. No comments provided.

## ATT

15. NO COMMENT

## Columbia Water

16. No comments.

## Wastewater

17. Columbia Wastewater has no concerns.

## Atmos Energy

18. No comments provided.

## CPWS BB

19. Do not plan to serve

**ATTACHMENTS: Final Plat**

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

## PURPOSE NOTE

THE PURPOSE OF THIS PLAT IS TO CREATE 30 RESIDENTIAL LOTS, AND TO DEDICATE OPEN SPACE AREAS.

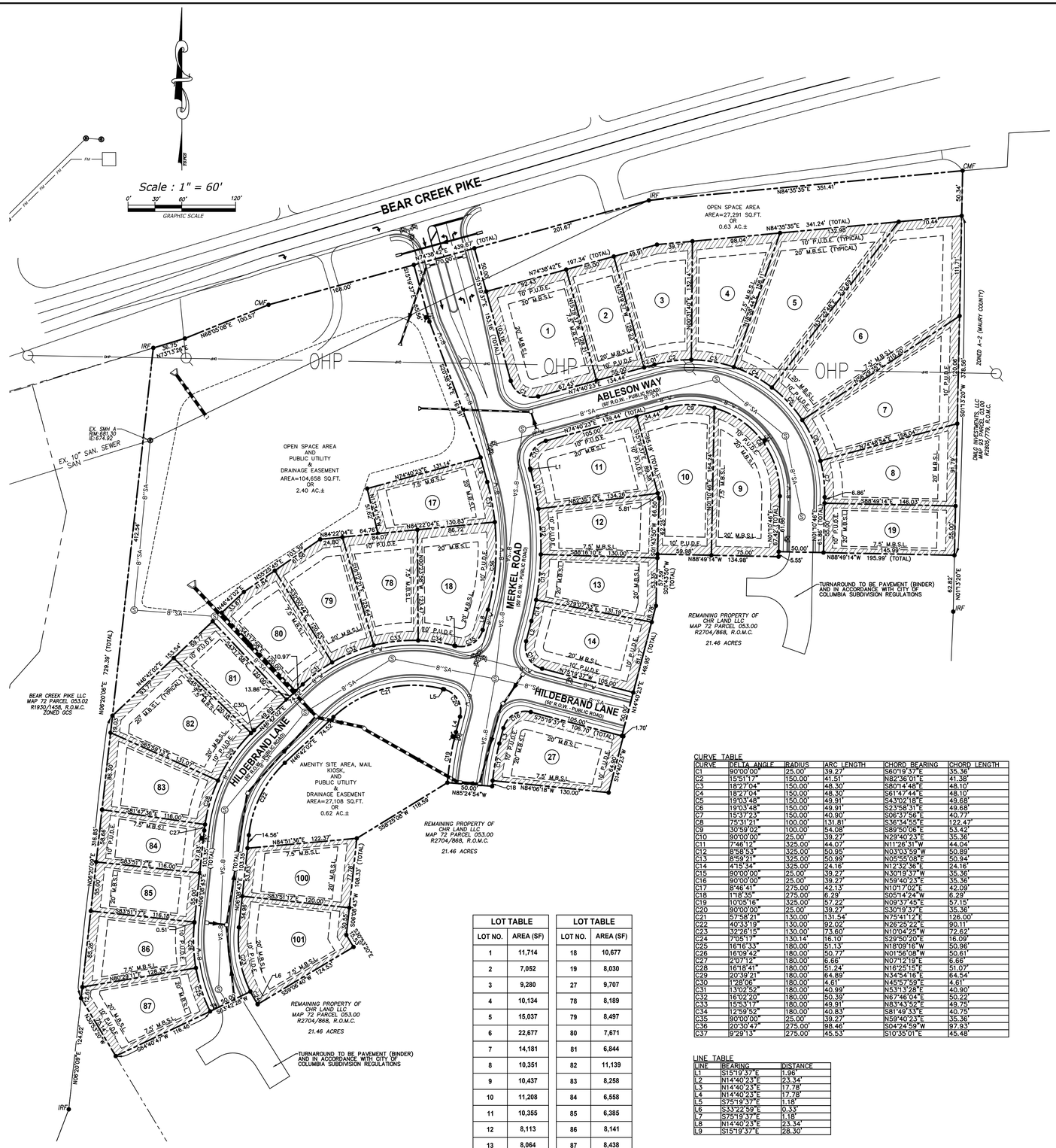
### Surveyor's Notes

1. The property shown hereon is located within the City of Columbia, Maury County, TN. All matters pertaining to construction, use, location of improvements, signage, parking, noise, vibration, emissions, fire hazards, radiation, illumination, setback provisions, etc., are subject to the City of Columbia's Zoning Regulations as interpreted and regulated by the Department of Development Services.
2. This property currently identified as a portion of Parcel Number 053.00 per Tax Map No. 72.
3. Deed reference: Record Book R2704, Page 868, Register's Office of Maury County, Tennessee.
4. Bearings based on: Tennessee State Plane, as determined by GPS observation.
5. This drawing was prepared in accordance with our field survey notes. It shows improvements as they exist to the best of our knowledge, but is not guaranteed to be correct in each and every detail.
6. This survey was prepared from current deeds of record and does not represent a title search or a guarantee of title, and is subject to any state of facts a current and accurate search may reveal.
7. Total area of property surveyed is 12.49 Acres ±.
8. New Right-Of-Way dedication: 2.10 Acres ±.
9. There is a 10 foot easement on property lines parallel to the public road for public utility and drainage easements. Additional requirements may apply based on actual field conditions.
10. Subject property does not lie in a FEMA/FIRM "Special Flood Hazard Area" as shown on Map 47119C0195E dated April 16, 2007.
11. Unless otherwise noted, all lot corners are marked with iron rods.

### Utility Notes

Stormwater appurtenances as depicted on this Final Plat shall be maintained as directed in the "Inspection and Maintenance Agreement of Private Stormwater Management Facilities" as recorded in Record Book _____, pages _____ in the Register's Office of Maury County, Tennessee.

**Owner:**
CHR LAND, LLC
1081 CRANFORD HOLLOW ROAD
COLUMBIA, TN 38401


Scale : 1" = 60'
0' 30' 60' 120'
GRAPHIC SCALE
BEAR CREEK PIKE
ABLESON WAY
(50' R.O.W. - PUBLIC ROAD)
MERKEL ROAD
(50' R.O.W. - PUBLIC ROAD)
HILDEBRAND LANE
(50' R.O.W. - PUBLIC ROAD)
HILDEBRAND LANE
(50' R.O.W. - PUBLIC ROAD)
OPEN SPACE AREA
AREA=27,291 SQ.FT.
OR
0.63 AC.±
OPEN SPACE AREA
AND
PUBLIC UTILITY
&
DRAINAGE EASEMENT
AREA=104,658 SQ.FT.
OR
2.40 AC.±
AMENITY SITE AREA, MAIL KIOSK,
AND
PUBLIC UTILITY
&
DRAINAGE EASEMENT
AREA=27,108 SQ.FT.
OR
0.62 AC.±
EX. SMH 4
RIM=821.30
E=674.93
EX. 10" SAN. SEWER
SAN
EX. 8" W
EX. 12" W
EX. 8" G
EX. OHP
BEAR CREEK PIKE LLC
MAP 72 PARCEL 053.02
R1930/1458, R.O.M.C.
ZONED GCS
ZONED A-2 (MAURY COUNTY)
DMS INVESTMENTS, LLC
MAP 72 PARCEL 053.00
R2805/779, R.O.M.C.
REMAINING PROPERTY OF
CHR LAND, LLC
MAP 72 PARCEL 053.00
R2704/868, R.O.M.C.
21.46 ACRES
REMAINING PROPERTY OF
CHR LAND LLC
MAP 72 PARCEL 053.00
R2704/868, R.O.M.C.
21.46 ACRES
REMAINING PROPERTY OF
CHR LAND, LLC
MAP 72 PARCEL 053.00
R2704/868, R.O.M.C.
21.46 ACRES
TURNAROUND TO BE PAVEMENT (BINDER) AND IN ACCORDANCE WITH CITY OF COLUMBIA SUBDIVISION REGULATIONS
TURNAROUND TO BE PAVEMENT (BINDER) AND IN ACCORDANCE WITH CITY OF COLUMBIA SUBDIVISION REGULATIONS
N84°35'35"E 351.41'
N74°38'42"E 439.67' (TOTAL)
N74°40'23"E 359.44' (TOTAL)
N84°35'35"E 341.24' (TOTAL)
S01°13'20"W 376.56'
S88°49'14"E 146.03'
N88°49'14"W 195.99' (TOTAL)
N88°49'14"W 134.98'
S88°49'14"E 145.99'
S88°49'14"E 1200.00'
S01°13'20"W 62.82'
N01°13'20"E 62.82'
S74°40'23"W 134.44'
S74°40'23"W 131.14'
S74°40'23"W 86.72'
S74°40'23"W 105.00'
S74°40'23"W 134.44'
S74°40'23"W 134.44'
N74°38'42"E 197.34' (TOTAL)
N74°38'42"E 70.00'
N74°40'23"E 134.44'
N74°40'23"E 131.14'
N84°22'04"E 130.83'
N84°22'04"E 64.78'
N84°22'04"E 24.80'
N65°20'45"E 61.98'
N48°47'07"E 24.54'
N28°20'08"E 729.39' (TOTAL)
N28°20'08"E 124.62'
N28°20'08"E 151.44'
N28°20'08"E 100.00'
N28°20'08"E 116.00'
N28°20'08"E 116.00'
N28°20'08"E 116

## PURPOSE NOTE

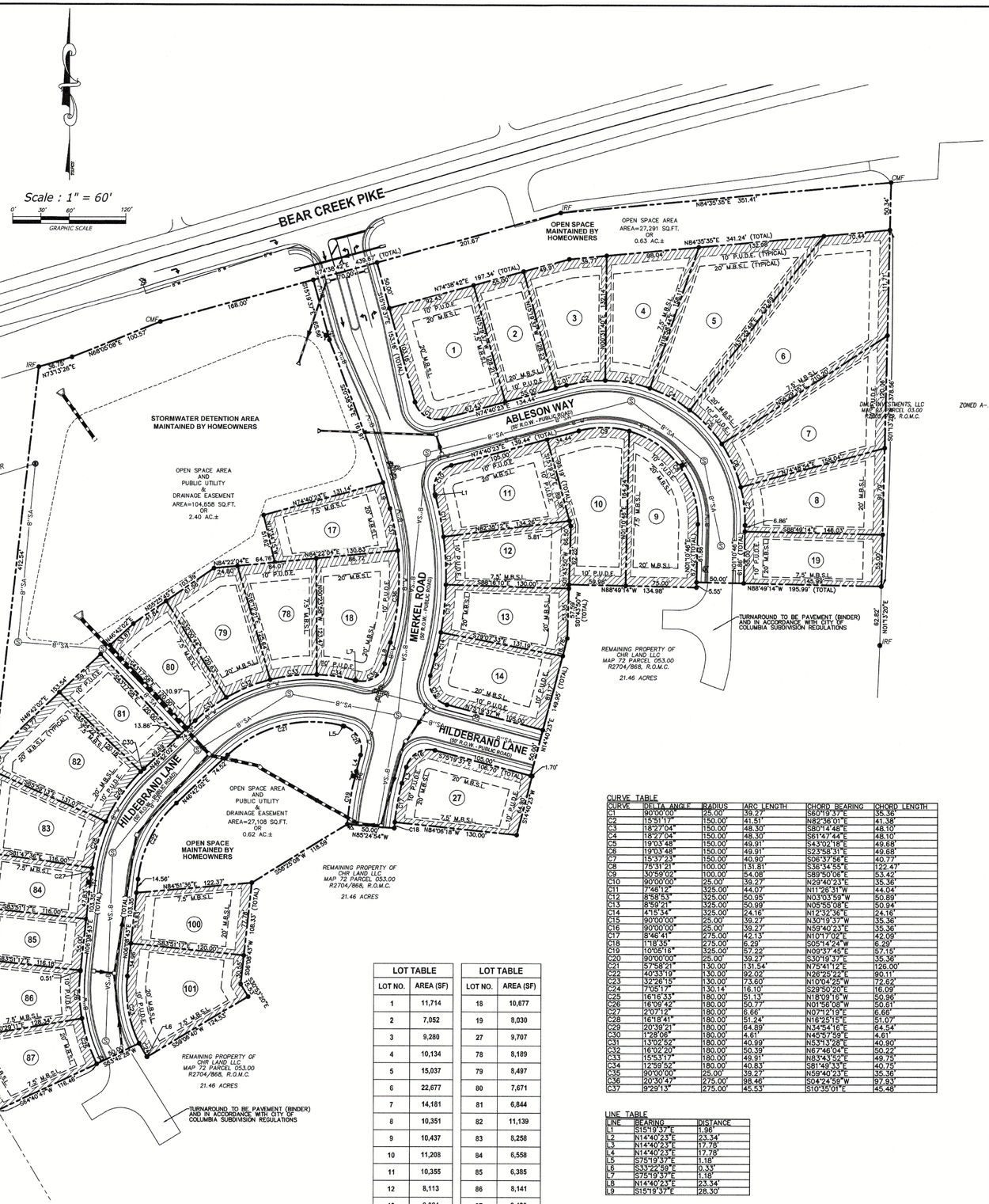
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5. This drawing was prepared in accordance with our field survey notes. It shows improvements as they exist to the best of our knowledge, but is not guaranteed to be correct in each and every detail.
6. This survey was prepared from current deeds of record and does not represent a title search or a guarantee of title, and is subject to any state of facts a current and accurate search may reveal.
7. Total area of property surveyed is 12.49 Acres ±.
8. New Right-Of-Way dedication: 2.10 Acres ±.
9. There is a 10 foot easement on property lines parallel to the public road for public utility and drainage easements. Additional requirements may apply based on actual field conditions. Public Utility and Drainage Easements (PUDE) shall be required, 5 feet in width on all interior lot lines.
10. Subject property does not lie in a FEMA/FIRM "Special Flood Hazard Area" as shown on Map 47119C0195E dated April 16, 2007.
11. Unless otherwise noted, all lot corners are marked with iron rods.

### Utility Notes

Stormwater appurtenances as depicted on this Final Plat shall be maintained as directed in the "Inspection and Maintenance Agreement of Private Stormwater Management Facilities" as recorded in Record Book _____, pages _____, in the Register's Office of Maury County, Tennessee.


Scale : 1" = 60'
0' 30' 60' 120'
GRAPHIC SCALE
BEAR CREEK PIKE
CMF
IRF
N84°35'35"E 351.41'
OPEN SPACE MAINTAINED BY HOMEOWNERS
OPEN SPACE AREA AREA=27,291 SQ.FT. OR 0.63 AC.±
N84°35'35"E 341.24' (TOTAL)
10' P.U.D.E. (TYPICAL)
20' M.B.S.L. (TYPICAL)
N74°38'42"E 439.67' (TOTAL)
N74°38'42"E 197.34' (TOTAL)
N68°05'08"E 100.57'
N73°13'28"E 58.76'
EX. 10" SAN. SEWER
STORMWATER DETENTION AREA MAINTAINED BY HOMEOWNERS
OPEN SPACE AREA AND PUBLIC UTILITY & DRAINAGE EASEMENT AREA=104,658 SQ.FT. OR 2.40 AC.±
ABLESON WAY
(60' R.O.W. - PUBLIC ROAD)
N74°40'23"E 134.44' (TOTAL)
N74°40'23"E 132.44'
MERKEL ROAD
(60' R.O.W. - PUBLIC ROAD)
HILDEBRAND LANE
(60' R.O.W. - PUBLIC ROAD)
N74°40'23"E 130.83'
N84°22'04"E 64.76'
N84°22'04"E 130.83'
N84°22'04"E 86.72'
N84°22'04"E 64.76'
N84°22'04"E 24.80'
N84°22'04"E 84.07'
N84°22'04"E 169.36'
N84°22'04"E 87.56'
N84°22'04"E 84.07'
N84°22'04"E 24.80'
N84°22'04"E 64.76'
N84°22'04"E 131.14

# Appendix B: Subdivision Development Agreement

This DEVELOPMENT AGREEMENT is made and entered into on this

15 day of August, 2022,
between THE CITY OF COLUMBIA, TENNESSEE, (hereinafter the "CITY"), and

CHR Land LLC, the DEVELOPER (hereinafter the "DEVELOPER") named on the Addendum to this Agreement attached hereto and by this reference made a part hereof (hereinafter the "ADDENDUM").

WITNESSETH:

WHEREAS, the DEVELOPER desires to develop the property described on the ADDENDUM (hereinafter the "PROJECT"); and,

WHEREAS, the Development Plan of the PROJECT has been approved by the Columbia Municipal Planning Commission (hereinafter the “CMPC”) on the

_____ day of _____, 20_____ ,
pursuant to Tennessee Code Annotated Title 13, Chapter 4, and the Subdivision Regulations of Columbia, Tennessee (hereinafter the "SUBDIVISION REGULATIONS”); and,

WHEREAS, the DEVELOPER is the owner of the PROJECT and has authority to engage in such development; and,

WHEREAS, the DEVELOPER desires to develop and improve said PROJECT; and,

WHEREAS, in order to provide for the health, safety, and welfare of future residents of the PROJECT, it will be necessary for certain improvements to the CITY'S utility systems, public infrastructure, and common areas to be constructed within and to serve the PROJECT including but not be limited to roads, bridges, sidewalks, pedestrian facilities, stormwater facilities, street signs, markings, signals, street lighting, recreation and park facilities, landscaping, and the like (hereinafter the “IMPROVEMENTS”); and,

WHEREAS, in order for the IMPROVEMENTS to be fully integrated with the utility systems and public infrastructure of the CITY and to function in a satisfactory manner, the DEVELOPER has agreed to construct, in accordance with the Subdivision Regulations and other rules, regulations, and ordinances of the CITY, the IMPROVEMENTS in said PROJECT and extend utilities to the PROJECT at their own cost; and,

WHEREAS, the CITY is willing to accept the dedication of the streets, utilities, and other improvements as determined in the Development Plan of the PROJECT, subject to the City of Columbia City Council approval by resolution, and subject to the applicant's compliance with all requirements in this agreement and applicable existing laws of the CITY of Columbia and the State of Tennessee,

NOW, THEREFORE, it is agreed and understood as follows:

## B1 General Conditions

### B1.1 Construction Costs

The DEVELOPER shall pay for all material and labor necessary to install and complete the roads, sidewalks, sewers, utilities, and other facilities in accordance with this agreement.

### B1.2 City Ordinances, Rules and Regulations

All currently existing CITY ordinances, rules and regulations, and the Subdivision Regulations adopted by the CMPC are made a part of this agreement. In the event of a conflict between the terms of this agreement and a CITY ordinance, the ordinance shall prevail. In the event of a conflict between the terms of this agreement and the Subdivision Regulations, the Subdivision Regulations shall prevail. All work done under this agreement is to be performed in accordance with plans and specifications approved by the City and made a part, hereof.

### B1.3 Fees

Review fees, inspection fees, and other amounts established by the CITY shall be paid prior to any review of the plans. If the DEVELOPER fails to install the facilities in accordance with the terms of this Agreement, no portion of the review fees, inspection fees, or other amounts paid to the CITY shall be refundable to the DEVELOPER.

### B1.4 Inspection

The CITY shall have a continuous right to inspect the work and facilities to assure that the work and facilities are in accordance with the Subdivision Regulations, approved Construction Plans, and other rules, regulations, and ordinances of the CITY.

### B1.5 Right of Entry

The CITY shall have the right, in case of breach of the Performance Agreement, to enter upon any property of the DEVELOPER and take all necessary actions to complete the work and obligations not completed.

### B1.6 Easements

The DEVELOPER shall obtain and dedicate to the CITY or cause to be dedicated to the CITY, either by dedication on the plat or by easement deed, in either case in a form acceptable to the CITY, permanent easements of such widths as required by the CITY and noted on the Plans. The DEVELOPER further agrees to grant the necessary easements and rights-of-way across the DEVELOPER’s properties without expense to the CITY and waive any claim for damages.

### B1.7 Stormwater Maintenance Agreement

If the PROJECT includes any detention or retention ponds, common drainage ditches, water quality facilities, or stormwater facilities outside of the CITY rights-of-way, the DEVELOPER will submit a Stormwater Maintenance Agreement, to be filed with and recorded with the Final Plat.

**B1.8 Attorney Fees and Other Expenses**

The DEVELOPER shall pay all reasonable costs and expenses incurred by the CITY in enforcing or completing this agreement. The DEVELOPER shall pay all costs and expenses, including the CITY'S attorney fees, of any legal proceedings brought by the CITY against the DEVELOPER seeking remedies for the DEVELOPER'S failure to perform any of its obligations hereunder, whether or not any proceedings are prosecuted to judgment.

**B1.9 Agreement Not Assignable**

No third party shall obtain any benefits or rights under this agreement nor shall the rights or duties be assigned by either party.

**B1.10 Revocation and Interpretation**

This agreement shall bind the DEVELOPER when executed by the DEVELOPER and may not be revoked by the DEVELOPER without permission of the CITY, even if the agreement has not been executed by the CITY, or does not bind CITY, for other reasons. This agreement shall be interpreted in accordance with Tennessee law and may only be enforced in the Chancery Court or Circuit Court or Court of competent jurisdiction of Maury County, Tennessee, and Tennessee Appellate Courts.

**B1.11 No Oral Agreement**

This agreement may not be orally amended and supersedes all prior negotiations, commitments, or understandings.

**B1.12 Separability**

If any portion of this agreement is held to be unenforceable, the CITY shall have the right to determine whether the remainder of the agreement shall remain in effect, or whether the agreement shall be void and all rights of the DEVELOPER pursuant to this agreement terminated.

**B 1.13 Transferability**

The DEVELOPER agrees to not transfer the property on which this PROJECT is to be located without first providing the CITY with written notice. The transferee shall provide the CITY an Assumption Agreement of this Agreement, whereby the transferee agrees to perform the IMPROVEMENTS required under this agreement and to provide a performance surety. The DEVELOPER understands that if the DEVELOPER transfers said property without providing the notice of transfer and Assumption Agreement as required herein, they will be in breach of this agreement and in violation of the Subdivision Regulations.

**B1.14 Indemnity**

The DEVELOPER shall indemnify and hold the CITY harmless from all loss, costs, expenses, liability, money damages, penalties, or claims arising out of any work covered by this agreement, including any attorney fees incurred by the CITY in connection therewith. Inspection of the IMPROVEMENTS by an authorized representative of the CITY shall not constitute a waiver by the CITY of any defect or of any of the DEVELOPER'S obligations hereunder.

### B1.15 Binding Effect

This agreement shall be binding upon the DEVELOPER and the DEVELEPOR's heirs, administrators, executors, assigns, and any other successors in interest.

### B1.16 Entire Agreement

This document contains the entire agreement between the parties, and there are no collateral understandings or agreements between them. No variations or alterations of the terms of this agreement shall be binding upon either of the parties, unless the same be reduced to writing and made an amendment to this agreement.

### B1.17 Headings

Paragraph titles and headings contained herein are inserted for convenience only and shall not be deemed a part of the agreement and in no way shall define, limit, extend, or describe the scope or intent of any provision, hereof.

## B2 Performance Surety

At the time of execution of this agreement, the DEVELOPER shall provide the CITY a performance surety, in an amount determined by the City Engineer for the IMPROVEMENTS and other items specified by the Construction Plans, plats, and plans approved by the CMPC. This performance surety shall secure performance of all obligations of the DEVELOPER under this agreement. The performance surety shall meet all requirements established in Chapter 4: Performance Agreement of the Subdivision Regulations and secure full compliance with all terms and conditions of this agreement. The performance surety may be called for failure to comply with the provisions of this agreement in whole or in part according to the terms of the performance surety. The performance surety will not be released, except and until there has been full compliance with this agreement.

## B3 Construction

### B3.1 Construction Plans

The DEVELOPER shall submit to the CITY, Construction Plans describing in reasonable detail all utility systems, all storm water management systems, all street systems, pedestrian facilities, and all IMPROVEMENTS. The Construction Plans shall be designed according to the Engineering Standards and Specifications, all other codes and ordinances enforced by the City, and sound engineering judgment. The design of all utility systems shall follow the State of Tennessee and utility provider design criteria and specifications. In the event of a disagreement as to compliance with or interpretation of the Construction Plans and the CITY'S specifications, the decision of the CITY shall be final and binding on the DEVELOPER. The Construction Plans shall be prepared by a design professional licensed by the State of Tennessee to design all systems and shall bear the seal, signature, date, and license number of the professional preparing the Construction Plans.

**B3.2 Commencement of Construction**

Construction of IMPROVEMENTS may not begin until the following events have occurred:

A. The Preliminary Plat has been approved by the CMPC;
B. The Construction Plans are approved by the CITY;
C. The Tennessee Department of Environment and Conservation has approved the applicable portions of the Plans and has confirmed its approval to the CITY and/or DEVELOPER in writing;
D. The CITY shall have received an appropriately executed Development Agreement; and
E. The DEVELOPER shall give the CITY notice of commencement of construction, in writing at least one (1) working day prior to commencement.

**B3.3 Site Grading**

The DEVELOPER, hereby, agrees to construct all site grading to comply with the approved Construction Plans, including the approved Erosion Control Plan for the PROJECT and to comply with the Engineering Standards and Specifications, Stormwater Ordinance, and all other codes and ordinances enforced by the CITY.

**B3.4 Storm Water Management Systems**

The DEVELOPER shall be responsible for all storm water management work made necessary by the development of this PROJECT. It is understood and agreed that the CITY in its proprietary function is not and could not be expected to oversee, supervise, or direct the construction of all drainage improvements, and the excavation incident thereto. Neither is the CITY vested with the original design responsibility nor the means to formally survey elevations or the locations of improvements at every stage of the construction process. The CITY is vested with the right of periodic inspections, stop work order, and final approval as a measure of secondary or subsequent enforcement. The DEVELOPER has and shall retain the responsibility to properly anticipate, survey, design and construct the subdivision storm water improvements and give full assurance that same shall not adversely affect the flow or quality of surface water from or upon any property. In providing technical assistance, plan and design review, the CITY does not and shall not relieve or accept any liability from the DEVELOPER.

**B3.5 Street Construction**

The DEVELOPER, hereby, agrees to construct and improve the streets shown on the Construction Plans to comply with the CITY's specifications and to the satisfaction and approval of the City Engineer by grading, draining, subgrade preparation, base preparation, curbing, signage, striping, signalization, sidewalk installation, and paving with the required preparation, amounts, and types of material. The DEVELOPER further agrees to pay the cost of all engineering, inspection and laboratory cost incidental to the construction of subdivision streets including but not limited to material and density testing. The DEVELOPER further agrees to make all necessary adjustments to manholes and valve boxes to meet finished surface grade and to repair subsurface or base material, as required, in areas directed by the CITY Engineer, prior to application of final surface.

**B3.6 Time Period for Construction**

The DEVELOPER agrees to be bound to complete, within three (3) years of commencement of construction, all IMPROVEMENTS shown on the plat and plans and all things required by this agreement.

The DEVELOPER further agrees that if due to unforeseen circumstances, he is unable to complete all work included in this agreement within the time specified above, but desires to complete said agreement to the satisfaction of the CITY, the DEVELOPER shall submit a written request for extension of the agreement period to the CITY at least sixty (60) days prior to the expiration of the existing agreement period, specifying the reason for the DEVELOPER's failure to complete the work as agreed and a prospective date for such completion. The DEVELOPER further agrees that if the performance surety executed to secure the value of the work to be performed under this agreement, due to inflation or rising costs, is determined to be inadequate by the City Engineer to secure the cost of said IMPROVEMENTS at the time an extension is sought, the DEVELOPER will provide the additional security to bring the performance surety amount in line with current cost projections as made by the CITY. The DEVELOPER understands that the DEVELOPER's failure to follow the extension procedure constitutes a breach of this agreement and places the DEVELOPER in violation of the Subdivision Regulations. The DEVELOPER further understands, that should the DEVELOPER fail to complete any part of the work outlined in this agreement in a good and workmanlike manner as approved, the CITY shall reserve the right to withhold and withdraw all building permits within the PROJECT until all items of this Agreement have been fulfilled by the DEVELOPER.

**B3.7 Off-Site Improvements**

The DEVELOPER shall construct any and all off-site facilities that may be required to serve the PROJECT. Unless specifically noted in the Construction Plans and made a part of separate agreement with the CITY, the CITY shall not be required to reimburse the DEVELOPER for construction of off-site improvements.

**B3.9 Inspection and Compliance**

After construction begins, the CITY shall provide on-site construction inspection as the CITY deems necessary to ensure that all work is performed and completed in accordance with the Construction Plans, CITY specifications, and the contents of this agreement. In the event of a disagreement as to compliance with or interpretation of the Construction Plans and the CITY'S specifications, the decision of the CITY shall be final and binding on the DEVELOPER. If the DEVELOPER fails to construct in accordance with the approved Construction Plans or to comply with the CITY'S specifications, the CITY may issue a stop-work order and DEVELOPER, hereby, agrees to be bound by such order.

**B3.10 Testing**

The DEVELOPER agrees to pay the cost of all engineering, inspection, and laboratory cost incidental to construction of the streets, sidewalks, utilities, sewers, compacted fill material, and other facilities included within this agreement. Such testing includes, but is not limited to, material and density testing.

**B3.11 Scrap Removal**

The DEVELOPER agrees to comply with all local, state, and federal rules and regulations regarding waste material and debris disposal.

**B3.12 Traffic Control**

The DEVELOPER, hereby, agrees to prepare a traffic control/detour plan where required and shall submit said plan to the CITY for review and approval. All traffic control and safety devices, including

signs, lane markings, and barriers necessitated by construction activity undertaken pursuant to this agreement shall be installed and maintained by the DEVELOPER. All traffic control devices shall meet the standards and be installed in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, published by the United States Department of Transportation.

**B3.13 Temporary Facilities**

The DEVELOPER shall provide all temporary facilities including but not limited to utilities and roadways, that are determined by the CITY to be required in connection with or as a result of interruption of service or access that occurs as a consequence of construction activity associated with the work covered by this agreement. Such temporary services shall in all regards and at all points in time be adequate to assure emergency access and adequate fire flows.

## B4 Acceptance of Improvements

### B4.1 Completion of Improvements

At such time as the improvements have been constructed and installed, in accordance with the Constructions Plans and specifications, required testing and inspections completed and found satisfactory, and all clean-up and cover-up has been done to the satisfaction the City Engineer, a letter requesting preliminary acceptance of the PROJECT will be provided by the DEVELOPER. Formal acceptance shall follow the procedure established in the Subdivision Regulations.

The DEVELOPER agrees the DEVELOPER shall have no claim, direct or implied, in the title or ownership of the IMPROVEMENTS specified in this agreement when the IMPROVEMENTS are complete and thereafter accepted by the CITY. The DEVELOPER will be responsible for construction failures and defects in PROJECT prior to final acceptance. During this period, it shall remain the responsibility of the DEVELOPER to correct and cure these defects and failures.

### B4.2 As-Built Drawings and Post-Completion Items

The DEVELOPER agrees to furnish to the CITY as-built plans, on a reproducible, stable media, of the sanitary sewer, storm water management, water mains and service system, and streets within the subdivision before the CITY shall accept the subdivision.

### B4.3 Acceptance of Facilities

Upon final acceptance of all or part of the IMPROVEMENTS in the PROJECT, then those IMPROVEMENTS shall become the property of the CITY free from all claims from any person or entity without the necessity of any further writing, agreement, or deed. The DEVELOPER further agrees that any facilities placed within a public or platted right-of-way or dedicated public easement are irrevocably dedicated to the public use without any right of reimbursement or compensation of any kind.

### B4.4 Failure to Install

In the event the DEVELOPER fails to install the facilities in accordance with the terms of this agreement, the CITY may, in its sole discretion, elect to accept all or a portion of the IMPROVEMENTS in the PROJECT. Should the CITY choose to accept all or a portion of these IMPROVEMENTS, the CITY shall become the sole owner of these facilities. The CITY may give notice of acceptance by writing delivered to the DEVELOPER or recorded in the Register’s Office of Maury County, Tennessee. No further writing or deed shall be required.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in multiple originals by persons properly authorized so, to do on or as of the day and year first given.

Bear Creek Overlook Phase I

PROJECT

| *Completed by the Developer* | *Completed by the City* |
|---|---|
| CHR Land LLC<br>DEVELOPER NAME | |
| Gary W. Martin<br>AUTHORIZED AGENT NAME | CITY ENGINEER |
| SIGNATURE | SIGNATURE |
| August 15, 2022<br>DATE | DATE |
| 818 S. Main Street<br>STREET | |
| Columbia, TN 38401<br>CITY, STATE, ZIP | |
| 615-812-2147<br>PHONE | |
| gary@martinengrg.com<br>EMAIL | |
| *Attest* | *Attest* |
| ATTEST NAME | ATTEST NAME |
| ATTEST SIGNATURE | ATTEST SIGNATURE |
| DATE | DATE |

TKC ARCHITECTURE INTERIORS CIVIL SITE

818 SOUTH MAIN ST.
COLUMBIA, TN 38401
TKC-AE.COM
615.617.7477

January 15, 2024

Development Service
City of Columbia

Project: Overlook Subdivision Phase 1 Section 1

Subject: Revision to Recorded Final Plat for Phase 1

Staff,

We are proposing a change to the approved and recorded final plat for the Overlook Subdivision to allow for a neighborhood amenity site. The proposed change is between lot 100 and the intersection of Hilderbrand Lane and Merkel Road. The area of change was originally called an open space lot (Open Space Area and Public Utility and Drainage Easement) on the approved and recorded plat and we are now proposing to change the lot to an amenity area (Amenity Site Area, Mail Kiosk and Public Utility and Drainage Easement). The size of the area is remaining the same at 0.62 acres.

If you have any comments or questions please contact Cole Newton at TKC Architecture and Engineering at cole@tkc-ae.com or 615.617.7477

Thank you,

Cole Newton, PE
TKC Architecture and Engineering LLC
615.617.7477 (o)
931.797.3323 (c)
cole@tkc-ae.com

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | | | |
| | TAX MAP: 88 | GROUP: | PARCEL: 51.03 |
| SUMMARY OF NATURE OF REQUEST AND WORK | To obtain approval for one lot change to the Final Plat of Bear Creek Overlook Phase 1. The Open Space lot in the "middle" of the first phase is being renamed to Amenity Area to allow a neighborhood amenity. | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | several conversations | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ❑ Annexation<br>❑ Rezoning<br>❑ Preliminary Plat<br>❑ Final Plat<br>❑ PUD Preliminary Master Plan<br>❑ PUD Final Site Plan<br>❑ Multi-Family Site Plan<br>☒ Other: Final Plat revision<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>❑ Written Legal Description copy<br>❑ Requested Zone Listed<br>❑ Compliance with Comprehensive Plan<br>❑ Annexation Permission Form<br>❑ Plans and/or Plats conforming to City standards with check list completed<br>❑ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>❑ Project Name (include Sections & Phases)<br>Bear Creek Overlook Phase 1<br>❑ Total Number of Lots<br>30 single-family lots<br>❑ Total acreage<br>12.49 acres |

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

All communications go to the Applicant's email that is provided.

| | | | |
|---|---|---|---|
| NAME | TKC Architecture & Engineering LLC | PHONE | 615-617-7477 |
| ADDRESS | 818 S. Main Street<br>Columbia, TN 38401 | EMAIL | cole@tkc-ae.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | CHR Land LLC | PHONE | 615-812-2147 |
| ADDRESS | 818 S. Main Street, Columbia, TN 38401 | EMAIL | gary@martinengrg.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

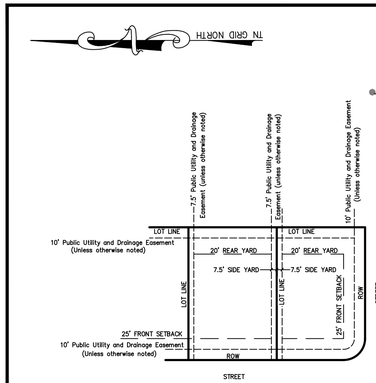
| Cole Newton, TKC A&E | Cole Newton | 1/15/24 |
|---|---|---|
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |
| CHR Land LLC |  | 1/15/24 |
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

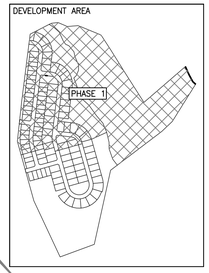
| | |
|---|---|
| BOARD ACTION | |




## SUBDIVISION
### TYPICAL LOT LAYOUT

**Legend**

- IPF Iron Rod Found
- IPS Iron Rod Set
- I.P.F. Iron Pipe Found
- AXLE Axle Found
- FCM Fence Post
- Concrete Monument Existing
- P.K.F. PK Nail Found
- P.K.S. PK Nail Set
- R.R.S.F. Railroad Spike Found
- R.R.S.S. Railroad Spike Set
- Bench Mark
- Stake Found
- Fire Hydrant
- Water Meter
- Water Valve
- Water Reducer
- Clean Out
- Sanitary Sewer Manhole
- Storm Sewer Manhole
- Catch Basin
- Curb Inlet
- Storm Pipe
- Cable Manhole
- Electric Manhole
- Telephone Manhole
- Water Manhole
- Electric Meter
- Cable Riser
- Electric Riser
- Telephone Riser
- Telephone Booth
- Gas Meter
- Gas Valve
- Light Pole
- Power Pole
- Telephone Pole
- Guy Pole
- Power Pole
- Flag Pole
- Guy Wire
- Mailbox
- Parking Block
- Satellite Dish
- Handicap Parking
- Water Spigot
- Bollard
- Evergreen Tree
- Deciduous Tree
- Bush
- Sign
- Adjoining Property Line
- Subject Property Line
- Easement Line
- Building Setback Line
- Centerline
- Edge of Pavement
- Edge of Gravel
- Fence Line
- Landscape
- Woods / Tree line
- Edge of Water
- Ditch / Creek Centerline
- Minor Contour Line
- Index Contour Line
- Gas Line
- Sanitary Sewer Line
- Water Line
- Storm Sewer Line
- Overhead Utility Line
- Overhead Cable Line
- Overhead Electric Line
- Overhead Telephone Line
- Underground Utility Line
- Underground Cable Line
- Underground Electric Line
- Underground Telephone Line
- Forced Main Line




PAGE 5 OF 5
PAGE 2 OF 5
PAGE 3 OF 5
PAGE 4 OF 5
MATCH LINE 5 OF 5
MATCH LINE 2 OF 5
MATCH LINE 5 OF 5
MATCH LINE 3 OF 5
MATCH LINE 2 OF 5
MATCH LINE 3 OF 5
MATCH LINE 4 OF 5

FUTURE DEVELOPMENT REMAINING PROPERTY

TEMPORARY P.U.D.A.E.

FUTURE DEVELOPMENT REMAINING PROPERTY

TEMPORARY P.U.D.A.E.

**OPEN SPACE NOTE:**
ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.

GRAPHIC SCALE
100' 0 50' 100' 200' 400'
( IN FEET )
1 inch = 100' ft.

Register of Deed Recording Stamp

### CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2871, Page 1405, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

Date — Lennar Homes of Tennessee LLC

### CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE, STREET SIGNS, AND UTILITIES

I hereby certify that the streets, drainage, and utilities designated in Preserve at Drumwright have been installed in accordance with City Specifications, or a performance surety in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

Date — City Engineer, Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date — Maury County E-911, Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF SEWER SYSTEM

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other has been filed to guarantee said installation.

Date — Director of Wastewater Department, Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF WATER SYSTEM

I, (we) hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled Preserve at Drumwright has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

Date — Columbia Power & Water Systems, Columbia, Tennessee

### CERTIFICATE OF COMPLIANCE

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations and other adopted ordinances and policies.

Date — City Engineer, Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations, with the exception of such variances, if any, as are noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register:

Date — Secretary, Planning Commission, Columbia, Tennessee

### SURVEYOR'S CERTIFICATION (TENNESSEE)

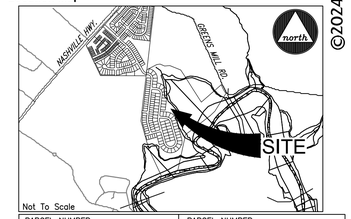
I hereby certify that to the best of my knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a category "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

10/6/24 — Allen B. O'Leary — TN RLS #1987
Date — Allen B. O'Leary — Number

### Surveyor's Notes

1. All distances were measured with E.D.M. equipment and have been adjusted for temperature and pressure.
2. The property (Boundary) Line Survey exceeds the minimum requirements of an Urban Land Survey Category 1 as per Standards of Practice adopted by the State Board of Examiners for Land Surveyors for the State of Tennessee, and the precision of the unadjusted survey is greater than 1 foot in 10,000 feet.
3. Information concerning site utility services and appurtenances shown hereon is based on visible evidence noted during the survey, information provided by utility representatives or information shown on original construction plans by other. Information and location of service lines on site should be considered approximate and there may be underground utility lines that are not shown on the survey. Owner(s) and contractor(s) should assume responsibility of locating all underground utility service lines prior to any construction, excavation or any disturbance of the existing ground elevation to avoid hazard of unnecessary expense.
4. Information concerning major utilities or appurtenances shown hereon are based on visible evidence noted during the survey or information provided by utility representatives. Verification of existence, size, location, depth and availability of service should be confirmed by local utility agencies.
5. The property shown hereon is located within the City of Columbia, Maury County, TN. All matters pertaining to construction, use location of improvements, signage, parking, noise, vibration, emissions, fire hazards, radiation, illumination, setback provisions, etc., are subject to the City of Columbia's Zoning Regulation as interpreted and regulated by the Department of Planning and Codes.
6. The area of the parcels as shown hereon.
7. This property currently identified as Tax Map No. 051, Parcel No. 034.00 & 034.01, Maury County. For designation shown thus ( ) indicates Parcel Numbers for said map.
8. Plat reference: P11, Page 26 & P11, Page 81
9. Deed reference: Book R2871, Page 1405
10. Bearings based on: Tennessee State Plane, Fipzone 4100.
11. This drawing was prepared in accordance with our field survey notes. It shows improvements as they exist to the best of our knowledge, but is not guaranteed to be correct in each and every detail.
12. This survey was prepared from current deeds of record and does not represent a title search or a guarantee of title, and is subject to any state of facts a current and accurate search may reveal.
13. This survey was prepared for the exclusive use of the person, persons, or entity, if any, named on the certification hereon. Said certificate does not extend to any unnamed person without an express re-certification by the surveyor naming said person.
14. The certification as provided on this survey, is purely a statement of professional opinion based on knowledge, information and belief, based on existing field evidence and documentary evidence provided by others.
15. The certification is not an expressed or implied warranty or guarantee.
16. This property is located in a Special Flood Hazard Area as shown on F.E.M.A. Flood Insurance Rate Map, Community Panel No. 47119C0180E, dated April 16, 2007, and shown hereon graphically.
17. All public utility and drainage easements located on proposed lots are to be maintained by the individual property owner for said lot.
18. All property corners are ½" rebar with cap reading "WES 1987" unless otherwise noted.

### Location Map




Not To Scale

©2024

PARCEL NUMBER: TAX MAP 051, PARCEL 034.00
DEED BOOK: R2871, PAGE 1405
PLAT BOOK: P11, PAGE 27
PARCEL ADDRESS: 2554 GREENS MILL RD COLUMBIA, TN 38401

PARCEL NUMBER: TAX MAP 051, PARCEL 034.01
DEED BOOK: R2871, PAGE 1405
PLAT BOOK: P11, PAGE 27 & P11, PAGE 81
PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401

EXISTING ZONING: PUD

BUILDING SETBACKS:
FRONT – 25'
SIDE – 7.5'
REAR – 20'

ACREAGE OF PARCEL:
±77.50 ACRES TOTAL
±51.98 ACRES PHASE 1
±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER:
LENNAR HOMES OF TENNESSEE LLC
381 MALLORY STATION RD
SUITE 200
FRANKLIN, TN 37067

**PURPOSE NOTE:**
The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

**STORMWATER MANAGEMENT AGREEMENT:**
RECORDED: _____
DEED BOOK: _____ PAGE: _____

**DRIVEWAY NOTE:**
All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

WES Engineers & Surveyors
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
PHONE: (931) 388-2329
www.wesengineers.com
ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

| REVISIONS | DATE |
|---|---|
| DEVELOPMENT REVIEW COMMENTS | 01-16-2024 |

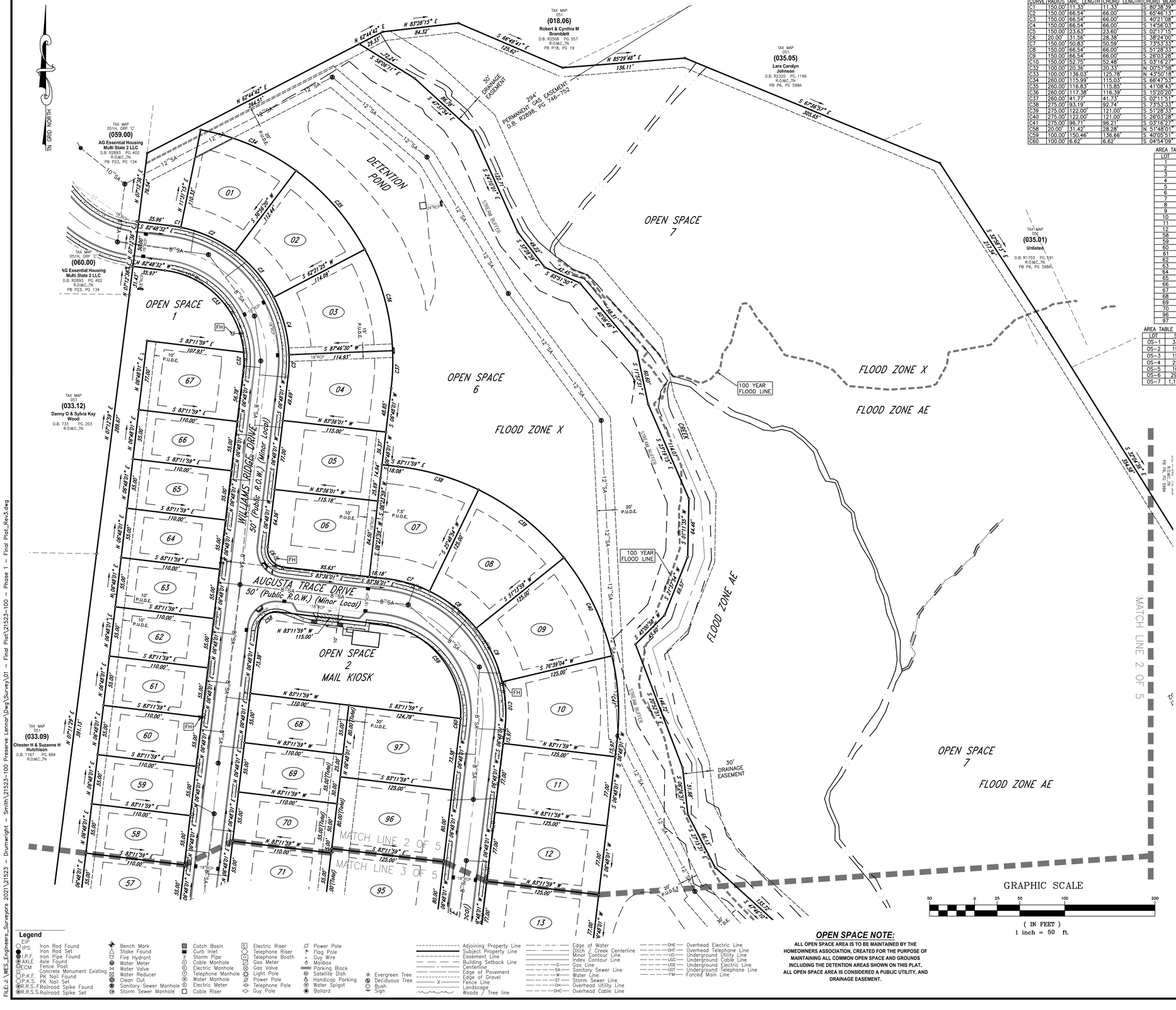
Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no 21523-100
Scale: Vertical: —
Horizontal: 1"=100'

1 of 5

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — TENNESSEE NO. 1987
allen@wesengineers.com

FILE: J:\WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg




| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE | RADIUS | ARC LENGTH | CHORD | LENGTH | CHORD BEARING | DELTA ANGLE |
| C1 | 150.00' | 111.33' | 111.33' | | S 80°38'39" E | 4°15'47" |
| C2 | 150.00' | 66.54' | 66.00' | | S 65°46'13" E | 25°25'05" |
| C3 | 150.00' | 66.54' | 66.00' | | S 40°21'08" E | 25°25'05" |
| C4 | 150.00' | 66.54' | 66.00' | | S 14°56'03" E | 25°25'05" |
| C5 | 150.00' | 23.63' | 23.60' | | S 02°17'15" W | 9°01'31" |
| C6 | 20.00' | 31.56' | 28.38' | | S 38°24'00" E | 90°24'02" |
| C7 | 150.00' | 50.83' | 50.59' | | S 73°53'33" E | 19°24'55" |
| C8 | 150.00' | 66.54' | 66.00' | | S 51°28'33" E | 25°25'05" |
| C9 | 150.00' | 66.54' | 66.00' | | S 26°03'28" E | 25°25'05" |
| C10 | 150.00' | 52.75' | 52.48' | | S 03°16'27" E | 20°08'57" |
| C32 | 100.00' | 20.36' | 20.33' | | N 00°57'58" E | 11°40'06" |
| C33 | 100.00' | 136.03' | 125.78' | | N 43°50'18" W | 77°56'27" |
| C34 | 260.00' | 115.99' | 115.03' | | S 66°47'53" E | 25°33'37" |
| C35 | 260.00' | 116.83' | 115.85' | | S 41°08'43" E | 25°44'43" |
| C36 | 260.00' | 117.38' | 116.39' | | S 15°20'20" E | 25°52'02" |
| C37 | 260.00' | 41.77' | 41.73' | | S 02°11'51" W | 9°12'20" |
| C38 | 275.00' | 93.19' | 92.74' | | S 73°53'33" E | 19°24'55" |
| C39 | 275.00' | 122.00' | 121.00' | | S 51°28'33" E | 25°25'05" |
| C40 | 275.00' | 122.00' | 121.00' | | S 26°03'28" E | 25°25'05" |
| C41 | 275.00' | 96.71' | 96.21' | | S 03°16'27" E | 20°08'57" |
| C58 | 20.00' | 31.42' | 28.28' | | N 51°48'01" E | 90°00'00" |
| C59 | 100.00' | 150.46' | 136.66' | | S 40°05'51" E | 86°12'16" |
| C60 | 100.00' | 6.62' | 6.62' | | S 04°54'09" W | 3°47'44" |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| 1 | 10,167.0 | 0.23 |
| 2 | 10,369.4 | 0.24 |
| 3 | 10,537.6 | 0.24 |
| 4 | 9,426.2 | 0.22 |
| 5 | 8,857.5 | 0.20 |
| 6 | 9,670.6 | 0.22 |
| 7 | 11,274.1 | 0.26 |
| 8 | 11,783.9 | 0.27 |
| 9 | 11,783.9 | 0.27 |
| 10 | 11,337.5 | 0.26 |
| 11 | 9,625.0 | 0.22 |
| 12 | 9,625.0 | 0.22 |
| 58 | 6,050.0 | 0.14 |
| 59 | 6,050.0 | 0.14 |
| 60 | 6,050.0 | 0.14 |
| 61 | 6,050.0 | 0.14 |
| 62 | 6,050.0 | 0.14 |
| 63 | 6,050.0 | 0.14 |
| 64 | 6,050.0 | 0.14 |
| 65 | 6,050.0 | 0.14 |
| 66 | 6,050.0 | 0.14 |
| 67 | 8,456.1 | 0.19 |
| 68 | 6,050.0 | 0.14 |
| 69 | 6,050.0 | 0.14 |
| 70 | 6,050.0 | 0.14 |
| 96 | 10,000.0 | 0.23 |
| 97 | 9,999.5 | 0.23 |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| OS-1 | 33,203.0 | 0.76 |
| OS-2 | 19,713.0 | 0.45 |
| OS-3 | 15,795.4 | 0.36 |
| OS-4 | 29,172.6 | 0.67 |
| OS-5 | 10,232.3 | 0.23 |
| OS-6 | 291,488.3 | 6.69 |
| OS-7 | 1,179,852.6 | 27.09 |

**Legend**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| EIP | | Bench Mark | Catch Basin | Electric Riser | Power Pole | Adjoining Property Line | Edge of Water |
| IPS | Iron Rod Found | Stake Found | Curb Inlet | Telephone Riser | Flag Pole | Subject Property Line | Ditch / Creek Centerline |
| I.P.F. | Iron Rod Set | Fire Hydrant | Storm Pipe | Telephone Booth | Guy Wire | Easement Line | Minor Contour Line |
| AXLE | Iron Pipe Found | Water Meter | Cable Manhole | Gas Meter | Mailbox | Building Setback Line | Index Contour Line |
| FCM | Axle Found | Water Valve | Electric Manhole | Gas Valve | Parking Block | Centerline | Gas Line |
| | Fence Post | Water Reducer | Telephone Manhole | Light Pole | Satellite Dish | Edge of Pavement | Sanitary Sewer Line |
| P.K.F. | Concrete Monument Existing | Clean Out | Water Manhole | Power Pole | Handicap Parking | Edge of Gravel | Water Line |
| P.K.S. | PK Nail Found | Sanitary Sewer Manhole | Electric Meter | Telephone Pole | Water Spigot | Fence Line | Storm Sewer Line |
| R.R.S.-F | PK Nail Set | Storm Sewer Manhole | Cable Riser | Guy Pole | Bollard | Landscape | Overhead Utility Line |
| R.R.S.S. | Railroad Spike Found | | | | | Woods / Tree line | Overhead Cable Line |
| | Railroad Spike Set | | | | | | |

| | | |
|---|---|---|
| Evergreen Tree | Adjoining Property Line | Edge of Water |
| Deciduous Tree | Subject Property Line | Ditch / Creek Centerline |
| Bush | Easement Line | Minor Contour Line |
| Sign | Building Setback Line | Index Contour Line |
| | Centerline | Gas Line |
| | Edge of Pavement | Sanitary Sewer Line |
| | Edge of Gravel | Water Line |
| | Fence Line | Storm Sewer Line |
| | Landscape | Overhead Utility Line |
| | Woods / Tree line | Overhead Cable Line |

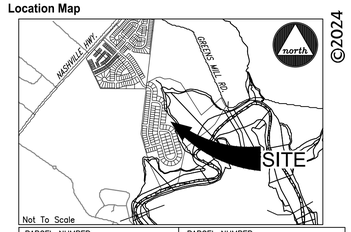
| | |
|---|---|
| OHE | Overhead Electric Line |
| OHT | Overhead Telephone Line |
| UG | Underground Utility Line |
| UGC | Underground Cable Line |
| UGE | Underground Electric Line |
| UGT | Underground Telephone Line |
| FM | Forced Main Line |

***OPEN SPACE NOTE:***

**ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.**

Register of Deed Recording Stamp

## Location Map




Not To Scale

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| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01 |
| DEED BOOK: R2871, PAGE 1405 | DEED BOOK: R2871, PAGE 1405 |
| PLAT BOOK: P11, PAGE 27 | PLAT BOOK: P11, PAGE 27 & P11, PAGE 81 |
| PARCEL ADDRESS: 2556 GREENS MILL RD COLUMBIA, TN 38401 | PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401 |
| EXISTING ZONING: PUD | PROPERTY OWNER: LENNAR HOMES OF TENNESSEE LLC 381 MALLORY STATION RD SUITE 200 FRANKLIN, TN 37067 |
| BUILDING SETBACKS: FRONT – 25' SIDE – 7.5' REAR – 20' | |
| ACREAGE OF PARCEL: ±77.50 ACRES TOTAL ±51.98 ACRES PHASE 1 ±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION | |

**PURPOSE NOTE:**
The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

**STORMWATER MANAGEMENT AGREEMENT:**
RECORDED:
DEED BOOK: _____ PAGE: _____

**DRIVEWAY NOTE:**
All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

### CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2871, Page 1405, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

Date _____ Lennar Homes of Tennessee LLC

### CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE, STREET SIGNS, AND UTILITIES

I hereby certify that the streets, drainage, and utilities designated in Preserve at Drumwright, Phase 1 have been installed in accordance with City Specifications, or a performance surety in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

Date _____ City Engineer Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date _____ Maury County E-911 Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF SEWER SYSTEM

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other has been filed to guarantee said installation.

Date _____ Director of Wastewater Department Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF WATER SYSTEM

I, (we) hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled Preserve at Drumwright, Phase 1 has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

Date _____ Columbia Power & Water Systems Columbia, Tennessee

### CERTIFICATE OF COMPLIANCE

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations and other adopted ordinances and policies.

Date _____ City Engineer Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations, with the exception of such variances, if any, as are noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register:

Date _____ Secretary, Planning Commission Columbia, Tennessee

### SURVEYOR'S CERTIFICATION (TENNESSEE)

I hereby certify that to the best of my knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a category "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

1/16/24 Date — Allen B. O'Leary — TN RLS #1987 Number

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — TENNESSEE NO. 1987


WES ENGINEERS & SURVEYORS
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
PHONE: (931) 388-2329
www.wesengineers.com
ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

allen@wesengineers.com


# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

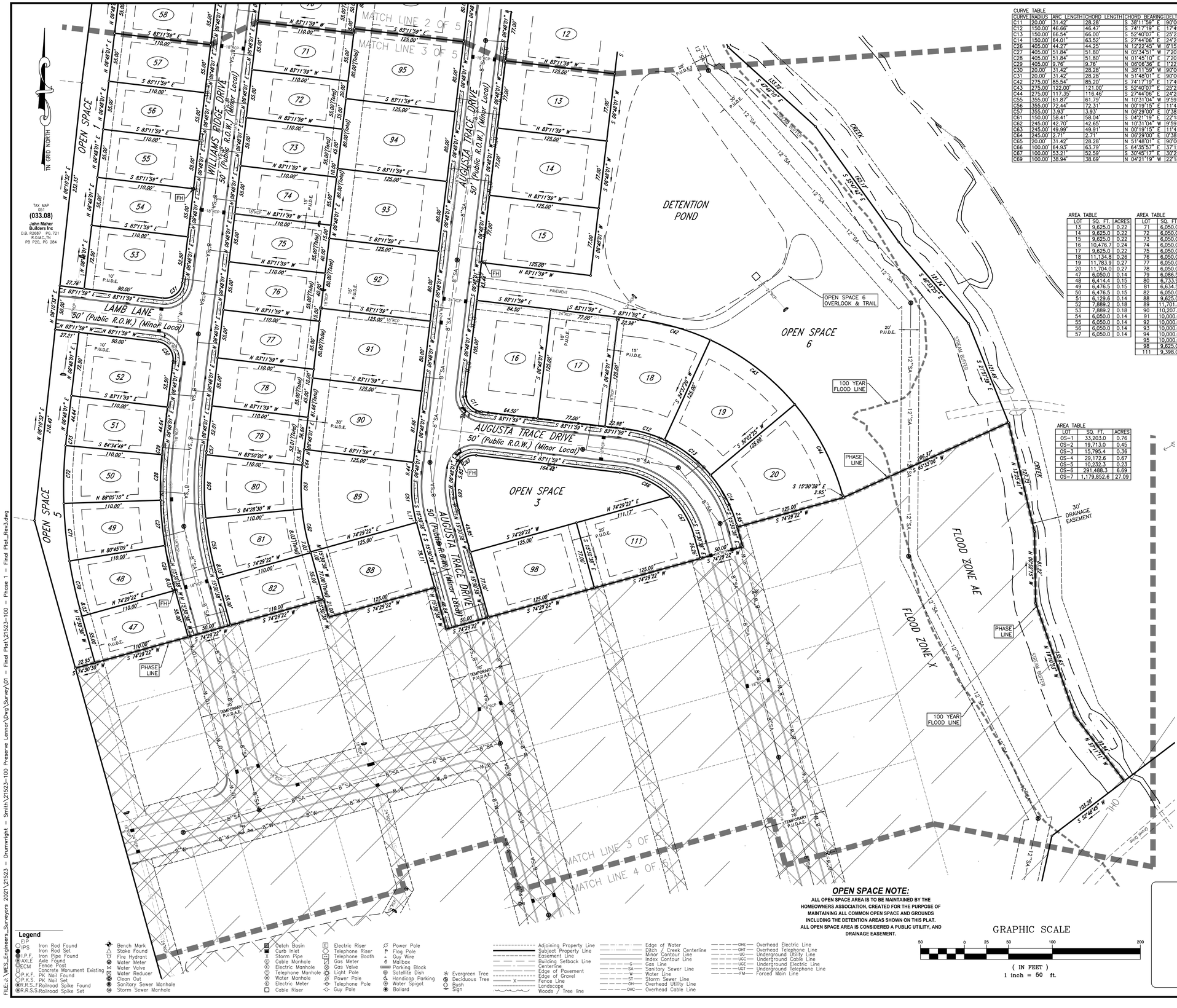
| REVISIONS | DATE |
|---|---|
| DEVELOPMENT REVIEW COMMENTS | 01-16-2024 |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no. 21523-100
Scale: Vertical: ____ Horizontal: 1"=50'

2 of 5

FILE: J:\WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg



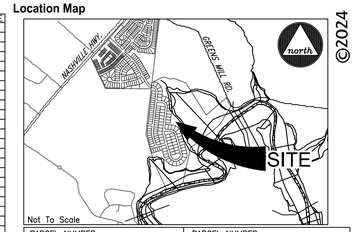

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE | RADIUS | ARC LENGTH | CHORD LENGTH | CHORD BEARING | DELTA ANGLE |
| C11 | 20.00' | 31.42' | 28.28' | S 38°11'59" E | 90°00'00" |
| C12 | 150.00' | 46.66' | 46.47' | S 74°17'19" E | 17°49'19" |
| C13 | 150.00' | 66.54' | 66.00' | S 52°40'07" E | 25°25'05" |
| C14 | 150.00' | 64.01' | 63.52' | S 27°44'08" E | 24°26'57" |
| C26 | 405.00' | 44.27' | 44.25' | N 12°22'45" W | 6°15'47" |
| C27 | 405.00' | 51.84' | 51.80' | N 05°34'51" W | 7°20'01" |
| C28 | 405.00' | 51.84' | 51.80' | N 01°45'10" E | 7°20'01" |
| C29 | 405.00' | 9.76' | 9.76' | N 06°06'36" E | 1°22'50" |
| C30 | 20.00' | 31.42' | 28.28' | N 38°11'59" W | 90°00'00" |
| C31 | 20.00' | 31.42' | 28.28' | N 51°48'01" E | 90°00'00" |
| C42 | 275.00' | 85.54' | 85.20' | S 74°17'19" E | 17°49'19" |
| C43 | 275.00' | 122.00' | 121.00' | S 52°40'07" E | 25°25'05" |
| C44 | 275.00' | 117.35' | 116.46' | S 27°44'08" E | 24°26'57" |
| C55 | 355.00' | 61.87' | 61.79' | N 10°31'04" W | 9°59'08" |
| C56 | 355.00' | 72.44' | 72.31' | N 00°19'15" E | 11°41'30" |
| C57 | 355.00' | 3.93' | 3.93' | N 06°29'00" E | 0°38'01" |
| C61 | 150.00' | 58.41' | 58.04' | S 04°21'19" E | 22°18'39" |
| C62 | 245.00' | 42.70' | 42.65' | N 10°31'04" W | 9°59'08" |
| C63 | 245.00' | 49.99' | 49.91' | N 00°19'15" E | 11°41'30" |
| C64 | 245.00' | 2.71' | 2.71' | N 06°29'00" E | 0°38'01" |
| C65 | 20.00' | 31.42' | 28.28' | N 51°48'01" E | 90°00'00" |
| C66 | 100.00' | 64.93' | 63.79' | S 64°35'57" E | 37°12'04" |
| C67 | 100.00' | 53.21' | 52.59' | S 30°45'17" E | 30°29'17" |
| C69 | 100.00' | 38.94' | 38.69' | N 04°21'19" W | 22°18'39" |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| 13 | 9,625.0 | 0.22 |
| 14 | 9,625.0 | 0.22 |
| 15 | 9,625.0 | 0.22 |
| 16 | 10,476.7 | 0.24 |
| 17 | 9,625.0 | 0.22 |
| 18 | 11,134.8 | 0.26 |
| 19 | 11,783.9 | 0.27 |
| 20 | 11,704.0 | 0.27 |
| 47 | 6,050.0 | 0.14 |
| 48 | 6,414.4 | 0.15 |
| 49 | 6,476.5 | 0.15 |
| 50 | 6,476.5 | 0.15 |
| 51 | 6,129.6 | 0.14 |
| 52 | 7,889.2 | 0.18 |
| 53 | 7,889.2 | 0.18 |
| 54 | 6,050.0 | 0.14 |
| 55 | 6,050.0 | 0.14 |
| 56 | 6,050.0 | 0.14 |
| 57 | 6,050.0 | 0.14 |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| 71 | 6,050.0 | 0.14 |
| 72 | 6,050.0 | 0.14 |
| 73 | 6,050.0 | 0.14 |
| 74 | 6,050.0 | 0.14 |
| 75 | 6,050.0 | 0.14 |
| 76 | 6,050.0 | 0.14 |
| 77 | 6,050.0 | 0.14 |
| 78 | 6,050.0 | 0.14 |
| 79 | 6,086.5 | 0.14 |
| 80 | 6,733.9 | 0.15 |
| 81 | 6,634.5 | 0.15 |
| 82 | 6,050.0 | 0.14 |
| 88 | 9,625.0 | 0.22 |
| 89 | 11,701.8 | 0.27 |
| 90 | 10,207.1 | 0.23 |
| 91 | 10,000.0 | 0.23 |
| 92 | 10,000.0 | 0.23 |
| 93 | 10,000.0 | 0.23 |
| 94 | 10,000.0 | 0.23 |
| 95 | 10,000.0 | 0.23 |
| 98 | 9,625.0 | 0.22 |
| 111 | 9,398.0 | 0.22 |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| OS-1 | 33,203.0 | 0.76 |
| OS-2 | 19,713.0 | 0.45 |
| OS-3 | 15,795.4 | 0.36 |
| OS-4 | 29,172.6 | 0.67 |
| OS-5 | 10,232.3 | 0.23 |
| OS-6 | 291,488.3 | 6.69 |
| OS-7 | 1,179,852.6 | 27.09 |

**Location Map**




Not To Scale

©2024

| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00<br>DEED BOOK: R2871, PAGE 1405<br>PLAT BOOK: P11, PAGE 27<br>PARCEL ADDRESS: 2556 GREENS MILL RD COLUMBIA, TN 38401 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01<br>DEED BOOK: R2871, PAGE 1405<br>PLAT BOOK: P11, PAGE 27 & P11, PAGE 81<br>PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401 |

EXISTING ZONING: PUD

BUILDING SETBACKS: FRONT – 25' SIDE – 7.5' REAR – 20'

ACREAGE OF PARCEL: ±77.50 ACRES TOTAL ±51.98 ACRES PHASE 1 ±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER: LENNAR HOMES OF TENNESSEE LLC 381 MALLORY STATION RD SUITE 200 FRANKLIN, TN 37067

**PURPOSE NOTE:**
The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

**STORMWATER MANAGEMENT AGREEMENT:**
RECORDED: _____
DEED BOOK: _____ PAGE: _____

**DRIVEWAY NOTE:**
All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

## CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2871, Page 1405, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

Date _____ Lennar Homes of Tennessee LLC

## CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE, STREET SIGNS, AND UTILITIES

I hereby certify that the streets, drainage, and utilities designated in Preserve at Drumwright, Phase 1 have been installed in accordance with City Specifications, or a performance surety in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

Date _____ City Engineer Columbia, Tennessee

## CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date _____ Maury County E-911 Columbia, Tennessee

## CERTIFICATE OF APPROVAL OF SEWER SYSTEM

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other has been filed to guarantee said installation.

Date _____ Director of Wastewater Department Columbia, Tennessee

## CERTIFICATE OF APPROVAL OF WATER SYSTEM

I, (we) hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled Preserve at Drumwright, Phase 1 has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

Date _____ Columbia Power & Water Systems Columbia, Tennessee

## CERTIFICATE OF COMPLIANCE

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations and other adopted ordinances and policies.

Date _____ City Engineer Columbia, Tennessee

## CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations, with the exception of such variances, if any, as are noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register:

Date _____ Secretary, Planning Commission Columbia, Tennessee

## SURVEYOR'S CERTIFICATION (TENNESSEE)

I hereby certify that to the best of my knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a category "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

1/16/24 Allen B. O'Leary TN RLS #1987
Date Allen B. O'Leary Number

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — AGRICULTURE — SURVEYOR — TENNESSEE NO. 1987

allen@wesengineers.com

Register of Deed Recording Stamp

**OPEN SPACE NOTE:**
**ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.**

GRAPHIC SCALE
50 0 25 50 100 200
( IN FEET )
1 inch = 50 ft.

**Legend**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ○ EIP | Iron Rod Found | ✦ | Bench Mark | ▨ | Catch Basin | E | Electric Riser | ○ | Power Pole |
| ● IPS | Iron Rod Set | △ | Stake Found | ■ | Curb Inlet | T | Telephone Riser | ⚑ | Flag Pole |
| ● I.P.F. | Iron Pipe Found | ⊕ | Fire Hydrant | X | Storm Pipe | T | Telephone Booth | + | Guy Wire |
| ◉ AXLE | Axle Found | W | Water Meter | ◎ | Cable Manhole | G | Gas Meter | ♁ | Mailbox |
| ○ FCM | Fence Post Concrete Monument Existing | ⋈ | Water Valve | ◎ | Electric Manhole | G | Gas Valve | ▭ | Parking Block |
| ○ P.K.F. | PK Nail Found | ⊠ | Water Reducer | ◎ | Telephone Manhole | ☼ | Light Pole | ◉ | Satellite Dish |
| ○ P.K.S. | PK Nail Set | ◎ | Clean Out | ◉ | Water Manhole | ⌀ | Power Pole | ♿ | Handicap Parking |
| ◉ R.R.S. F | Railroad Spike Found | ◉ | Sanitary Sewer Manhole | ◉ | Electric Meter | ⌀ | Telephone Pole | ◉ | Water Spigot |
| ◉ R.R.S.S | Railroad Spike Set | Ⓢ | Storm Sewer Manhole | □ | Cable Riser | ○ | Guy Pole | ◉ | Bollard |

| | | | |
|---|---|---|---|
| Adjoining Property Line | Edge of Water | OHE | Overhead Electric Line |
| Subject Property Line | Ditch / Creek Centerline | OHT | Overhead Telephone Line |
| Easement Line | Minor Contour Line | UG | Underground Utility Line |
| Building Setback Line | Index Contour Line | UGC | Underground Cable Line |
| Centerline | Gas Line | UGE | Underground Electric Line |
| Edge of Pavement | Sanitary Sewer Line | UGT | Underground Telephone Line |
| Edge of Gravel | Water Line | FM | Forced Main Line |
| Fence Line | Storm Sewer Line | | |
| Landscape | Overhead Utility Line | | |
| Woods / Tree line | Overhead Cable Line | | |

| | |
|---|---|
| ✳ | Evergreen Tree |
| ⊗ | Deciduous Tree |
| ◇ | Bush |
| ⚑ | Sign |


WES E NGINEERS & S URVEYORS
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
PHONE: (931) 388-2329
www.wesengineers.com


ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

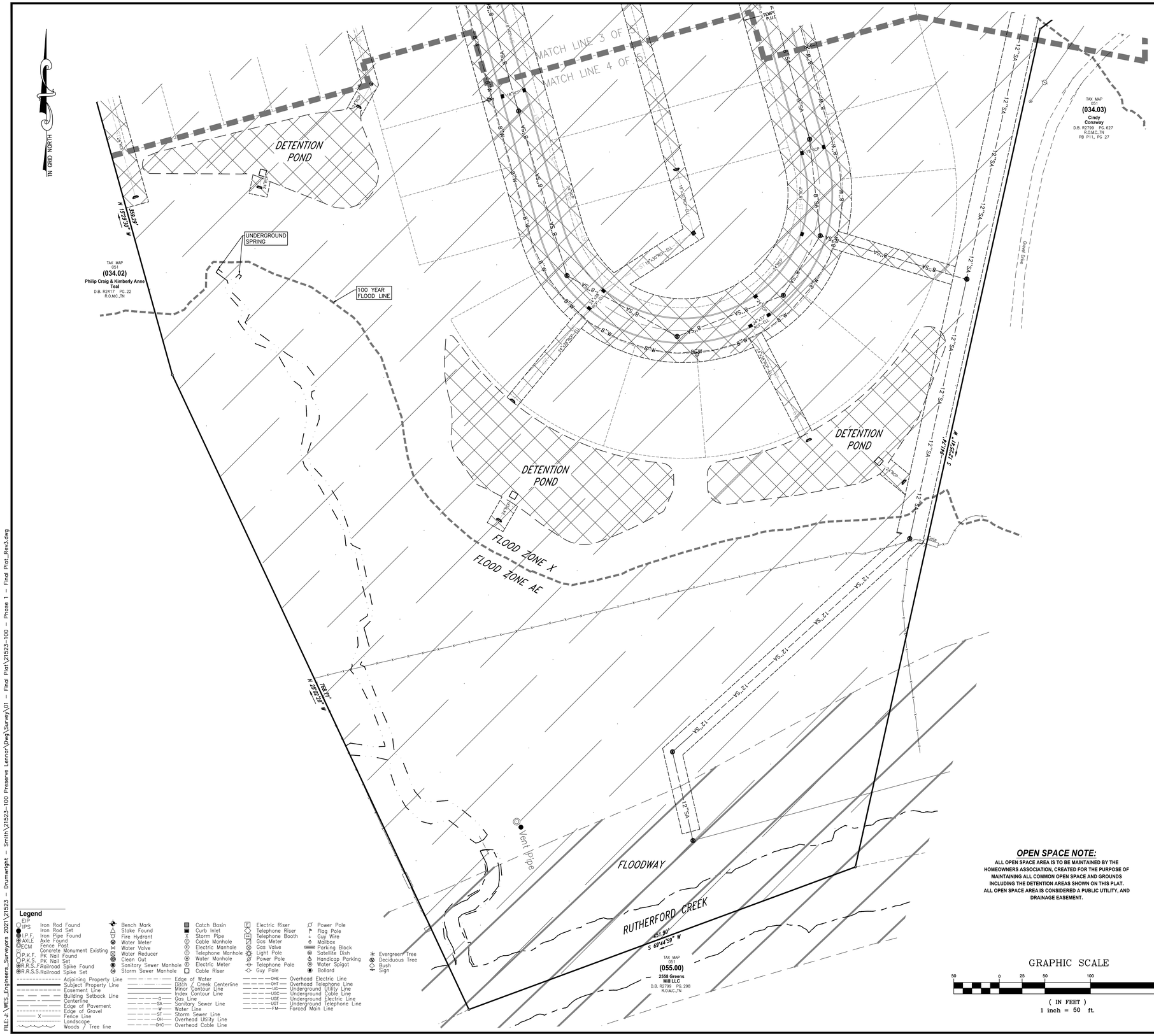
| REVISIONS | DATE |
|---|---|
| DEVELOPMENT REVIEW COMMENTS | 01-16-2024 |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no. 21523-100
Scale:
Vertical: 1"=50'
Horizontal:

**3 of 5**

FILE: J:\ WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg




**Legend**

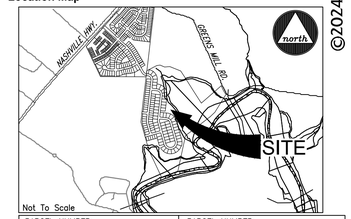
- EIP Iron Rod Found
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- AXLE Axle Found
- FCM Fence Post
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- P.K.F. PK Nail Found
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- R.R.S.-F Railroad Spike Found
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- Adjoining Property Line
- Subject Property Line
- Easement Line
- Building Setback Line
- Centerline
- Edge of Pavement
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- Woods / Tree line
- Bench Mark
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- Water Reducer
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- Storm Sewer Manhole
- Catch Basin
- Curb Inlet
- Storm Pipe
- Cable Manhole
- Electric Manhole
- Telephone Manhole
- Water Manhole
- Electric Meter
- Cable Riser
- Edge of Water
- Ditch / Creek Centerline
- Minor Contour Line
- Index Contour Line
- Gas Line
- Sanitary Sewer Line
- Water Line
- Storm Sewer Line
- Overhead Utility Line
- Overhead Cable Line
- Electric Riser
- Telephone Riser
- Telephone Booth
- Gas Meter
- Gas Valve
- Light Pole
- Power Pole
- Telephone Pole
- Guy Pole
- Overhead Electric Line
- Overhead Telephone Line
- Underground Utility Line
- Underground Cable Line
- Underground Electric Line
- Underground Telephone Line
- Forced Main Line
- Power Pole
- Flag Pole
- Guy Wire
- Mailbox
- Parking Block
- Satellite Dish
- Handicap Parking
- Water Spigot
- Bollard
- Evergreen Tree
- Deciduous Tree
- Bush
- Sign

## OPEN SPACE NOTE:

**ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.**

Register of Deed Recording Stamp

**Location Map**




Not To Scale

©2024

| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00<br>DEED BOOK: R2871, PAGE 1405<br>PLAT BOOK: P11, PAGE 27<br>PARCEL ADDRESS: 2554 GREENS MILL RD COLUMBIA, TN 38401 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01<br>DEED BOOK: R2871, PAGE 1405<br>PLAT BOOK: P11, PAGE 27 & P11, PAGE 81<br>PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401 |

EXISTING ZONING: PUD

BUILDING SETBACKS: FRONT – 25' SIDE – 7.5' REAR – 20'

ACREAGE OF PARCEL: ±77.50 ACRES TOTAL ±51.98 ACRES PHASE 1 ±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER: LENNAR HOMES OF TENNESSEE LLC 381 MALLORY STATION RD SUITE 200 FRANKLIN, TN 37067

**PURPOSE NOTE:** The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

**STORMWATER MANAGEMENT AGREEMENT:** RECORDED: DEED BOOK: _____ PAGE: _____

**DRIVEWAY NOTE:** All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

### CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2871, Page 1405, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

Date _____ Lennar Homes of Tennessee LLC

### CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE, STREET SIGNS, AND UTILITIES

I hereby certify that the streets, drainage, and utilities designated in Preserve at Drumwright, Phase 1 have been installed in accordance with City Specifications, or a performance surety in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

Date _____ City Engineer Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date _____ Maury County E-911 Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF SEWER SYSTEM

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other has been filed to guarantee said installation.

Date _____ Director of Wastewater Department Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF WATER SYSTEM

I, (we) hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled Preserve at Drumwright, Phase 1 has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

Date _____ Columbia Power & Water Systems Columbia, Tennessee

### CERTIFICATE OF COMPLIANCE

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations and other adopted ordinances and policies.

Date _____ City Engineer Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations, with the exception of such variances, if any, as are noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register:

Date _____ Secretary, Planning Commission Columbia, Tennessee

### SURVEYOR'S CERTIFICATION (TENNESSEE)

I hereby certify that to the best of my knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a category "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

1/16/24 Date — Allen B. O'Leary — TN RLS #1987 Number

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — 1987 — AGRICULTURE — COMMERCE — TENNESSEE NO. 1987

allen@wesengineers.com

WES Engineers & Surveyors
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
PHONE: (931) 388-2329
www.wesengineers.com

ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

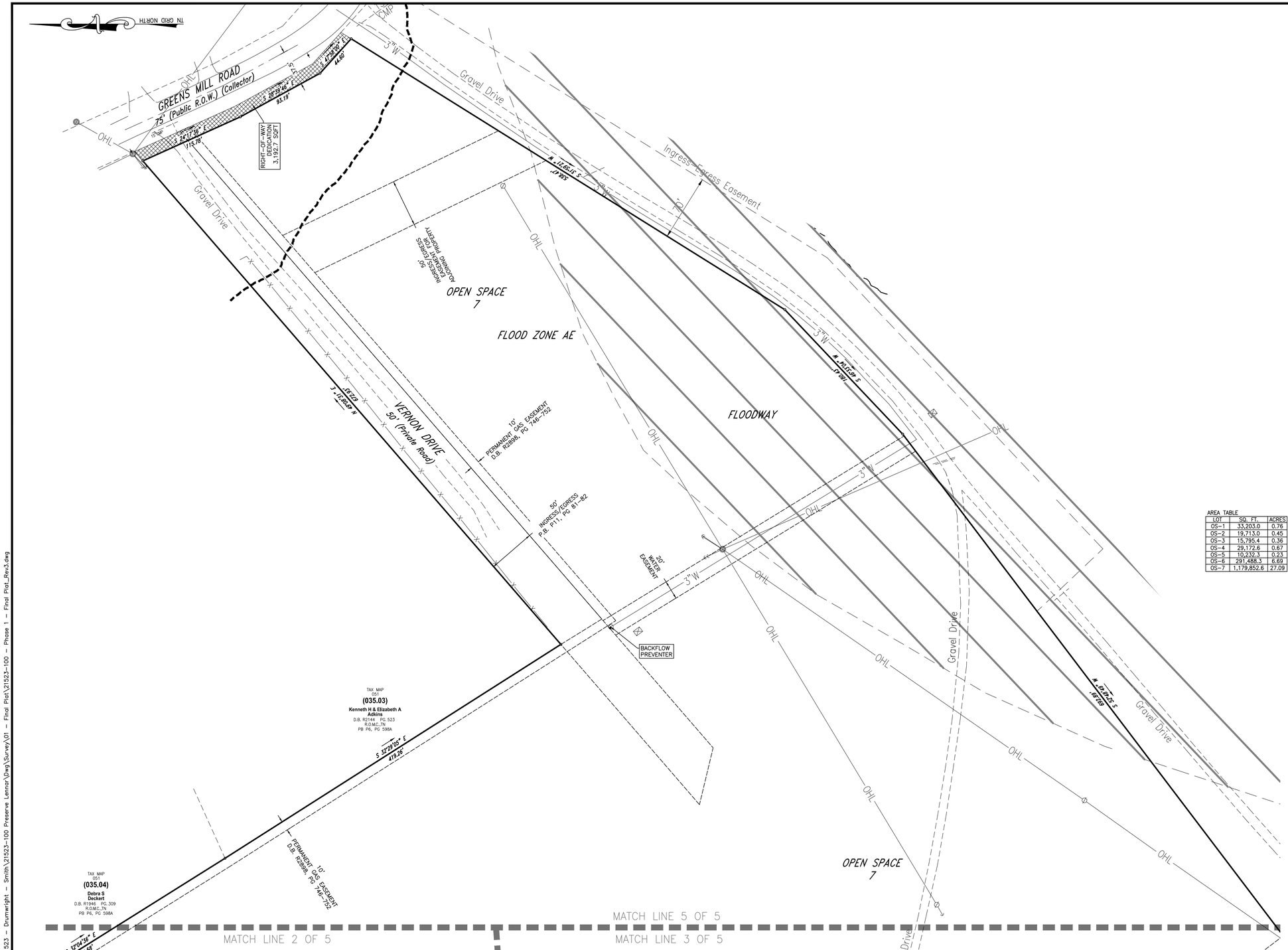
| REVISIONS | DATE |
|---|---|
| DEVELOPMENT REVIEW COMMENTS | 01-16-2024 |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no. 21523-100
Scale: Vertical: 1"=50' Horizontal:

4 of 5

FILE: J:_WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg




**Legend**

- EIP Iron Rod Found
- IPS Iron Rod Set
- I.P.F. Iron Pipe Found
- AXLE Axle Found
- FCM Fence Post
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- P.K.F. PK Nail Found
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- Overhead Utility Line
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- Underground Cable Line
- Underground Electric Line
- Underground Telephone Line
- Forced Main Line

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GRAPHIC SCALE

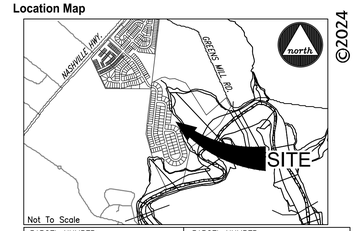
50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

AREA TABLE

| LOT | SQ. FT. | ACRES |
|---|---|---|
| OS-1 | 33,203.0 | 0.76 |
| OS-2 | 19,713.0 | 0.45 |
| OS-3 | 15,795.4 | 0.36 |
| OS-4 | 29,172.6 | 0.67 |
| OS-5 | 10,232.3 | 0.23 |
| OS-6 | 291,488.3 | 6.69 |
| OS-7 | 1,179,852.6 | 27.09 |

**Location Map**




Not To Scale

©2024

| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01 |
| DEED BOOK: R2871, PAGE 1405 | DEED BOOK: R2871, PAGE 1405 |
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EXISTING ZONING:
PUD

BUILDING SETBACKS:
FRONT – 25'
SIDE – 7.5'
REAR – 20'

ACREAGE OF PARCEL:
±77.50 ACRES TOTAL
±51.98 ACRES PHASE 1
±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

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SUITE 200
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**PURPOSE NOTE:**
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**STORMWATER MANAGEMENT AGREEMENT:**
RECORDED:
DEED BOOK: _____ PAGE: _____

**DRIVEWAY NOTE:**
All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

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Date _____ City Engineer
Columbia, Tennessee

## CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date _____ Maury County E-911
Columbia, Tennessee

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10/16/24 Allen B. O'Leary TN RLS #1987
Date Allen B. O'Leary Number

STATE OF TENNESSEE
ALLEN B. O'LEARY
REGISTERED LAND SURVEYOR
AGRICULTURE
No. 1987
SURVEY
allen@wesengineers.com

Register of Deed Recording Stamp


WES ENGINEERS & SURVEYORS
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
PHONE: (931) 388-2329
www.wesengineers.com


ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

| REVISIONS | DATE |
|---|---|
| DEVELOPMENT REVIEW COMMENTS | 01-16-2024 |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no. 21523-100
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FILE: J:\WES_Engineers_Surveyors 2021\21523 – Drumwright – Smith\21523-100 Preserve Lennar\Dwg\Survey\01 – Final Plat\21523-100 – Phase 1 – Final Plat_Rev3.dwg

January 16, 2024

City of Columbia
Development Services
700 North Garden Street
Columbia, TN 38401

**RE: Project Name: Preserve at Drumwright, Phase 1, Final Plat**
City of Columbia Staff Review Submittal

On behalf of Lennar Homes of Tennessee LLC, the owner of these 68 proposed single family lots, **WES Engineers & Surveyors** would like to resubmit this Final Plat to the City of Columbia for Planning Commission approval. Comments are addressed below in red.

**Planning**

1. The lead staff person for this case is Planner II Robert Archibald; he will prepare the staff report for this item. Please contact rarchibald@columbiatn.com with question about the development review process or technical comments. Noted.
2. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, please simply note that the information has been acknowledged. Noted.
3. Please indicate the number of CBUs for Mail Kiosk OS #2. If more than 75 units, ESS standards apply. See detail. This is being handled by the developer.
4. The PUD Master Plan indicates 3 parallel spaces at the mail kiosk location. The Final Plat identifies 90-degree parking. Revise detail to match Master PUD. Site will be held to this standard. A change to the parking arrangement requires a PUD revision. The parking area has been revised to be parallel parking and will be constructed as such.
5. Identify line shown beginning at detention pond in OS #6 continuing through NW corner of Lot #1. This is a french drain per the construction plans but was never installed.

**Wastewater**

6. Columbia Wastewater has no concerns. Noted.

**Engineering**

7. Record/reference the stormwater maintenance agreement. This will be recorded and referenced prior to the recording of the final plat.
8. Construction on Greens Mill Rd improvements to commence prior to recording of the plat. The developer has been notified of this requirement.
9. Provide LOC by resubmittal date of 1/16/2024. This is being handled by the developer.
10. Relocate driveway to Vernon Drive within appropriate access easement as indicated on the Master Plan. A 50' wide ingress/egress easement from Vernon Drive to the adjoining property is shown for the relocation of the driveway.
11. Perpendicular parking not allowed off roadway at OS2/Mail Kiosk. Parallel may be provided. The parking area has been revised to be parallel parking and will be constructed as such.

**Columbia Water**

12. Water infrastructure must be completed in accordance with the approved plans by January 16, 2024. Conduct pressure testing, bacteria testing, walk-through inspection and infrastructure deeded to CPWS by February 14, 2024. Water system must be active in order for the plat to be recorded". Noted.

**Maury County Schools**

13. Battle Creek Elementary, Battle Creek Middle, Battle Creek High (24/25) See Attached Capacity Numbers. The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students. Noted.

**Atmos Energy**

14. Natural gas being installed by Triton Construction and Atmos inspecting. Noted.

**Columbia Power**

15. Columbia Power System has an existing power line near your proposed development. We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction. Unfortunately, due to current supply chain challenges, no timeframe can be guaranteed regarding the availability of meters or transformers appropriate for your development. Noted.

**Maury County E911**

16. Preserve at Drumwright - Reserved and correct. Serene Valley Trail. Augusta Trace Dr. Williams Ridge Dr. All names reserved and correct for this development. Noted.

**AT&T**

17. AT&T intends to serve. Noted.

If you have any questions or comments with this submittal, please do not hesitate to contact me directly.

Sincerely,
**WES Engineers & Surveyors**



Allen B. O'Leary, RLS
Principal

CITY OF COLUMBIA
TENNESSEE

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, January 9, 2024

**ITEM NO.**
23-0542

**DESCRIPTION:** Preserve at Drumwright (Ph1) Final Plat to create 68 single family lots and dedicate right-of-way.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

**Planning**

1. The lead staff person for this case is Planner II Robert Archibald; he will prepare the staff report for this item. Please contact rarchibald@columbiatn.com with question about the development review process or technical comments.
2. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, please simply not that the information has been acknowledged.
3. Please indicate the number of CBUs for Mail Kiosk OS #2. If more than 75 units, ESS standards apply. See detail.
4. The PUD Master Plan indicates 3 parallel spaces at the mail kiosk location. The Final Plat identifies 90-degree parking. Revise detail to match Master PUD. Site will be held to this standard. A change to the parking arrangement requires a PUD revision.
5. Identify line shown beginning at detention pond in OS #6 continuing through NW corner of Lot #1.

**Wastewater**

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**Engineering**

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9. Provide LOC by resubmittal date of 1/16/2024.
10. Relocate driveway to Vernon Drive within appropriate access easement as indicated on the Master Plan.
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## Columbia Water

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## Maury County E911

16. Preserve at Drumwright - Reserved and correct. Serene Valley Trail. Augusta Trace Dr. Williams Ridge Dr. All names reserved and correct for this development.

## AT&T

17. AT&T intends to serve.

No comments Building, Fire, Duck River Electric Membership Corp, or the Maury County Highway Department.

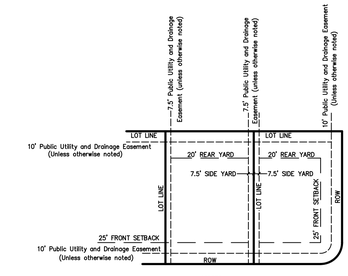
**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

## Current Enrollment / Capacity

| | Facility Name | Date Constructed | Sq. Ft. | Acreage | Capacity |
|---|---|---|---|---|---|
| **Elementary** | Baker | 1960 | 43,920 | 12 | 340 |
| | Battle Creek | 2019 | 90,000 | 30 | 700 |
| | Brown | 1968 | 56,720 | 20 | 405 |
| | Highland | 1986 | 47,800 | 4.5 | 380 |
| | Howell | 1999 | 81,600 | 17.5 | 700 |
| | Mt. Pleasant | 1978 | 80,021 | 22 | 630 |
| | Riverside | 1984 | 71,150 | 14 | 500 |
| | Spring Hill | 1984 | 69,000 | 10 | 540 |
| | Woodard | 1990 | 76,200 | 17 | 600 |
| | Wright | 2005 | 97,765 | 18 | 740 |
| | | | | | ***5535*** |
| | | | | | |
| **Middle** | Battle Creek | 2019 | 125,000 | 45 | 900 |
| | Cox | 1997 | 137,200 | 25 | 900 |
| | Mt. Pleasant | 2001 | 113,938 | 29.2 | 550 |
| | Spring Hill | 2010 | 158,106 | 39.49 | 950 |
| | Whitthorne | 1979 | 175,600 | 17 | 1050 |
| | | | | | ***4350*** |
| | | | | | |
| **High** | Central | 2016 | 296,740 | 55 | 1700 |
| | Mt. Pleasant | 1969 | 110,759 | 31 | 600 |
| | Spring Hill | 1993 | 181,800 | 57 | 1200 |
| | | | | | ***3500*** |
| | | | | | |
| **Unit** | Culleoka | 1969 | 205,800 | 34 | 1020 |
| | Hampshire | 1978 | 83,410 | 13.12 | 500 |
| | Santa Fe | 1964 | 94,225 | 24 | 650 |
| | | | | | ***2170*** |
| | | | | | |
| **Other** | Central Office | 1960 | 15,400 | 1.5 | |
| | College Hill | 1958 | 42,211 | 2.26 | |
| | Maintenance | 1987 | 9,400 | 4.7 | |
| | McDowell | | 46,165 | 7 | |
| | | | | | |
| | | | **2,509,930** | **550.27** | **15555** |

| Current Enrollment | Capacity Used |
|---|---|
| 328 | 96.5% |
| 632 | 90.3% |
| 358 | 88.4% |
| 304 | 80.0% |
| 592 | 84.6% |
| 580 | 92.1% |
| 406 | 81.2% |
| 445 | 82.4% |
| 559 | 93.2% |
| 601 | 81.2% |
| ***4805*** | ***86.8%*** |
| | |
| 731 | 81.2% |
| 656 | 72.9% |
| 424 | 77.1% |
| 527 | 55.5% |
| 971 | 92.5% |
| ***3309*** | ***76.1%*** |
| | |
| 1396 | 82.1% |
| 379 | 63.2% |
| 1223 | 101.9% |
| ***2998*** | ***85.7%*** |
| | |
| 875 | 85.8% |
| 408 | 81.6% |
| 509 | 78.3% |
| ***1792*** | ***82.6%*** |
| | |
| | |
| 166 | |
| | |
| | |
| | |
| **13070** | |

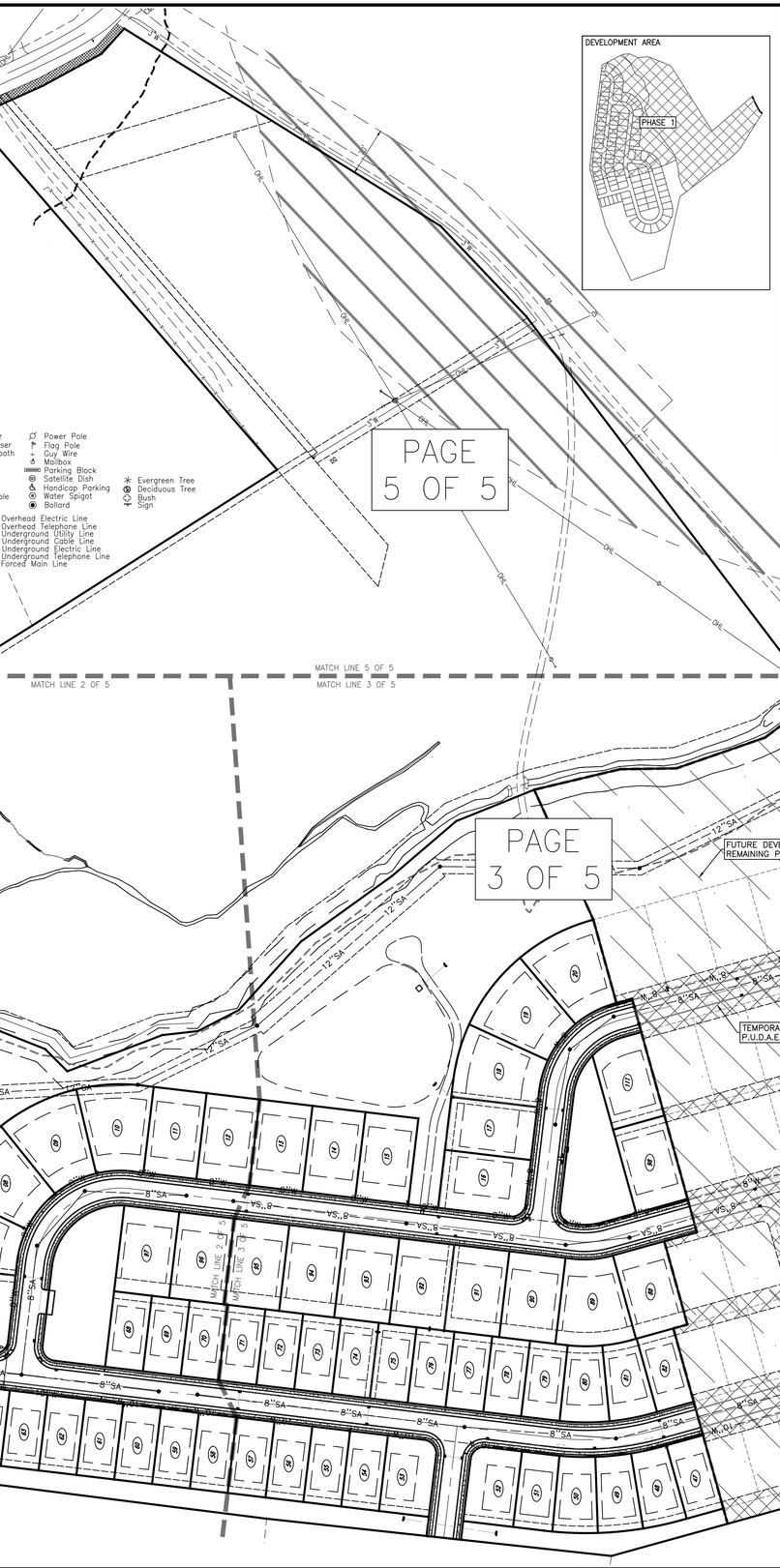
TN GRID NORTH




## SUBDIVISION
### TYPICAL LOT LAYOUT

**Legend**

- IPF Iron Rod Found
- IPS Iron Rod Set
- I.P.F. Iron Pipe Found
- AXLE Axle Found
- ECM Fence Post
- Concrete Monument Existing
- P.K.F. PK Nail Found
- P.K.S. PK Nail Set
- R.R.S.F. Railroad Spike Found
- R.R.S.S. Railroad Spike Set
- Bench Mark
- Stake Found
- Fire Hydrant
- Water Meter
- Water Valve
- Water Reducer
- Clean Out
- Sanitary Sewer Manhole
- Storm Sewer Manhole
- Catch Basin
- Curb Inlet
- Storm Pipe
- Cable Manhole
- Electric Manhole
- Telephone Manhole
- Water Manhole
- Electric Meter
- Cable Riser
- Electric Riser
- Telephone Riser
- Telephone Booth
- Gas Meter
- Gas Valve
- Light Pole
- Power Pole
- Telephone Pole
- Guy Pole
- Power Pole
- Flag Pole
- Guy Wire
- Mailbox
- Parking Block
- Satellite Dish
- Handicap Parking
- Water Spigot
- Bollard
- Evergreen Tree
- Deciduous Tree
- Bush
- Sign
- Adjoining Property Line
- Subject Property Line
- Easement Line
- Building Setback Line
- Centerline
- Edge of Pavement
- Edge of Gravel
- Fence Line
- Landscape
- Woods / Tree line
- Edge of Water
- Ditch / Creek Centerline
- Minor Contour Line
- Index Contour Line
- Gas Line
- Sanitary Sewer Line
- Water Line
- Storm Sewer Line
- Overhead Utility Line
- Overhead Cable Line
- Overhead Electric Line
- Overhead Telephone Line
- Underground Utility Line
- Underground Cable Line
- Underground Electric Line
- Underground Telephone Line
- Forced Main Line




DEVELOPMENT AREA




### CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2871, Page 1405, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

Date — Lennar Homes of Tennessee LLC

### CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE, STREET SIGNS, AND UTILITIES

I hereby certify that the streets, drainage, and utilities designated in Preserve at Drumwright have been installed in accordance with City Specifications, or a performance surety in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

Date — City Engineer, Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date — Maury County E-911, Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF SEWER SYSTEM

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other has been filed to guarantee said installation.

Date — Director of Wastewater Department, Columbia, Tennessee

### CERTIFICATE OF APPROVAL OF WATER SYSTEM

I, (we) hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled Preserve at Drumwright has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

Date — Columbia Power & Water Systems, Columbia, Tennessee

### CERTIFICATE OF COMPLIANCE

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations and other adopted ordinances and policies.

Date — City Engineer, Columbia, Tennessee

### CERTIFICATE OF APPROVAL FOR RECORDING

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations, with the exception of such variances, if any, as are noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register:

Date — Secretary, Planning Commission, Columbia, Tennessee

### SURVEYOR'S CERTIFICATION (TENNESSEE)

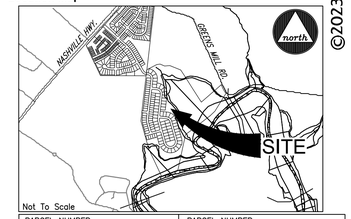
I hereby certify that to the best of my knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a category "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

12/18/23 — Allen B. O'Leary — TN RLS #1987
Date — Number

### Surveyor's Notes

1. All distances were measured with E.D.M. equipment and have been adjusted for temperature and pressure.
2. The property (Boundary) Line Survey exceeds the minimum requirements of an Urban Land Survey Category 1 as per Standards of Practice adopted by the State Board of Examiners for Land Surveyors for the State of Tennessee, and the precision of the unadjusted survey is greater than 1 foot in 10,000 feet.
3. Information concerning site utility services and appurtenances shown hereon is based on visible evidence noted during the survey, information provided by utility representatives or information shown on original construction plans by other. Information and location of service lines on site should be considered approximate and there may be underground utility lines that are not shown on the survey. Owner(s) and contractor(s) should assume responsibility of locating all underground utility service lines prior to any construction, excavation or any disturbance of the existing ground elevation to avoid hazard of unnecessary expense.
4. Information concerning major utilities or appurtenances shown hereon are based on visible evidence noted during the survey or information provided by utility representatives. Verification of existence, size, location, depth and availability of service should be confirmed by local utility agencies.
5. The property shown hereon is located within the City of Columbia, Maury County, TN. All matters pertaining to construction, use location of improvements, signage, parking, noise, vibration, emissions, fire hazards, radiation, illumination, setback provisions, etc., are subject to the City of Columbia's Zoning Regulation as interpreted and regulated by the Department of Planning and Codes.
6. The area of the parcels as shown hereon.
7. This property currently identified as Tax Map No. 051, Parcel No. 034.00 & 034.01, Maury County. For designation shown thus ( ) indicates Parcel Numbers for said map.
8. Plat reference: P11, Page 26 & P11, Page 81
9. Deed reference: Book R2871, Page 1405
10. Bearings based on: Tennessee State Plane, Fipzone 4100.
11. This drawing was prepared in accordance with our field survey notes. It shows improvements as they exist to the best of our knowledge, but is not guaranteed to be correct in each and every detail.
12. This survey was prepared from current deeds of record and does not represent a title search or a guarantee of title, and is subject to any state of facts a current and accurate search may reveal.
13. This survey was prepared for the exclusive use of the person, persons, or entity, if any, named on the certification hereon. Said certificate does not extend to any unnamed person without an express re-certification by the surveyor naming said person.
14. The certification as provided on this survey, is purely a statement of professional opinion based on knowledge, information and belief, based on existing field evidence and documentary evidence provided by others.
15. The certification is not an expressed or implied warranty or guarantee.
16. This property is located in a Special Flood Hazard Area as shown on F.E.M.A. Flood Insurance Rate Map, Community Panel No. 47119C0180E, dated April 16, 2007, and shown hereon graphically.
17. All public utility and drainage easements located on proposed lots are to be maintained by the individual property owner for said lot.
18. All property corners are ½" rebar with cap reading "WES 1987" unless otherwise noted.

### Location Map




Not To Scale

©2023

PARCEL NUMBER: TAX MAP 051, PARCEL 034.00
DEED BOOK: R2871, PAGE 1405
PLAT BOOK: P11, PAGE 27
PARCEL ADDRESS: 2554 GREENS MILL RD COLUMBIA, TN 38401

PARCEL NUMBER: TAX MAP 051, PARCEL 034.01
DEED BOOK: R2871, PAGE 1405
PLAT BOOK: P11, PAGE 27 & P11, PAGE 81
PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401

EXISTING ZONING: PUD

BUILDING SETBACKS: FRONT – 25' SIDE – 7.5' REAR – 20'

ACREAGE OF PARCEL: ±77.50 ACRES TOTAL ±51.98 ACRES PHASE 1 ±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER: LENNAR HOMES OF TENNESSEE LLC 381 MALLORY STATION RD SUITE 200 FRANKLIN, TN 37067

**PURPOSE NOTE:** The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

**STORMWATER MANAGEMENT AGREEMENT:** RECORDED:_____ DEED BOOK:_____ PAGE:_____

**DRIVEWAY NOTE:** All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

### OPEN SPACE NOTE:

ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.

GRAPHIC SCALE

100' 0 50' 100' 200' 400'

( IN FEET )
1 inch = 100' ft.

Register of Deed Recording Stamp

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — AGRICULTURE, TN — TENNESSEE NO. 1987

allen@wesengineers.com


WES Engineers & Surveyors
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
PHONE: (931) 388-2329
www.wesengineers.com


ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

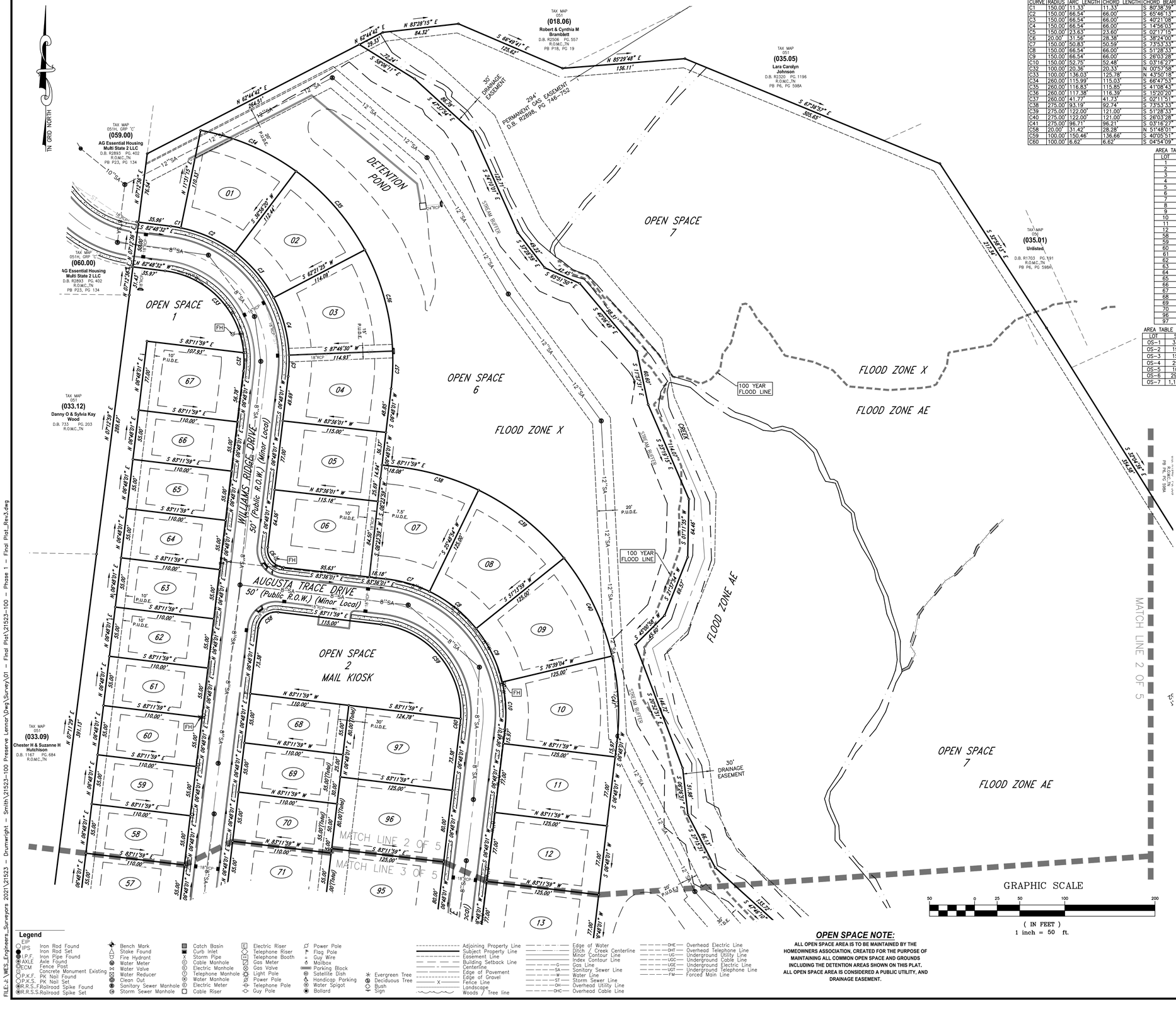
| REVISIONS | DATE |
|---|---|
| | |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no 21523-100
Scale: Vertical: —— Horizontal: 1"=100'

1 of 5

FILE: J:\WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg




| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE | RADIUS | ARC LENGTH | CHORD LENGTH | CHORD BEARING | DELTA ANGLE |
| C1 | 150.00' | 111.33' | 111.33' | S 80°38'39" E | 4°15'47" |
| C2 | 150.00' | 66.54' | 66.00' | S 65°46'13" E | 25°25'05" |
| C3 | 150.00' | 66.54' | 66.00' | S 40°21'08" E | 25°25'05" |
| C4 | 150.00' | 66.54' | 66.00' | S 14°56'03" E | 25°25'05" |
| C5 | 150.00' | 23.63' | 23.60' | S 02°17'15" W | 9°01'31" |
| C6 | 20.00' | 31.56' | 28.38' | S 38°24'00" E | 90°24'02" |
| C7 | 150.00' | 50.83' | 50.59' | S 73°53'33" E | 19°24'55" |
| C8 | 150.00' | 66.54' | 66.00' | S 51°28'33" E | 25°25'05" |
| C9 | 150.00' | 66.54' | 66.00' | S 26°03'28" E | 25°25'05" |
| C10 | 150.00' | 152.75' | 52.48' | S 03°16'27" E | 2°08'57" |
| C32 | 100.00' | 20.36' | 20.33' | N 00°57'58" E | 11°40'06" |
| C33 | 100.00' | 136.03' | 125.78' | N 43°50'18" W | 77°56'27" |
| C34 | 260.00' | 115.99' | 115.03' | S 66°47'53" E | 25°33'37" |
| C35 | 260.00' | 116.83' | 115.85' | S 41°08'43" E | 25°44'43" |
| C36 | 260.00' | 117.38' | 116.39' | S 15°20'20" E | 25°52'02" |
| C37 | 260.00' | 41.77' | 41.73' | S 02°11'51" W | 9°12'20" |
| C38 | 275.00' | 93.19' | 92.74' | S 73°53'33" E | 19°24'55" |
| C39 | 275.00' | 122.00' | 121.00' | S 51°28'33" E | 25°25'05" |
| C40 | 275.00' | 122.00' | 121.00' | S 26°03'28" E | 25°25'05" |
| C41 | 275.00' | 96.71' | 96.21' | S 03°16'27" E | 2°08'57" |
| C58 | 20.00' | 31.42' | 28.28' | N 51°48'01" E | 90°00'00" |
| C59 | 100.00' | 150.46' | 136.66' | S 40°05'51" E | 86°12'18" |
| C60 | 100.00' | 6.62' | 6.62' | S 04°54'09" W | 3°47'44" |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| 1 | 10,167.0 | 0.23 |
| 2 | 10,369.4 | 0.24 |
| 3 | 10,537.6 | 0.24 |
| 4 | 9,426.2 | 0.22 |
| 5 | 8,857.5 | 0.20 |
| 6 | 9,670.6 | 0.22 |
| 7 | 11,274.1 | 0.26 |
| 8 | 11,783.9 | 0.27 |
| 9 | 11,783.9 | 0.27 |
| 10 | 11,337.5 | 0.26 |
| 11 | 9,625.0 | 0.22 |
| 12 | 9,625.0 | 0.22 |
| 58 | 6,050.0 | 0.14 |
| 59 | 6,050.0 | 0.14 |
| 60 | 6,050.0 | 0.14 |
| 61 | 6,050.0 | 0.14 |
| 62 | 6,050.0 | 0.14 |
| 63 | 6,050.0 | 0.14 |
| 64 | 6,050.0 | 0.14 |
| 65 | 6,050.0 | 0.14 |
| 66 | 6,050.0 | 0.14 |
| 67 | 8,456.1 | 0.19 |
| 68 | 6,050.0 | 0.14 |
| 69 | 6,050.0 | 0.14 |
| 70 | 6,050.0 | 0.14 |
| 96 | 10,000.0 | 0.23 |
| 97 | 9,999.5 | 0.23 |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| OS-1 | 33,203.0 | 0.76 |
| OS-2 | 19,713.0 | 0.45 |
| OS-3 | 15,795.4 | 0.36 |
| OS-4 | 29,172.6 | 0.67 |
| OS-5 | 10,232.3 | 0.23 |
| OS-6 | 291,488.3 | 6.69 |
| OS-7 | 1,179,852.6 | 27.09 |

**Legend**

EIP Iron Rod Found; IPS Iron Rod Set; I.P.F. Iron Pipe Found; AXLE Axle Found; ECM Concrete Monument Existing; P.K.F. PK Nail Found; P.K.S. PK Nail Set; R.R.S.-F Railroad Spike Found; R.R.S.-S Railroad Spike Set

Bench Mark; Stake Found; Fire Hydrant; Water Meter; Water Valve; Water Reducer; Clean Out; Sanitary Sewer Manhole; Storm Sewer Manhole; Catch Basin; Curb Inlet; Storm Pipe; Cable Manhole; Electric Manhole; Telephone Manhole; Water Manhole; Electric Meter; Cable Riser; Electric Riser; Telephone Riser; Telephone Booth; Gas Meter; Gas Valve; Light Pole; Power Pole; Telephone Pole; Guy Pole; Power Pole; Flag Pole; Guy Wire; Mailbox; Parking Block; Satellite Dish; Handicap Parking; Water Spigot; Bollard; Evergreen Tree; Deciduous Tree; Bush; Sign

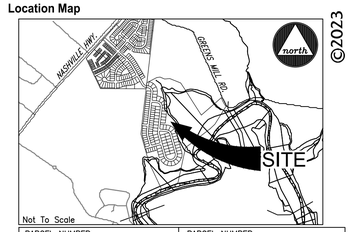
Adjoining Property Line; Subject Property Line; Easement Line; Building Setback Line; Centerline; Edge of Pavement; Edge of Gravel; Fence Line; Landscape; Woods / Tree line; Edge of Water; Ditch / Creek Centerline; Minor Contour Line; Index Contour Line; Gas Line; Sanitary Sewer Line; Water Line; Storm Sewer Line; Overhead Utility Line; Overhead Cable Line; Overhead Electric Line; Overhead Telephone Line; Underground Utility Line; Underground Cable Line; Underground Electric Line; Underground Telephone Line; Forced Main Line

***OPEN SPACE NOTE:***

**ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.**

Register of Deed Recording Stamp

**Location Map**




Not To Scale

©2023

| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00<br>DEED BOOK: R2871, PAGE 1405<br>PLAT BOOK: P11, PAGE 27<br>PARCEL ADDRESS: 2556 GREENS MILL RD COLUMBIA, TN 38401 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01<br>DEED BOOK: R2871, PAGE 1405<br>PLAT BOOK: P11, PAGE 27 & P11, PAGE 81<br>PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401 |

EXISTING ZONING: PUD

BUILDING SETBACKS: FRONT – 25' SIDE – 7.5' REAR – 20'

ACREAGE OF PARCEL: ±77.50 ACRES TOTAL ±51.98 ACRES PHASE 1 ±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER: LENNAR HOMES OF TENNESSEE LLC 381 MALLORY STATION RD SUITE 200 FRANKLIN, TN 37067

**PURPOSE NOTE:**
The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

**STORMWATER MANAGEMENT AGREEMENT:**
RECORDED: _____
DEED BOOK: _____ PAGE: _____

**DRIVEWAY NOTE:**
All driveways shall be constructed to contain gutter flow within the street and right-of-way, particularly lots that do not have a sidewalk.

## CERTIFICATE OF OWNERSHIP AND DEDICATION

I, (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number R2871, Page 1405, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

Date _____ Lennar Homes of Tennessee LLC

## CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE, STREET SIGNS, AND UTILITIES

I hereby certify that the streets, drainage, and utilities designated in Preserve at Drumwright, Phase 1 have been installed in accordance with City Specifications, or a performance surety in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

Date _____ City Engineer Columbia, Tennessee

## CERTIFICATE OF APPROVAL FOR SUBDIVISION NAME AND STREET NAMES

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

Date _____ Maury County E-911 Columbia, Tennessee

## CERTIFICATE OF APPROVAL OF SEWER SYSTEM

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other has been filed to guarantee said installation.

Date _____ Director of Wastewater Department Columbia, Tennessee

## CERTIFICATE OF APPROVAL OF WATER SYSTEM

I, (we) hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled Preserve at Drumwright, Phase 1 has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

Date _____ Columbia Power & Water Systems Columbia, Tennessee

## CERTIFICATE OF COMPLIANCE

I hereby certify that the subdivision plat shown hereon has been found to comply with the City of Columbia Subdivision Regulations and other adopted ordinances and policies.

Date _____ City Engineer Columbia, Tennessee

## CERTIFICATE OF APPROVAL FOR RECORDING

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Date _____ Secretary, Planning Commission Columbia, Tennessee

## SURVEYOR'S CERTIFICATION (TENNESSEE)

I hereby certify that to the best of my knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a category "I" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotated, and that the ratio of precision is greater than or equal to 1:10,000.

12/18/23 Date — Allen B. O'Leary — TN RLS #1987 Number

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — AGRICULTURE — TENNESSEE NO. 1987


WES ENGINEERS & SURVEYORS
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
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ENGINEERS & SURVEYORS
allen@wesengineers.com


Client: LENNAR HOMES, 381 MALLORY STATION ROAD, SUITE 200, FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

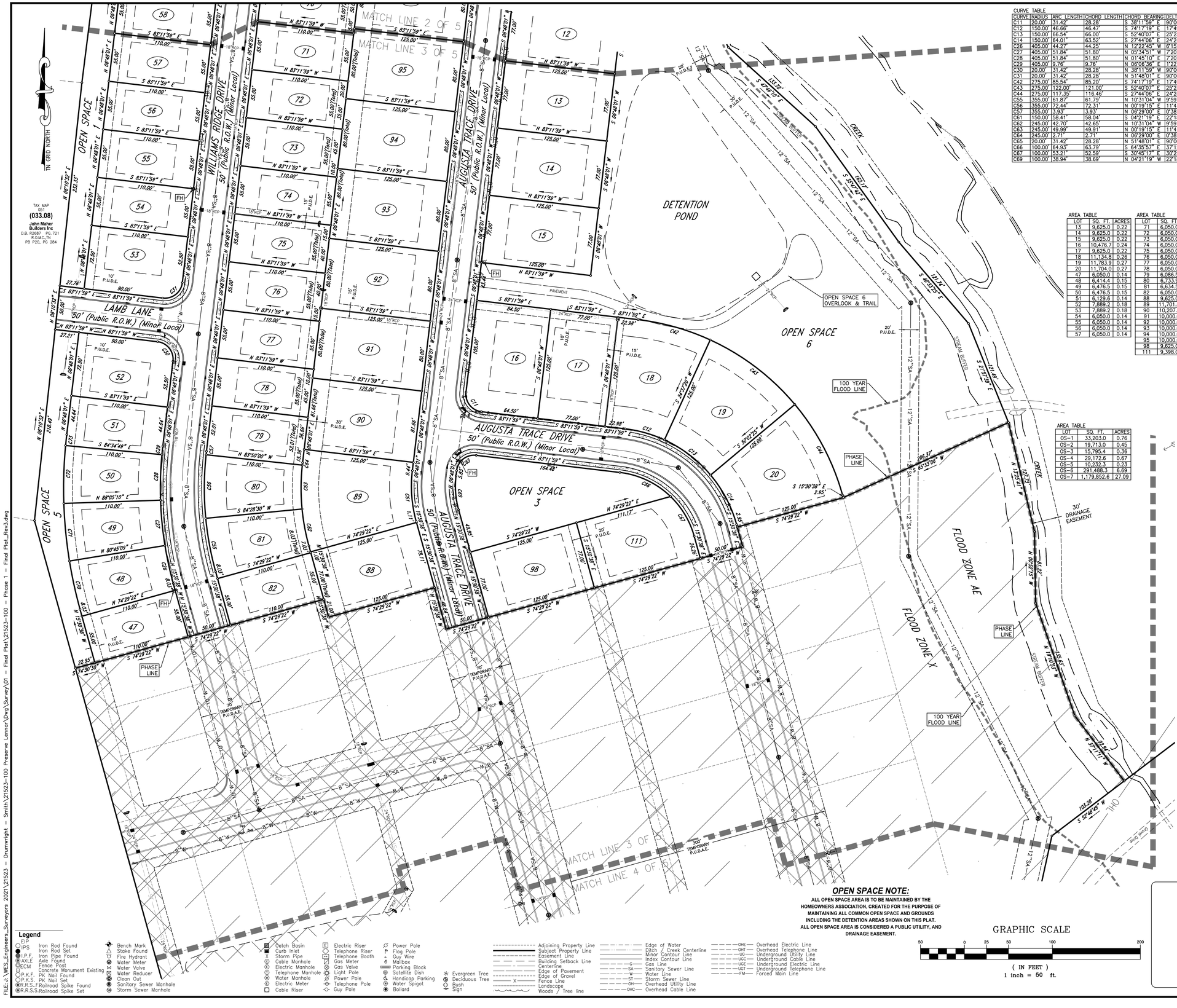
| DATE | REVISIONS |
|---|---|
| | |

Drawn: EB | Checked: AO | Approved: AO | Date: 10-16-2023

Job. no. 21523-100 | Scale: Vertical: ____ Horizontal: 1"=50'

2 of 5

FILE: J:\WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg



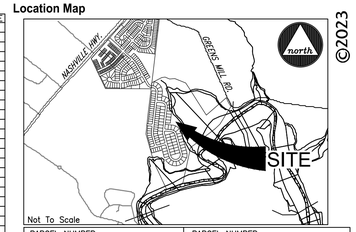

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE | RADIUS | ARC LENGTH | CHORD LENGTH | CHORD BEARING | DELTA ANGLE |
| C11 | 20.00' | 31.42' | 28.28' | S 38°11'59" E | 90°00'00" |
| C12 | 150.00' | 46.66' | 46.47' | S 74°17'19" E | 17°49'19" |
| C13 | 150.00' | 66.54' | 66.00' | S 52°40'07" E | 25°25'05" |
| C14 | 150.00' | 64.01' | 63.52' | S 27°44'08" E | 24°26'57" |
| C26 | 405.00' | 44.27' | 44.25' | N 12°22'45" W | 6°15'47" |
| C27 | 405.00' | 51.84' | 51.80' | N 05°34'51" W | 7°20'01" |
| C28 | 405.00' | 51.84' | 51.80' | N 01°45'10" E | 7°20'01" |
| C29 | 405.00' | 9.76' | 9.76' | N 06°06'36" E | 1°22'50" |
| C30 | 20.00' | 31.42' | 28.28' | N 38°11'59" W | 90°00'00" |
| C31 | 20.00' | 31.42' | 28.28' | N 51°48'01" E | 90°00'00" |
| C42 | 275.00' | 85.54' | 85.20' | S 74°17'19" E | 17°49'19" |
| C43 | 275.00' | 122.00' | 121.00' | S 52°40'07" E | 25°25'05" |
| C44 | 275.00' | 117.35' | 116.46' | S 27°44'08" E | 24°26'57" |
| C55 | 355.00' | 61.87' | 61.79' | N 10°31'04" W | 9°59'08" |
| C56 | 355.00' | 72.44' | 72.31' | N 00°19'15" E | 11°41'30" |
| C57 | 355.00' | 3.93' | 3.93' | N 06°29'00" E | 0°38'01" |
| C61 | 150.00' | 58.41' | 58.04' | S 04°21'19" E | 22°18'39" |
| C62 | 245.00' | 42.70' | 42.65' | N 10°31'04" W | 9°59'08" |
| C63 | 245.00' | 49.99' | 49.91' | N 00°19'15" E | 11°41'30" |
| C64 | 245.00' | 2.71' | 2.71' | N 06°29'00" E | 0°38'01" |
| C65 | 20.00' | 31.42' | 28.28' | N 51°48'01" E | 90°00'00" |
| C66 | 100.00' | 64.93' | 63.79' | S 64°35'57" E | 37°12'04" |
| C67 | 100.00' | 53.21' | 52.59' | S 30°45'17" E | 30°29'17" |
| C69 | 100.00' | 38.94' | 38.69' | N 04°21'19" W | 22°18'39" |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| 13 | 9,625.0 | 0.22 |
| 14 | 9,625.0 | 0.22 |
| 15 | 9,625.0 | 0.22 |
| 16 | 10,476.7 | 0.24 |
| 17 | 9,625.0 | 0.22 |
| 18 | 11,134.8 | 0.26 |
| 19 | 11,783.9 | 0.27 |
| 20 | 11,704.0 | 0.27 |
| 47 | 6,050.0 | 0.14 |
| 48 | 6,414.4 | 0.15 |
| 49 | 6,476.5 | 0.15 |
| 50 | 6,476.5 | 0.15 |
| 51 | 6,129.6 | 0.14 |
| 52 | 7,889.2 | 0.18 |
| 53 | 7,889.2 | 0.18 |
| 54 | 6,050.0 | 0.14 |
| 55 | 6,050.0 | 0.14 |
| 56 | 6,050.0 | 0.14 |
| 57 | 6,050.0 | 0.14 |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| 71 | 6,050.0 | 0.14 |
| 72 | 6,050.0 | 0.14 |
| 73 | 6,050.0 | 0.14 |
| 74 | 6,050.0 | 0.14 |
| 75 | 6,050.0 | 0.14 |
| 76 | 6,050.0 | 0.14 |
| 77 | 6,050.0 | 0.14 |
| 78 | 6,050.0 | 0.14 |
| 79 | 6,086.5 | 0.14 |
| 80 | 6,733.9 | 0.15 |
| 81 | 6,634.5 | 0.15 |
| 82 | 6,050.0 | 0.14 |
| 88 | 9,625.0 | 0.22 |
| 89 | 11,701.8 | 0.27 |
| 90 | 10,207.1 | 0.23 |
| 91 | 10,000.0 | 0.23 |
| 92 | 10,000.0 | 0.23 |
| 93 | 10,000.0 | 0.23 |
| 94 | 10,000.0 | 0.23 |
| 95 | 10,000.0 | 0.23 |
| 98 | 9,625.0 | 0.22 |
| 111 | 9,398.0 | 0.22 |

| AREA TABLE | | |
|---|---|---|
| LOT | SQ. FT. | ACRES |
| OS-1 | 33,203.0 | 0.76 |
| OS-2 | 19,713.0 | 0.45 |
| OS-3 | 15,795.4 | 0.36 |
| OS-4 | 29,172.6 | 0.67 |
| OS-5 | 10,232.3 | 0.23 |
| OS-6 | 291,488.3 | 6.69 |
| OS-7 | 1,179,852.6 | 27.09 |

**Location Map**




Not To Scale

©2023

| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01 |
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| PLAT BOOK: P11, PAGE 27 | PLAT BOOK: P11, PAGE 27 & P11, PAGE 81 |
| PARCEL ADDRESS: 2556 GREENS MILL RD COLUMBIA, TN 38401 | PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401 |

EXISTING ZONING:
PUD

BUILDING SETBACKS:
FRONT – 25'
SIDE – 7.5'
REAR – 20'

ACREAGE OF PARCEL:
±77.50 ACRES TOTAL
±51.98 ACRES PHASE 1
±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER:
LENNAR HOMES OF TENNESSEE LLC
381 MALLORY STATION RD
SUITE 200
FRANKLIN, TN 37067

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**STORMWATER MANAGEMENT AGREEMENT:**
RECORDED: _____
DEED BOOK: _____ PAGE: _____

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Date _____ Lennar Homes of Tennessee LLC

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Columbia, Tennessee

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Columbia, Tennessee

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12/18/23 Allen B. O'Leary TN RLS #1987
Date Allen B. O'Leary Number

ALLEN B. O'LEARY
REGISTERED LAND SURVEYOR
AGRICULTURE
TENNESSEE NO. 1987
allen@wesengineers.com

Register of Deed Recording Stamp

**OPEN SPACE NOTE:**
**ALL OPEN SPACE AREA IS TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION, CREATED FOR THE PURPOSE OF MAINTAINING ALL COMMON OPEN SPACE AND GROUNDS INCLUDING THE DETENTION AREAS SHOWN ON THIS PLAT. ALL OPEN SPACE AREA IS CONSIDERED A PUBLIC UTILITY, AND DRAINAGE EASEMENT.**

**Legend**

- EIP Iron Rod Found
- IPS Iron Rod Set
- I.P.F. Iron Pipe Found
- AXLE Axle Found
- FCM Fence Post
- CM Concrete Monument Existing
- P.K.F. PK Nail Found
- P.K.S. PK Nail Set
- R.R.S.F. Railroad Spike Found
- R.R.S.S. Railroad Spike Set
- Bench Mark
- Stake Found
- Fire Hydrant
- Water Meter
- Water Valve
- Water Reducer
- Clean Out
- Sanitary Sewer Manhole
- Storm Sewer Manhole
- Catch Basin
- Curb Inlet
- Storm Pipe
- Cable Manhole
- Electric Manhole
- Telephone Manhole
- Water Manhole
- Electric Meter
- Cable Riser
- Electric Riser
- Telephone Riser
- Telephone Booth
- Gas Meter
- Gas Valve
- Light Pole
- Power Pole
- Telephone Pole
- Guy Pole
- Power Pole
- Flag Pole
- Guy Wire
- Mailbox
- Parking Block
- Satellite Dish
- Handicap Parking
- Water Spigot
- Bollard
- Evergreen Tree
- Deciduous Tree
- Bush
- Sign
- Adjoining Property Line
- Subject Property Line
- Easement Line
- Building Setback Line
- Centerline
- Edge of Pavement
- Edge of Gravel
- Fence Line
- Landscape
- Woods / Tree line
- Edge of Water
- Ditch / Creek Centerline
- Minor Contour Line
- Index Contour Line
- Gas Line
- Sanitary Sewer Line
- Water Line
- Storm Sewer Line
- Overhead Utility Line
- Overhead Cable Line
- Overhead Electric Line
- Overhead Telephone Line
- Underground Utility Line
- Underground Cable Line
- Underground Electric Line
- Underground Telephone Line
- Forced Main Line


WES Engineers & Surveyors
CIVIL ENGINEERS & LAND SURVEYORS
2486 NASHVILLE HIGHWAY
COLUMBIA, TN 38401
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www.wesengineers.com
ENGINEERS & SURVEYORS


Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

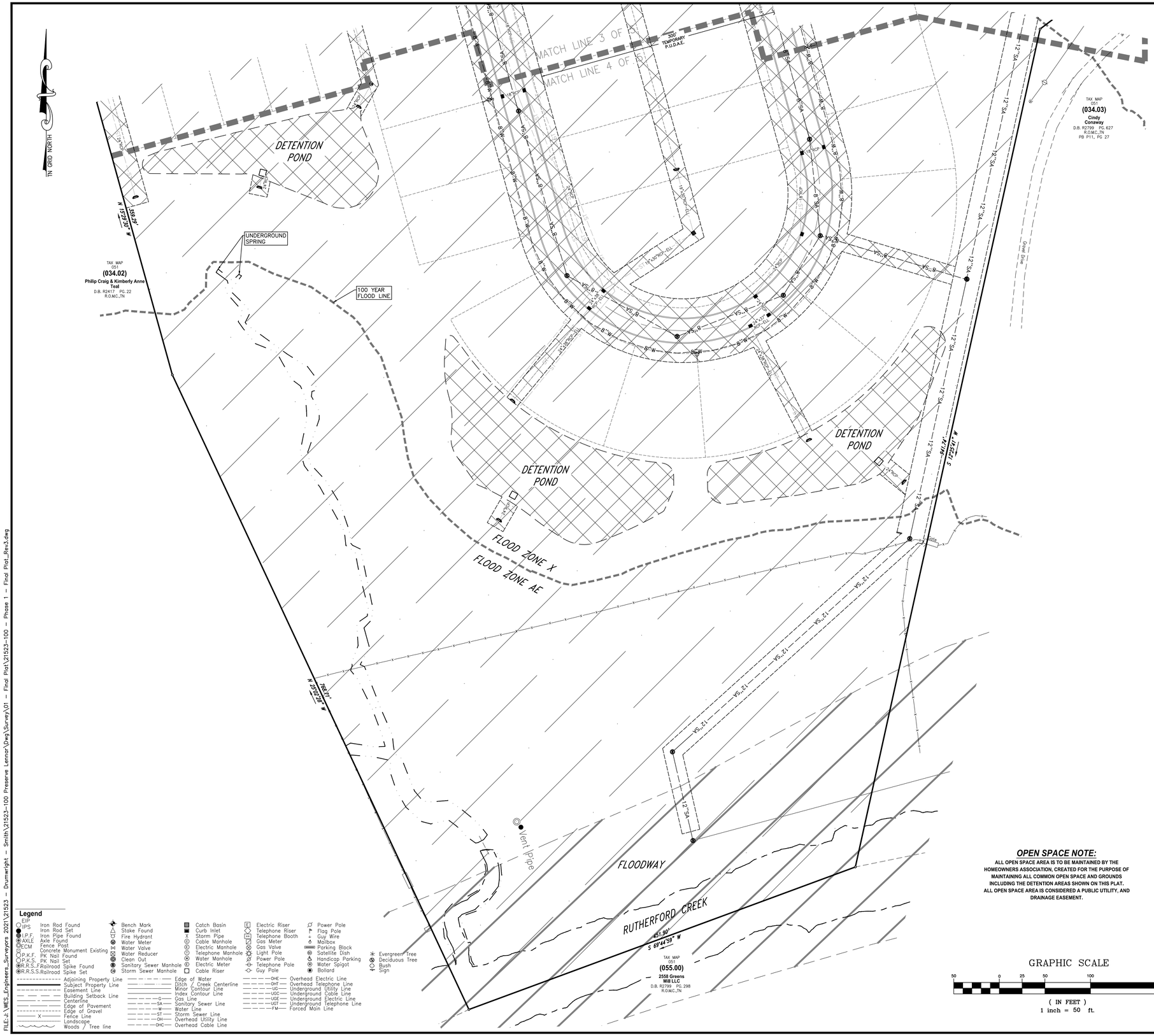
| DATE | REVISIONS |
|---|---|
| | |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no. 21523-100
Scale: Vertical: 1"=50'
Horizontal:

**3 of 5**

FILE: J:\ WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg




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- IPS Iron Rod Set
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- AXLE Axle Found
- FCM Fence Post
- Concrete Monument Existing
- P.K.F. PK Nail Found
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- R.R.S.-F Railroad Spike Found
- R.R.S.-S Railroad Spike Set
- Adjoining Property Line
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- Power Pole
- Telephone Pole
- Guy Pole
- Overhead Electric Line
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- Underground Cable Line
- Underground Electric Line
- Underground Telephone Line
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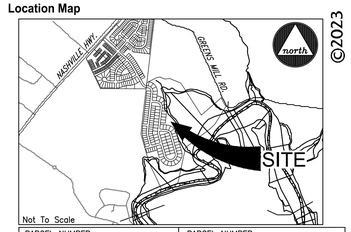
GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

Register of Deed Recording Stamp

**Location Map**




Not To Scale

©2023

| | |
|---|---|
| PARCEL NUMBER: TAX MAP 051, PARCEL 034.00 | PARCEL NUMBER: TAX MAP 051, PARCEL 034.01 |
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| PARCEL ADDRESS: 2554 GREENS MILL RD COLUMBIA, TN 38401 | PARCEL ADDRESS: VERNON RD COLUMBIA, TN 38401 |

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PUD

BUILDING SETBACKS:
FRONT – 25'
SIDE – 7.5'
REAR – 20'

ACREAGE OF PARCEL:
±77.50 ACRES TOTAL
±51.98 ACRES PHASE 1
±3.65 ACRE – 158,925.5 S.F. – R.O.W. DEDICATION

PROPERTY OWNER:
LENNAR HOMES OF TENNESSEE LLC
381 MALLORY STATION RD
SUITE 200
FRANKLIN, TN 37067

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The purpose of this plat is to create 68 single family lots and dedicate right-of-way.

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RECORDED:
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Columbia, Tennessee

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12/18/23 Allen B. O'Leary TN RLS #1987
Date Allen B. O'Leary Number

ALLEN B. O'LEARY — REGISTERED LAND SURVEYOR — STATE OF TENNESSEE — No. 1987 — AGRICULTURE

allen@wesengineers.com

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COLUMBIA, TN 38401
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ENGINEERS & SURVEYORS

Client
LENNAR HOMES
381 MALLORY STATION ROAD
SUITE 200
FRANKLIN, TN 37067

# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

| REVISIONS | DATE |
|---|---|
| | |

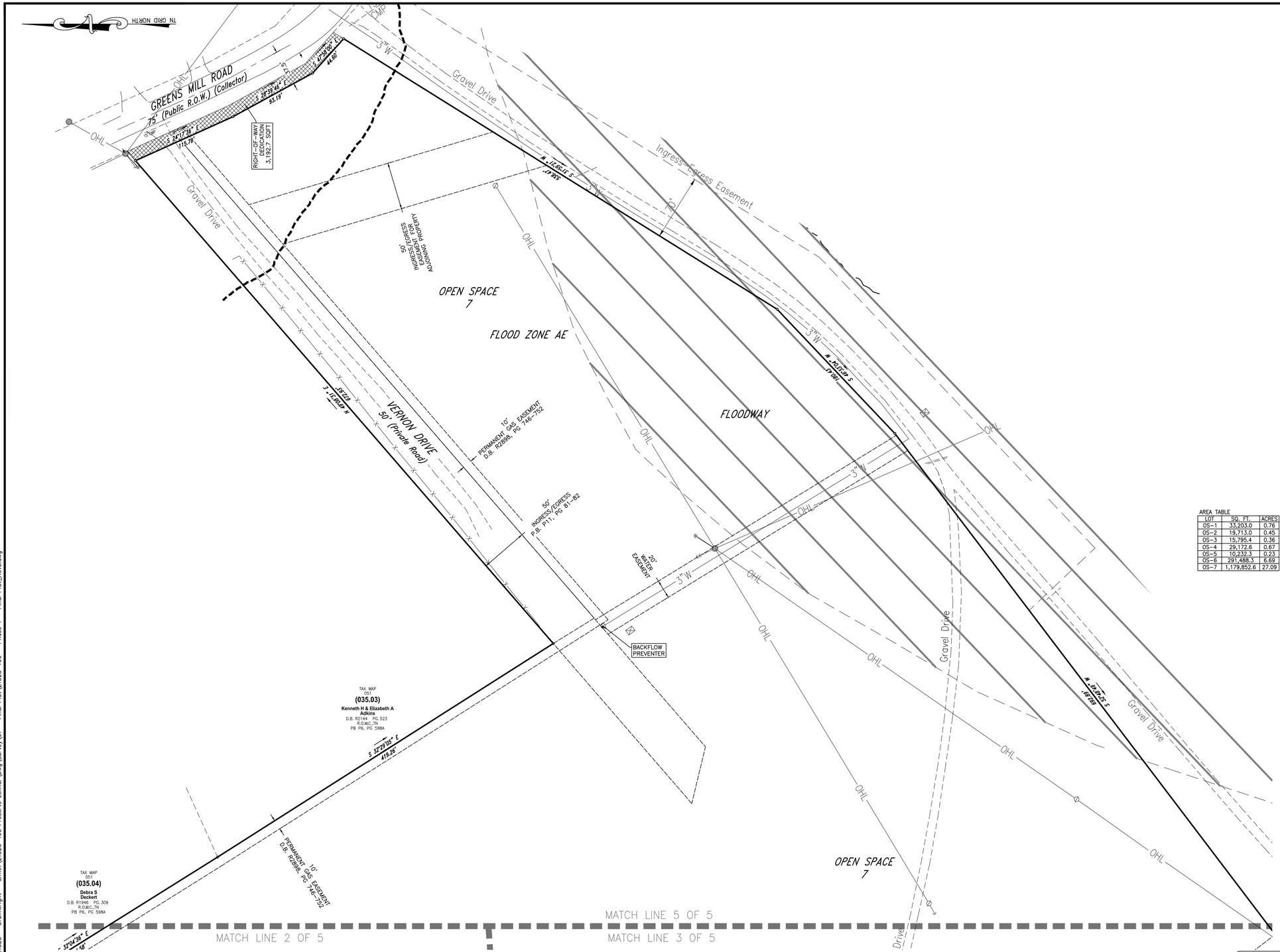
Drawn: EB Checked: AO Approved: AO Date: 10-16-2023

Job. no. 21523-100

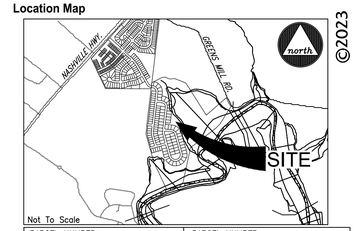
Scale: Vertical: 1"=50' Horizontal:



FILE: J:\WES_Engineers_Surveyors 2021\21523 - Drumwright - Smith\21523-100 Preserve Lennar\Dwg\Survey\01 - Final Plat\21523-100 - Phase 1 - Final Plat_Rev3.dwg




## Location Map




Not To Scale

©2023

| | |
|---|---|
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±51.98 ACRES PHASE 1
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Date Allen B. O'Leary Number

ALLEN B. O'LEARY
REGISTERED LAND SURVEYOR
AGRICULTURE
STATE OF TENNESSEE
1987
TENNESSEE NO. 1987

Register of Deed Recording Stamp

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GRAPHIC SCALE
50 0 25 50 100 200
( IN FEET )
1 inch = 50 ft.

**Legend**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| EIP | | Bench Mark | Catch Basin | Electric Riser | Power Pole | Adjoining Property Line | Edge of Water |
| IPS | Iron Rod Found | Stake Found | Curb Inlet | Telephone Riser | Flag Pole | Subject Property Line | Ditch / Creek Centerline |
| I.P.F. | Iron Rod Set | Fire Hydrant | Storm Pipe | Telephone Booth | Guy Wire | Easement Line | Minor Contour Line |
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| | | | | | Bush | | Overhead Telephone Line |
| | | | | | Sign | | Underground Utility Line |
| | | | | | | | Underground Cable Line |
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# FINAL PLAT
## PRESERVE AT DRUMWRIGHT, PHASE 1
COLUMBIA, TN

| REVISIONS | DATE |
|---|---|
| | |

Drawn: EB
Checked: AO
Approved: AO
Date: 10-16-2023

Job. no. 21523-100
Scale: Vertical: 1"=50' Horizontal:

5 of 5

FILE: J:\WES_Engineers_Surveyors 2021\21523 – Drumwright – Smith\21523-100 Preserve Lennar\Dwg\Survey\01 – Final Plat\21523-100 – Phase 1 – Final Plat_Rev3.dwg

December 18, 2023

City of Columbia
Development Services
700 North Garden Street
Columbia, TN 38401

**RE:** **Project Name: Preserve at Drumwright, Phase 1, Final Plat**
City of Columbia Staff Review Submittal

On behalf of Lennar Homes of Tennessee LLC, the owner of these 68 proposed single family lots, **WES Engineers & Surveyors** would like to resubmit this Final Plat to the City of Columbia for Planning Commission approval. Comments are addressed below in red.

## Planning

1. Prelim indicates 111 lots, FP shows 111, but tab indicates 112. Change notation to show correct number of lots. 111 is the correct number of lots for the subdivision. With change the subdivision to be done in phases, the count is now 68 lots for Phase 1.
2. Show pull-off and parking at open space (OS) 2 as indicated on C3.1 of the approved Master PUD. The pull off has been shown.
3. Identify OS uses as shown on approved Master PUD. Open space uses have been noted on the plat.
4. Identify surfacing of OS 6 walking trail. The walking trail is pavement and has been noted on the plat.

## Engineering

1. Include ROW dedication along Greens Mill Rd. 37.5 ft from the centerline of the existing ROW. Right-of-Way dedication has been added.
2. Provide MOU with Greens Mill Rd PUD, Drumwright, and Steadfast Greens Mill regarding installation of traffic improvement at Nashville Hwy and Greens Mill Rd. Provide proposed timing of construction of improvements. Platting of the development cannot be offered as a result of the full TIS requirements not being installed. It is our understanding that this is being handled by the developer.
3. Platting of development may not proceed until construction has commenced on the improvements. Full platting of the development may not be completed until improvements are complete. The development is now being broken into multiple phases.
4. Provide surety in the amount of $1,190,000 by 11/20. The value of the surety will need to be adjusted now that the subdivision is broken up into phases. This will be handled by the developer.
5. Record stormwater maintenance agreement by 11/20. This is being handled by the developer.
6. Binder and curbing to be installed by 11/20 Binder and curbing has been installed.

7. Relocate driveway to Vernon Drive and provide appropriate access easement as indicated on the Master Plan. An access easement has been added.

## Wastewater

1. Page 1 north arrow facing wrong way. Otherwise Columbia Wastewater has no concern. The north arrow was corrected.

If you have any questions or comments with this submittal, please do not hesitate to contact me directly.

Sincerely,
**WES Engineers & Surveyors**



Allen B. O'Leary, RLS
Principal

DocuSign Envelope ID: 47DDF488-990A-480E-965A-BAF1EB3223BF

CITY OF COLUMBIA TENNESSEE

DEVELOPMENT SERVICES
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*

*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | Nashville Hwy, Columbia, TN | | |
| | TAX MAP: 051 | GROUP: | PARCEL: 034.00/034.01 |
| SUMMARY OF NATURE OF REQUEST AND WORK | Request Final Plat approval for 68 single family residential lots and dedication of right-of-way for Preserve at Drumwright, Phase 1. | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ❑ Annexation<br>❑ Rezoning<br>❑ Preliminary Plat<br>☑ Final Plat<br>❑ PUD Preliminary Master Plan<br>❑ PUD Final Site Plan<br>❑ Multi-Family Site Plan<br>❑ Other:<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>❑ Written Legal Description copy<br>❑ Requested Zone Listed<br>❑ Compliance with Comprehensive Plan<br>❑ Annexation Permission Form<br>❑ Plans and/or Plats conforming to City standards with check list completed<br>❑ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>☑ Project Name (include Sections & Phases)<br>Preserve at Drumwright, Phase 1<br>☑ Total Number of Lots<br>68<br>☑ Total acreage<br>±51.98 |

DocuSign Envelope ID: 47DDF488-990A-480E-965A-BAF1EB3223BF

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

All communications go to the Applicant's email that is provided.

| | | | |
|---|---|---|---|
| NAME | Allen B. O'Leary | PHONE | 931-388-2329 |
| ADDRESS | 2486 Nashville Hwy, Columbia, TN | EMAIL | allen@wesengineers.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | Lennar Homes of Tennessee LLC | PHONE | |
| ADDRESS | 381 Mallory Station Rd, Suite 200<br>Franklin, TN 37067 | EMAIL | |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

| Lennar Homes of Tennessee LLC | DocuSigned by: Nick Branum 8C134011FD38474... | 12/21/2023 |
|---|---|---|
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |
| Lennar Homes of Tennessee LLC | DocuSigned by: Nick Branum 8C134011FD38474... | 12/21/2023 |
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |

DocuSign

## Certificate Of Completion

Envelope Id: 47DDF488990A480E965ABAF1EB3223BF
Status: Completed
Subject: Complete with DocuSign: Preserve at Drumwright, PH1-PC Application Final Plat.pdf
Source Envelope:
Document Pages: 2
Signatures: 2
Certificate Pages: 1
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Enabled
Time Zone: (UTC-08:00) Pacific Time (US & Canada)

Envelope Originator:
Angela Lashley
5505 Blue Lagoon Drive, Suite 502
Miami, FL 33126
Angela.Lashley@Lennar.com
IP Address: 45.22.154.219

## Record Tracking

Status: Original
12/21/2023 8:45:03 AM
Holder: Angela Lashley
Angela.Lashley@Lennar.com
Location: DocuSign

| Signer Events | Signature | Timestamp |
|---|---|---|
| Nick Branum<br>nick.branum@lennar.com<br>Director of Land Dev.<br>Lennar Corporation<br>Security Level: Email, Account Authentication (None) | DocuSigned by:<br>Nick Branum<br>8C134011FD38474...<br><br>Signature Adoption: Pre-selected Style<br>Using IP Address: 166.196.82.9<br>Signed using mobile | Sent: 12/21/2023 8:46:38 AM<br>Viewed: 12/21/2023 9:22:58 AM<br>Signed: 12/21/2023 9:23:14 AM |

**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

| In Person Signer Events | Signature | Timestamp |
|---|---|---|

| Editor Delivery Events | Status | Timestamp |
|---|---|---|

| Agent Delivery Events | Status | Timestamp |
|---|---|---|

| Intermediary Delivery Events | Status | Timestamp |
|---|---|---|

| Certified Delivery Events | Status | Timestamp |
|---|---|---|

| Carbon Copy Events | Status | Timestamp |
|---|---|---|

| Witness Events | Signature | Timestamp |
|---|---|---|

| Notary Events | Signature | Timestamp |
|---|---|---|

| Envelope Summary Events | Status | Timestamps |
|---|---|---|
| Envelope Sent | Hashed/Encrypted | 12/21/2023 8:46:38 AM |
| Certified Delivered | Security Checked | 12/21/2023 9:22:58 AM |
| Signing Complete | Security Checked | 12/21/2023 9:23:14 AM |
| Completed | Security Checked | 12/21/2023 9:23:14 AM |

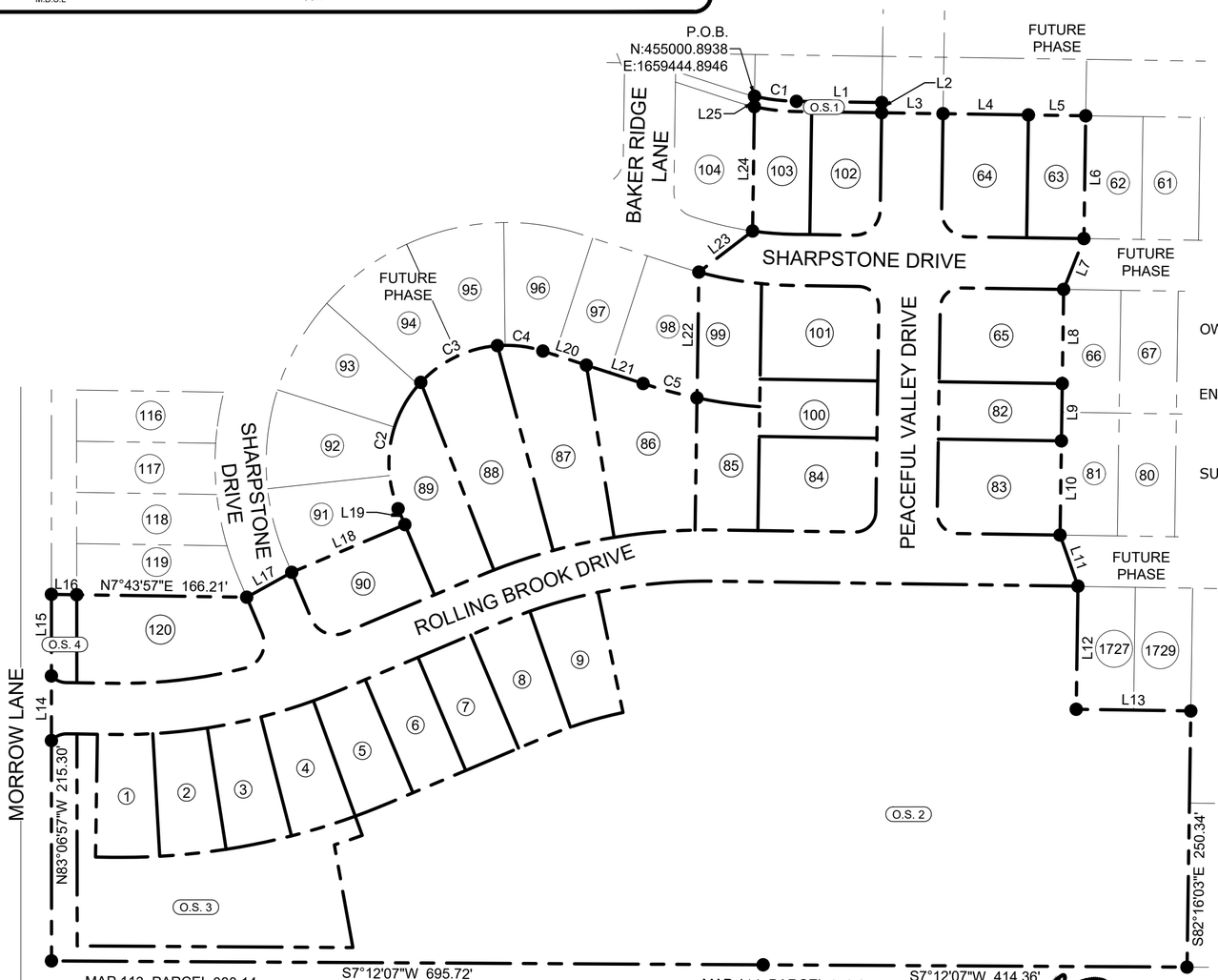
| Payment Events | Status | Timestamps |
|---|---|---|

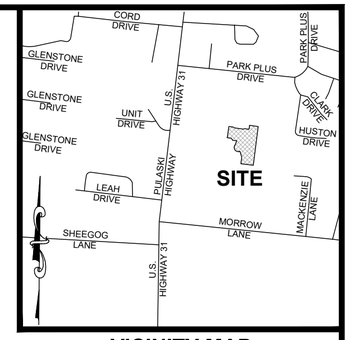
**LEGEND**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IRON PIN FOUND | | FIRE HYDRANT | | UTILITY POLE | | PUBLIC UTIL. & DRAIN ESMT. | P.U.D.E. | | BOUNDARY | | |
| IRON PIN SET | | SANITARY SEWER MH | SS | GUY ANCHOR | | ADDRESSES | 1234 | | CENTERLINE | | |
| CONC. MON. FOUND | | SANITARY SEWER CO | CO | COMMUNICATION BOX | C | HANDICAP SPACE | | | BUFFER | | |
| CONC. MON. SET | | AREA DRAIN | | COMMUNICATION MH | C | SANITARY SEWER | 8" SA | | WATER FEATURE | | |
| CONTROL POINT FOUND | | CURB INLET | | GAS METER | G | WATER | 4" W | | TREE LINE | | |
| CONTROL POINT SET | | STORM MH | ST | GAS VALVE | | UNDERGROUND ELEC | UGE | | R.O.W. | RIGHT OF WAY | |
| BENCH MARK | | ELECTRIC METER-BOX | E | EVERGREEN TREE | | OVERHEAD ELEC | OHE | | PVMT. | EDGE OF PAVEMENT | |
| WATER METER | W | ELECTRIC MH | E | SIDEWALK | | GAS | 4" G | | PUDE | PUBLIC UTILITY AND DRAINAGE EASEMENT | |
| WATER VALVE | | LIGHT POLE | | MIN. BUIDLING SETBACK | M.B.S.L | COMMUNICATIONS | COM | | G.I.E. | GREEN INFRASTRUCTURE EASEMENT | |

## PLAT NOTES

1. THE PURPOSE OF THIS PLAT IS TO CREATE 27 SINGLE-FAMILY RESIDENTIAL LOTS AND 3 OPEN SPACES.
2. SUBJECT PROPERTY IS PRESENTLY IDENTIFIED AS A PORTION OF PARCEL 80.50, ON MAURY COUNTY TAX MAP 113. SAID PARCEL IS FURTHER IDENTIFIED AS A PORTION OF THE PROPERTY DESCRIBED IN BOOK R2874, PAGE 1163, REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE.
3. THE PROPERTY SHOWN HEREON IS LOCATED WITHIN THE CITY OF COLUMBIA, MAURY COUNTY, TN. ALL MATTERS PERTAINING TO CONSTRUCTION, USE, LOCATION OF IMPROVEMENTS, SIGNAGE, PARKING, NOISE, VIBRATION, EMISSIONS, FIRE HAZARDS, RADIATION, ILLUMINATION, SETBACK PROVISIONS, ETC,. ARE SUBJECT TO THE CITY OF COLUMBIA'S ZONING REGULATIONS AS INTERPRETED AND REGULATED BY THE DEPARTMENT OF DEVELOPMENT SERVICES.
4. EXISTING ZONING: CD-4 & RS-40
5. I HEREBY CERTIFY THAT THIS IS A CATEGORY IV SURVEY AND WAS CONDUCTED IN ACCORDANCE WITH RULE 0820-03.11 (GLOBAL POSITION SYSTEMS SURVEYS) ACCORDING TO THE CURRENT TENNESSEE MINIMUM STANDARDS OF PRACTICE AS PROMULGATED BY THE TENNESSEE STATE BOARD OF EXAMINERS FOR LAND SURVEYORS. THIS SURVEY WAS CONDUCTED WITH DUAL-FREQUENCY RTK GPS EQUIPMENT BASED ON THE TDOT CORPS NETWORK.
   a. POSITIONAL ACCURACY: 0.07'
   b. DATE OF SURVEY: 03/24/22
   c. DATUM/EPOCH: TENNESSEE STATE PLANE (NAD83). OCCUPATIONS FOR CONTROL POINTS ARE 3 MINUTES EACH, SIDE SHOTS ARE 3 SECONDS.
   d. GEOID 3, ZONE 7 REVISED
6. NO COMBINED GRID FACTORS WERE USED.
7. BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE STATE PLANE COORDINATE SYSTEM (NAD83). ELEVATIONS SHOWN HEREON ARE BASED ON NAVD88.
8. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN ZONE "X" AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NO. 47119CO285E, WITH AN EFFECTIVE DATE OF APRIL 16, 2007, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE PROGRAM. ZONE "X" IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE "X" HAS TWO DESCRIPTIONS. PLEASE SEE FLOOD PLAIN MAP IF ZONE "X" IS SHADED. ***IF FIELD RUN CONTOURS ARE ESTABLISHED YOU MUST PLOT THE FLOOD LINE BASED ON BFE UNLESS THE PROPERTY IS IN ZONE A
9. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN ZONE "AE" AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NO. 47187C0190F, WITH AN EFFECTIVE DATE OF SEPTEMBER 29, 2006, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE PROGRAM. BASE FLOOD ELEVATION FOR THIS PROPERTY IS 630.9. ZONE "AE" IS AN AREA WHERE BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED. PLEASE MODIFY THIS NOTE FOR THE PROPER ZONE.
10. ALL CORNERS SHOWN ON THE FACE OF THE SURVEY WILL BE SET WITH 5/8 IRON ROD WITH CAP BEARING THIS SURVEYORS COMPANY NAME.
11. THE DEVELOPER ACKNOWLEDGES THAT ALL LOTS HAVE ADEQUATE BUILDING ENVELOPES AND NO VARIANCES WILL BE REQUIRED.
12. STORMWATER MAINTENANCE AGREEMENT RECORDED IN DEED BOOK R2874, PAGE 1163.
13. ALL STREETS AND ALLEYS ARE DESIGNATED AS PUBLIC RIGHT-OF-WAY; THE CITY OF COLUMBIA IS NOT RESPONSIBLE FOR THE REPLACEMENT OR REPAIR OF ANY PRIVATE STRUCTURES WITHIN PUBLIC EASEMENTS SHOULD THE STRUCTURES BE DISTURBED IN THE PROCESS OF THE CITY EXERCISING ITS EASEMEN RIGHTS.
14. STREETS, DRAINAGE EASEMENTS, STRUCTURES, AND CULVERTS SHALL BE MAINTAINED BY THE CITY OF COLUMBIA. DETENTION PONDS AND OUTLET STRUCTURES WITHIN PUBLIC DRAINAGE EASEMENTS ARE TO BE MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.
15. STORMWATER QUALITY SHALL BE ADDRESSED WITH EACH SITE PLAN.
16. OPEN SPACE AREAS, ROADWAY MEDIANS, BRICK PEDESTRIAN CROSSWALKS, BIKE PATHS, SIDEWALKS OUTSIDE OF RIGHT-OF-WAYS, TRAILS AND DETENTION FACILITIES SHALL BE MAINTAINED BY THE HOME OWNER'S ASSOCIATION AND SHALL BE PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENTS.
17. WITHIN NEW DEVELOPMENTS AND FOR OFF-SITE LINES CONSTRUCTED AS A RESULT OF, OR TO PROVIDE SERVICE TO, THE NEW DEVELOPMENT, ALL UTILITIES, (INCLUDING CABLE TELEVISION, ELECTRICAL, NATURAL GAS, SEWER, TELEPHONE AND WATER LINES) SHALL BE PLACED UNDERGROUND.
18. AT ALL TEMPORARY TURNAROUNDS, A SIGN SHALL BE PLACED STATING, "STREET TO BE EXTENDED BY AUTHORITY OF THE CITY OF COLUMBIA."
19. MAINTENANCE OF ALL STORMWATER MANAGEMENT FEATURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER(S) OR HOA.
20. NO OBSTRUCTIONS OR ENCROACHMENTS WHICH IMPEDE THE FLOW OF STORMWATER SHALL BE PERMITTED WITHIN PUBLIC DRAINAGE EASEMENTS BETWEEN LOTS. THE CITY OF FRANKLIN IS NOT RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY ENCROACHMENTS THAT ARE DAMAGED OR REMOVED IN THE COURSE OF MAINTENANCE ACTIVITY WITHIN EASEMENTS.
21. SIDEWALKS AND TRAILS OUTSIDE OF PUBLIC RIGHT-OF-WAY SHALL BE PUBLIC ACCESS EASEMENTS AND SHALL BE MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.
22. THE CITY OF COLUMBIA WATER MANAGEMENT DEPARTMENT HAS UNRESTRICTED ACCESS TO ITS DOMESTIC WATER, SANITARY SEWER, RECLAIM WATER LINES OR SYSTEM IMPROVEMENTS LOCATED WITHIN ITS EXCLUSIVE EASEMENTS WITHIN THE DEVELOPMENT. IN THE EVENT LANDSCAPING, FENCING, CONCRETE OR OTHER STRUCTURES ARE INSTALLED OR PLACED WITHIN A CITY OF COLUMBIA EASEMENT, THE CITY OF COLUMBIA SHALL HAVE THE RIGHT TO REMOVE SUCH ENCROACHMENTS WITHIN THE EASEMENT AS MAY BE NECESSARY FOR THE CITY OF COLUMBIA TO REPAIR, MAINTAIN OR REPLACE ITS INFRASTRUCTURE WHICH IS NOW OR IN THE FUTURE MAY BE LOCATED WITHIN THE EASEMENT WITHOUT OBTAINING ANY FURTHER PERMISSION FROM THE PROPERTY OWNER OR HOA. THE PROPERTY OWNER OR HOA SHALL BE RESPONSIBLE FOR REPAIRING AND/OR REPLACING ANY SUCH LANDSCAPING, FENCING, CONCRETE, OR OTHER STRUCTURES REMOVED OR DISTURBED BY THE CITY OF COLUMBIA IN COMMON OPEN SPACE LOTS AND IN AREAS OWNED BY THE PROPERTY OWNER OR HOA AT NO EXPENSE TO THE CITY OF COLUMBIA. INDIVIDUAL HOMEOWNERS SHALL BE RESPONSIBLE FOR STRUCTURES REMOVED OR DISTURBED BY THE CITY OF COLUMBIA WITHIN AN EASEMENT ON THE HOMEOWNER'S LOT AT THE HOMEOWNER'S EXPENSE.
23. ALL LOTS WITHIN PHASE 1A REQUIRE A FIRE SPRINKLER SYSTEM INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.A HORN AND STROBE WILL BE REQUIRED ON THE FRONT OF THE HOUSE. IT WILL ACTIVATE WHEN THE SPRINKLER SYSTEM IS ACTIVATED.
24. PUBLIC UTILITY AND DRAINAGE EASEMENTS (PUDE) SHALL BE REQUIRED AND BE TEN (10) FEET IN WIDTH ON ALL PROPERTY LINES PARALLEL AND ABUTTING PUBLIC ROADS OR RIGHTS-OF-WAY, AND FIVE (5) FEET IN WIDTH ON ALL INTERIOR LOT LINES, EXCEPT FOR INTERIOR LOT LINES WITH A ZERO LOT LINE OR A COMMON WALL ALONG A LOT LINE.




**VICINITY MAP**
NOT TO SCALE

OWNER: M/I HOMES OF NASHVILLE, LLC
4131 WORTH AVE STE 500
COLUMBUS, OH 43219

ENGINEER: CRUNK ENGINEERING, LLC
7112 CROSSROADS BLVD STE 201
BRENTWOOD, TN 37027
615-873-1795

SURVEYOR: JOEY C. WILSON II, PE, RLS
WILSON & ASSOCIATES, P.C.
108 BEASLEY DRIVE
FRANKLIN, TN 37064
(615)794-2275
JWILSON@WILSONPC.COM

GRAPHIC SCALE: 1" = 100'

# HILLCREST VILLAGE

## PHASE 1A

### CERTIFICATE OF APPROVAL OF WATER SYSTEM

I HEREBY CERTIFY THAT THE WATER SYSTEM(S) OUTLINED OR INDICATED ON THIS FINAL SUBDIVISION PLAT HAS/HAVE BEEN INSTALLED IN ACCORDANCE WITH CURRENT LOCAL AND STATE GOVERNMENT REQUIREMENTS, OR A SUFFICIENT BOND OR OTHER SURETY HAS BEEN FILED TO GUARANTEE SAID INSTALLATION.

NAME, TITLE, AGENCY OF AUTHORIZED APPROVING AGENT _____ DATE _____

### CERTIFICATE OF COMPLIANCE

I HEREBY CERTIFY THAT THE SUBDIVISION PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE COLUMBIA SUBDIVISION REGULATIONS AND OTHER ADOPTED ORDINANCES AND POLICIES.

CITY ENGINEER _____ DATE _____
COLUMBIA, TENNESSEE

### CERTIFICATE OF SURVEY ACCURACY

I (WE) HEREBY CERTIFY THAT TO THE BEST OF MY (OUR) KNOWLEDGE AND BELIEF THIS IS A TRUE AND ACCURATE SURVEY OF THE PROPERTY SHOWN HEREON; THAT THIS IS A CLASS "X" LAND SURVEY AS DEFINED IN TITLE 62, CHAPTER 18, TENNESSEE CODE ANNOTATED, AND THAT THE RATIO OF PRECISION IS GREATER THAN OR EQUAL TO 1: _ _.

DATE _____

JOEY C. WILSON II, TENNESSEE RLS NO. 2089
WILSON & ASSOCIATES, P.C.
ENGINEERING/SURVEYING/ENVIRONMENTAL
108 BEASLEY DRIVE, FRANKLIN, TN 37064
OFFICE: 615.794.2275 FAX 615.794.2176
JWILSON@WILSONPC.COM

### CERTIFICATE OF APPROVAL OF SUBDIVISION NAME & STREET NAMES

SUBDIVISION NAME AND STREET NAMES APPROVED BY THE CITY ENGINEERING DEPARTMENT AND BY E-911 MAURY COUNTY.

MAURY COUNTY E911 _____ DATE _____

### CERTIFICATE OF OWNERSHIP AND DEDICATION

I (WE) HEREBY CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY SHOWN AND DESCRIBED HEREON AS EVIDENCED IN BOOK NUMBER 0000, PAGE 0000, MAURY COUNTY REGISTERS OFFICE, AND THAT I (WE) HEREBY ADOPT THIS FINAL SUBDIVISION PLAT OF THE PROPERTY AS SHOWN HEREON AND DEDICATE ALL PUBLIC WAYS AND EASEMENTS AS NOTED WITH MY (OUR) FREE CONSENT.

OWNER _____ DATE _____

### CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE & UTILITIES

I HEREBY CERTIFY THAT THE STREETS, DRAINAGE, AND UTILITIES OUTLINED OR INDICATED ON THIS FINAL SUBDIVISION PLAT HAVE BEEN INSTALLED IN ACCORDANCE WITH CITY SPECIFICATIONS, OR A PERFORMANCE SURETY IN THE AMOUNT OF $_____ FOR STREETS AND DRAINAGE HAS BEEN POSTED WITH THE CITY OF COLUMBIA, TENNESSEE, TO ASSURE COMPLETION OF SUCH IMPROVEMENTS.

CITY ENGINEER _____ DATE _____
COLUMBIA, TENNESSEE

### CERTIFICATE OF APPROVAL FOR SANITARY SEWER SYSTEM

I HEREBY CERTIFY THAT THE SANITARY SEWER SYSTEM OUTLINED OR INDICATED ON THIS FINAL SUBDIVISION PLAT HAS BEEN INSTALLED IN ACCORDANCE WITH THE CURRENT LOCAL AND STATE GOVERNMENT REQUIREMENTS, OR A SUFFICIENT BOND OR OTHER SURETY HAS BEEN FILED TO GUARANTEE SAID INSTALLATION.

DIRECTOR OF WASTEWATER DEPARTMENT _____ DATE _____
COLUMBIA, TENNESSEE

### CERTIFICATE OF APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SUBDIVISION PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE CITY OF COLUMBIA SUBDIVISION REGULATIONS, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED IN THE MINUTES OF THE COLUMBIA MUNICIPAL PLANNING COMMISSION, AND THAT IT HAS BEEN APPROVED FOR RECORDING IN THE OFFICE OF THE MAURY COUNTY REGISTER OF DEEDS.

SECRETARY, PLANNING COMMISSION _____ DATE _____
COLUMBIA, TENNESSEE

RECORDING STAMP HERE

IF YOU CAN READ THIS YOU ARE HOLDING AN UNRECORDED COPY

WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

## FINAL SUBDIVISION PLAT

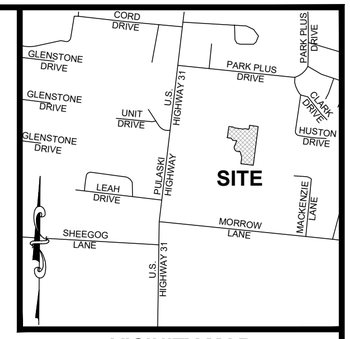
CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
| ACRES NEW RD/ST: | 2.161 (ROW) | L.F. OF NEW RD/ST: | 1897.11 +/- |
| ACRES OPEN SPACE: | 6.613 | CIVIL DISTRICT: | 3RD |
| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 100' | DATE: | 01/11/2024 |

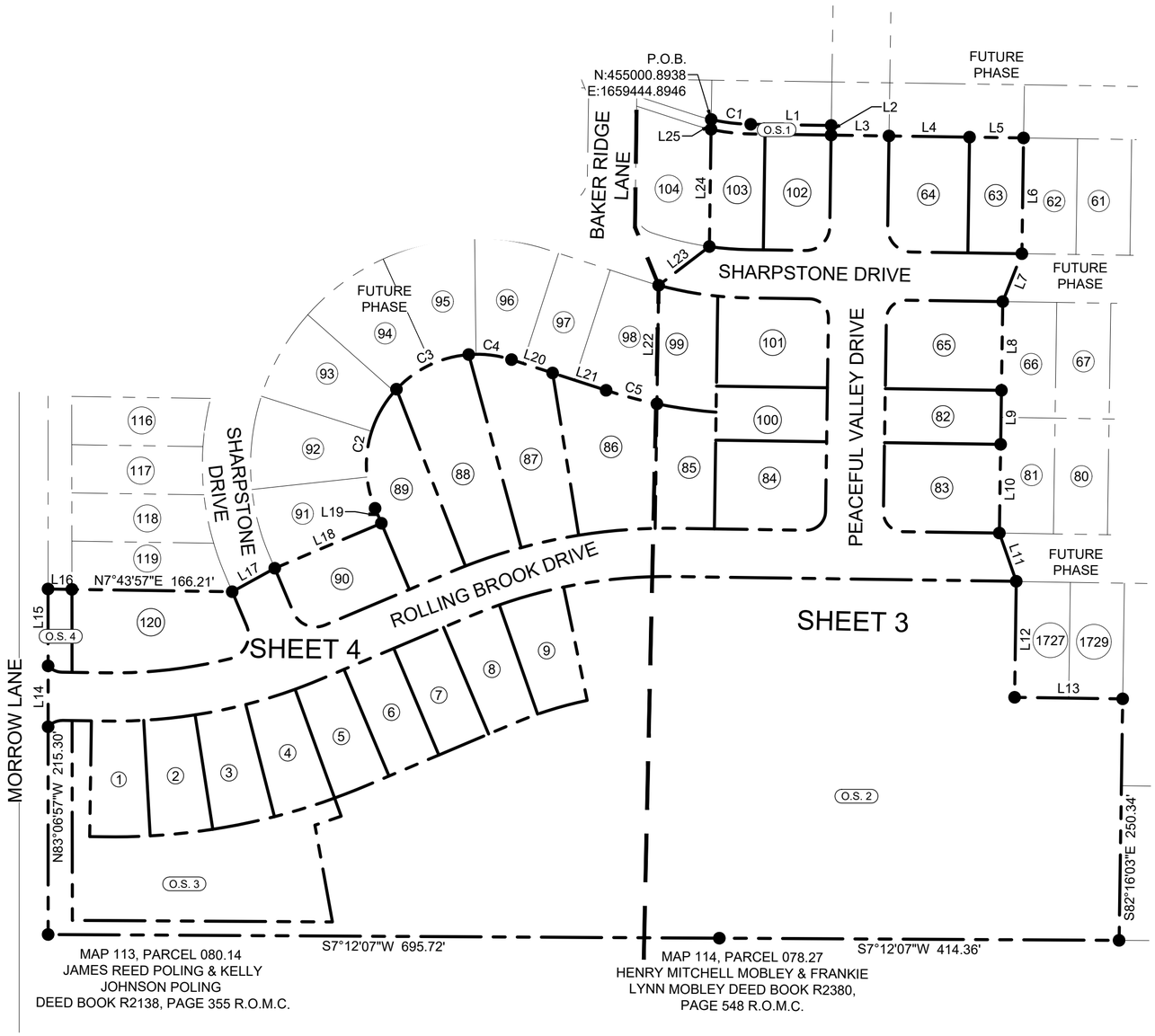
WA PROJECT NO. 22-1861 SHEET 1 0F 4

**LEGEND**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IRON PIN FOUND | | FIRE HYDRANT | | UTILITY POLE | | PUBLIC UTIL. & DRAIN ESMT. | P.U.D.E. | BOUNDARY | |
| IRON PIN SET | | SANITARY SEWER MH | SS | GUY ANCHOR | | ADDRESSES | 1234 | CENTERLINE | |
| CONC. MON. FOUND | | SANITARY SEWER CO | SCO | COMMUNICATION BOX | C | HANDICAP SPACE | | BUFFER | |
| CONC. MON. SET | | AREA DRAIN | | COMMUNICATION MH | C | SANITARY SEWER | 8" SA | WATER FEATURE | |
| CONTROL POINT FOUND | | CURB INLET | | GAS METER | G | WATER | 4" W | TREE LINE | |
| CONTROL POINT SET | | STORM MH | ST | GAS VALVE | | UNDERGROUND ELEC | UGE | R.O.W. | RIGHT OF WAY |
| BENCH MARK | | ELECTRIC METER-BOX | E | EVERGREEN TREE | | OVERHEAD ELEC | OHE | PVMT. | EDGE OF PAVEMENT |
| WATER METER | W | ELECTRIC MH | E | SIDEWALK | | GAS | 4" G | PUDE | PUBLIC UTILITY AND DRAINAGE EASEMENT |
| WATER VALVE | | LIGHT POLE | | MIN. BUIDLING SETBACK | M.B.S.L | COMMUNICATIONS | COM | G.I.E. | GREEN INFRASTRUCTURE EASEMENT |




**VICINITY MAP**
NOT TO SCALE




| Parcel Area Table | | |
|---|---|---|
| Parcel # | Area (SF) | Area (AC) |
| 1 | 7018.79' | 0.161 |
| 2 | 7131.86' | 0.164 |
| 3 | 7131.86' | 0.164 |
| 4 | 7131.86' | 0.164 |
| 5 | 6936.45' | 0.159 |
| 6 | 6720.00' | 0.154 |
| 7 | 6720.00' | 0.154 |
| 8 | 7023.35' | 0.161 |
| 9 | 7357.80' | 0.169 |
| 63 | 6720.00' | 0.154 |
| 64 | 9885.87' | 0.227 |
| 65 | 10992.25' | 0.252 |
| 82 | 6743.19' | 0.155 |
| 83 | 10992.25' | 0.252 |

| Parcel Area Table | | |
|---|---|---|
| Parcel # | Area (SF) | Area (AC) |
| 84 | 10494.16' | 0.241 |
| 85 | 7633.64' | 0.175 |
| 86 | 13585.98' | 0.312 |
| 87 | 13593.69' | 0.312 |
| 88 | 14858.87' | 0.341 |
| 89 | 10894.01' | 0.250 |
| 90 | 8805.87' | 0.202 |
| 99 | 7454.81' | 0.171 |
| 100 | 6440.00' | 0.148 |
| 101 | 10508.15' | 0.241 |
| 102 | 8085.87' | 0.186 |
| 103 | 6741.04' | 0.155 |
| 120 | 14268.47' | 0.328 |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 83.44' | N7°43'57"E |
| L2 | 10.00' | S82°16'03"E |
| L3 | 60.00' | N7°43'57"E |
| L4 | 83.50' | N7°43'57"E |
| L5 | 56.00' | N7°43'57"E |
| L6 | 120.00' | S82°16'03"E |
| L7 | 53.52' | S61°22'29"E |
| L8 | 92.00' | S82°16'03"E |
| L9 | 56.00' | S82°16'03"E |
| L10 | 92.00' | S82°16'03"E |
| L11 | 52.96' | N77°35'45"E |
| L12 | 120.28' | S82°18'54"E |
| L13 | 112.00' | N7°43'57"E |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L14 | 63.19' | N83°06'57"W |
| L15 | 79.69' | N83°06'57"W |
| L16 | 24.71' | N7°43'57"E |
| L17 | 50.28' | N22°01'41"W |
| L18 | 120.00' | N16°00'18"W |
| L19 | 16.80' | S73°59'42"W |
| L20 | 44.76' | N24°52'05"E |
| L21 | 58.31' | N24°52'05"E |
| L22 | 122.90' | N82°16'03"W |
| L23 | 66.09' | N30°29'48"W |
| L24 | 121.55' | N82°16'03"W |
| L25 | 10.22' | N82°16'03"W |

| Open Space Area Table | | |
|---|---|---|
| Parcel # | Area (SF) | Area (AC) |
| O.S. 1 | 1247.94' | 0.029 |
| O.S. 2 | 256804.88' | 5.895 |
| O.S. 3 | 27933.64' | 0.641 |
| O.S. 4 | 2101.35' | 0.048 |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 41.37' | 195.00' | 12° 09' 24" | N13° 48' 39"E | 41.30' |
| C2 | 132.75' | 115.00' | 66° 08' 25" | N72° 56' 06"W | 125.50' |
| C3 | 84.97' | 115.00' | 42° 19' 55" | N18° 41' 55"W | 83.05' |
| C4 | 44.96' | 115.00' | 22° 24' 03" | N13° 40' 04"E | 44.68' |
| C5 | 54.51' | 495.00' | 6° 18' 33" | N21° 42' 49"E | 54.48' |


OWNER: M/I HOMES OF NASHVILLE, LLC
4131 WORTH AVE STE 500
COLUMBUS, OH 43219
ENGINEER: CRUNK ENGINEERING, LLC
7112 CROSSROADS BLVD STE 201
BRENTWOOD, TN 37027
615-873-1795
SURVEYOR: JOEY C. WILSON II, PE, RLS
WILSON & ASSOCIATES, P.C.
108 BEASLEY DRIVE
FRANKLIN, TN 37064
(615)794-2275
JWILSON@WILSONPC.COM


GRAPHIC SCALE: 1" = 100'




WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

# HILLCREST VILLAGE

## PHASE 1A

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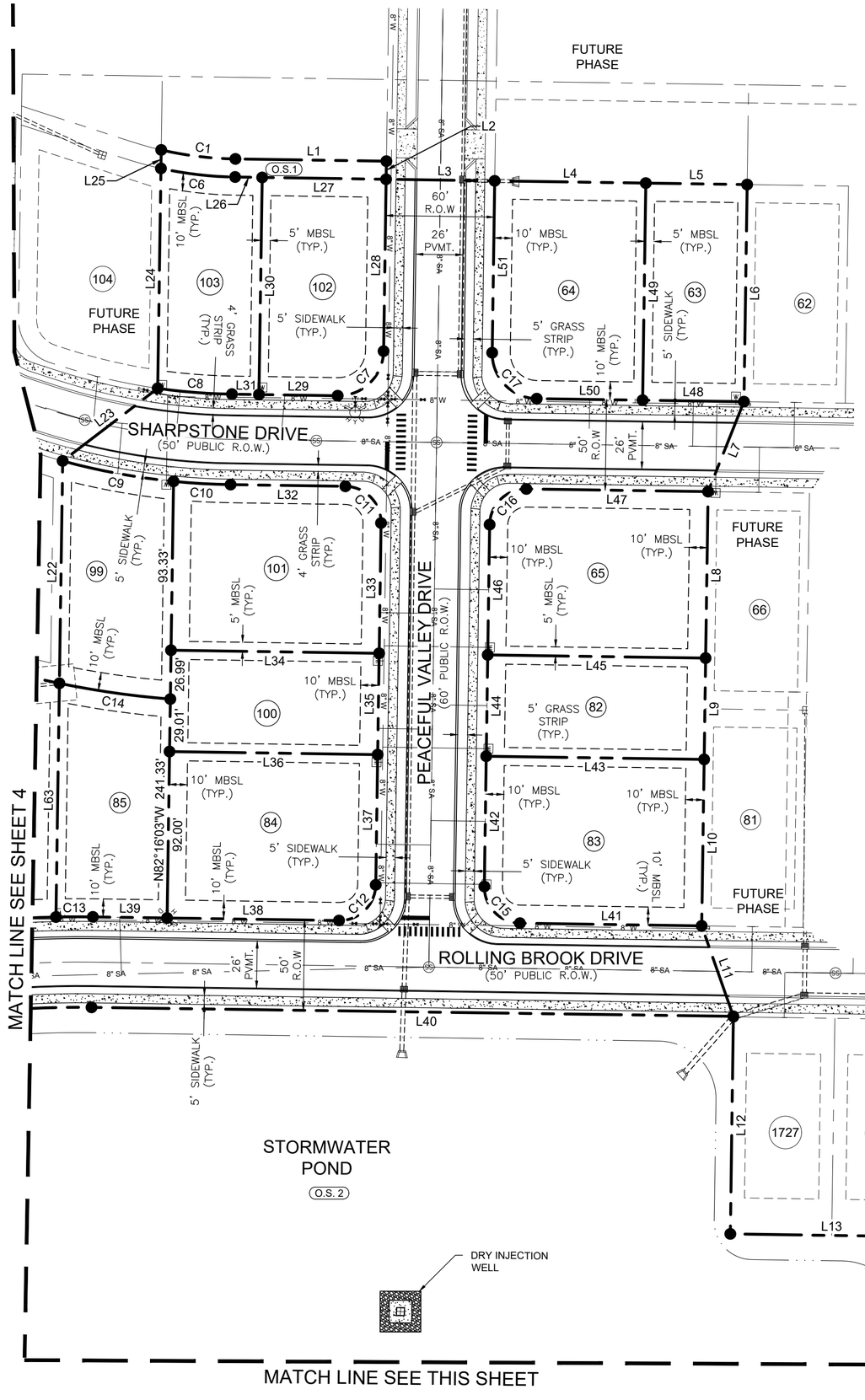
IF YOU CAN READ THIS YOU ARE HOLDING AN UNRECORDED COPY

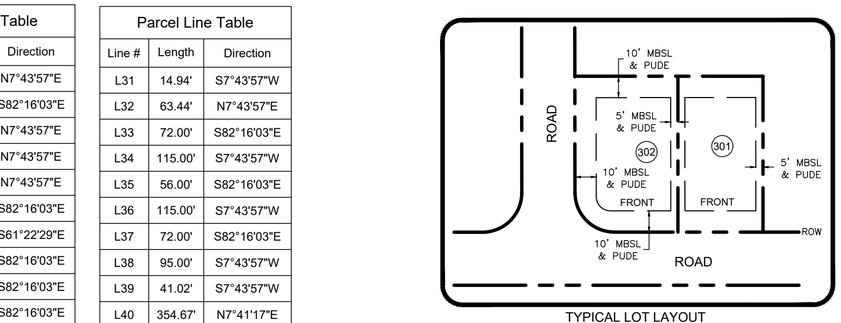
FINAL SUBDIVISION PLAT

CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
| ACRES NEW RD/ST: | 2.161 (ROW) | L.F. OF NEW RD/ST: | 1897.11 +/- |
| ACRES OPEN SPACE: | 6.613 | CIVIL DISTRICT: | 3RD |
| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 100' | DATE: | 01/11/2024 |

WA PROJECT NO. 22-1861 SHEET 2 0F 4



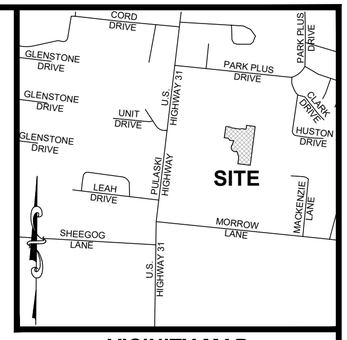




| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 83.44' | N7°43'57"E |
| L2 | 10.00' | S82°16'03"E |
| L3 | 60.00' | N7°43'57"E |
| L4 | 83.50' | N7°43'57"E |
| L5 | 56.00' | N7°43'57"E |
| L6 | 120.00' | S82°16'03"E |
| L7 | 53.52' | S61°22'29"E |
| L8 | 92.00' | S82°16'03"E |
| L9 | 56.00' | S82°16'03"E |
| L10 | 92.00' | S82°16'03"E |
| L11 | 52.96' | N77°35'45"E |
| L12 | 120.28' | S82°18'54"E |
| L13 | 112.00' | N7°43'57"E |
| L22 | 122.90' | N82°16'03"W |
| L23 | 66.09' | N30°29'48"W |
| L24 | 121.55' | N82°16'03"W |
| L25 | 10.22' | N82°16'03"W |
| L26 | 14.94' | N7°43'57"E |
| L27 | 68.50' | N7°43'57"E |
| L28 | 95.00' | S82°16'03"E |
| L29 | 43.50' | S7°43'57"W |
| L30 | 120.00' | S82°16'03"E |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L31 | 14.94' | S7°43'57"W |
| L32 | 63.44' | N7°43'57"E |
| L33 | 72.00' | S82°16'03"E |
| L34 | 115.00' | S7°43'57"W |
| L35 | 56.00' | S82°16'03"E |
| L36 | 115.00' | S7°43'57"W |
| L37 | 72.00' | S82°16'03"E |
| L38 | 95.00' | S7°43'57"W |
| L39 | 41.02' | S7°43'57"W |
| L40 | 354.67' | N7°41'17"E |
| L41 | 100.41' | S7°43'57"W |
| L42 | 72.00' | N82°16'03"W |
| L43 | 120.41' | S7°43'57"W |
| L44 | 56.00' | N82°16'03"W |
| L45 | 120.41' | S7°43'57"W |
| L46 | 72.00' | N82°16'03"W |
| L47 | 100.41' | N7°43'57"E |
| L48 | 56.00' | N7°43'57"E |
| L49 | 120.00' | S82°16'03"E |
| L50 | 58.50' | N7°43'57"E |
| L51 | 95.00' | S82°16'03"E |
| L63 | 129.17' | N82°16'03"W |




TYPICAL LOT LAYOUT
N.T.S.




**VICINITY MAP**
NOT TO SCALE

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 41.37' | 195.00' | 12° 09' 24" | N13° 48' 39"E | 41.30' |
| C6 | 41.34' | 205.00' | 11° 33' 19" | N13° 30' 37"E | 41.27' |
| C7 | 39.27' | 25.00' | 90° 00' 00" | S37° 16' 03"E | 35.36' |
| C8 | 41.17' | 325.00' | 7° 15' 32" | S11° 21' 43"W | 41.15' |
| C9 | 62.36' | 375.00' | 9° 31' 39" | N17° 19' 29"E | 62.28' |
| C10 | 31.60' | 375.00' | 4° 49' 42" | N10° 08' 48"E | 31.59' |
| C11 | 31.42' | 20.00' | 90° 00' 00" | N52° 43' 57"E | 28.28' |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C12 | 31.42' | 20.00' | 90° 00' 00" | S37° 16' 03"E | 28.28' |
| C13 | 20.40' | 575.00' | 2° 01' 57" | S6° 42' 59"W | 20.40' |
| C14 | 61.95' | 495.00' | 7° 10' 14" | S14° 58' 26"W | 61.91' |
| C15 | 31.42' | 20.00' | 90° 00' 00" | S52° 43' 57"W | 28.28' |
| C16 | 31.42' | 20.00' | 90° 00' 00" | N37° 16' 03"W | 28.28' |
| C17 | 39.27' | 25.00' | 90° 00' 00" | N52° 43' 57"E | 35.36' |

GRAPHIC SCALE: 1" = 50'




WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

# HILLCREST VILLAGE

## PHASE 1A

RECORDING STAMP HERE

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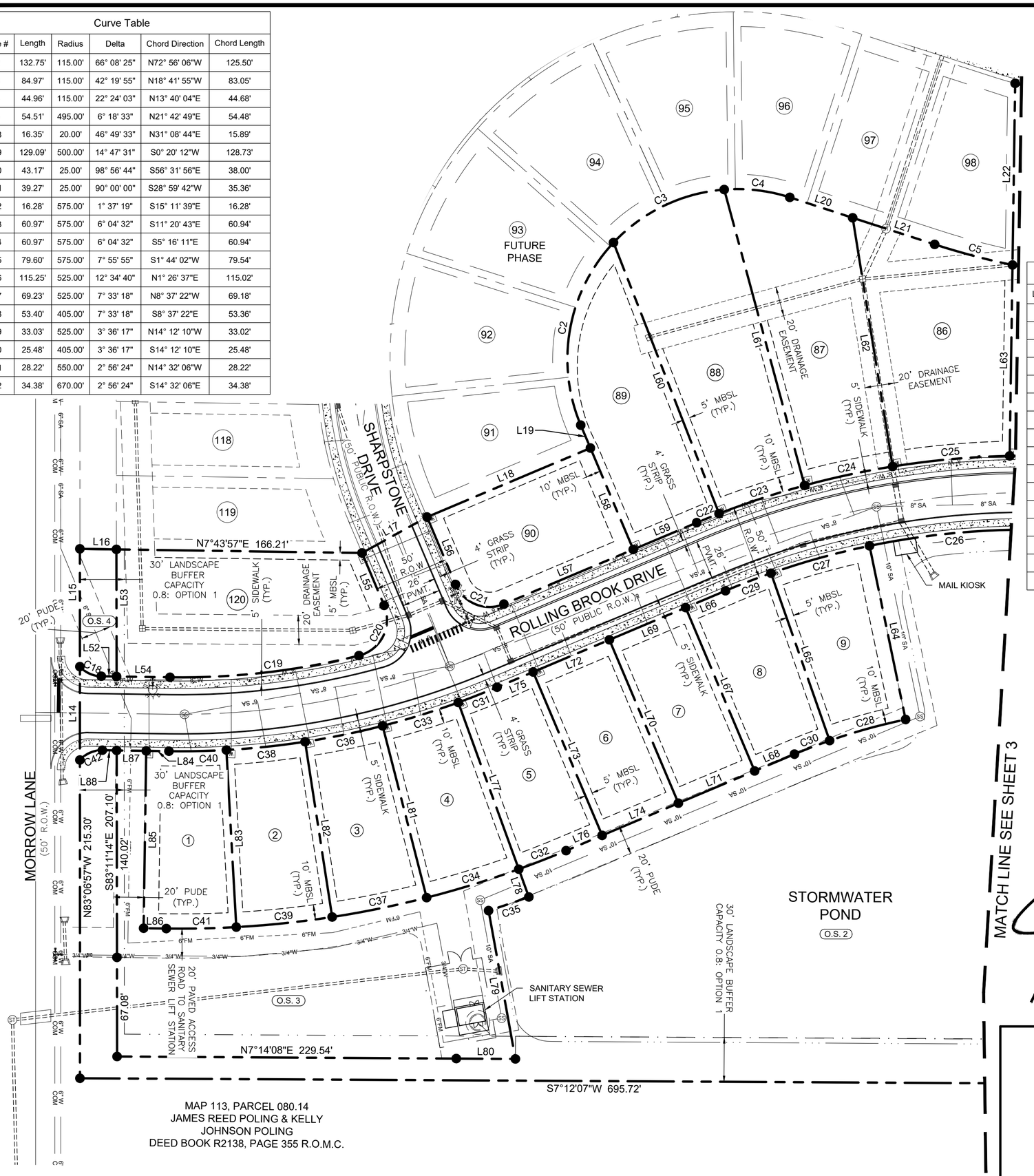
FINAL SUBDIVISION PLAT

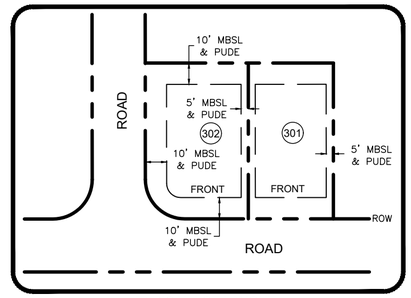
CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

| | | | |
|---|---|---|---|
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| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 50' | DATE: | 01/11/2024 |

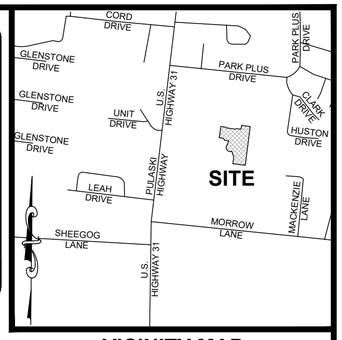
WA PROJECT NO. 22-1861 SHEET 3 0F 4

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C2 | 132.75' | 115.00' | 66° 08' 25" | N72° 56' 06"W | 125.50' |
| C3 | 84.97' | 115.00' | 42° 19' 55" | N18° 41' 55"W | 83.05' |
| C4 | 44.96' | 115.00' | 22° 24' 03" | N13° 40' 04"E | 44.68' |
| C5 | 54.51' | 495.00' | 6° 18' 33" | N21° 42' 49"E | 54.48' |
| C18 | 16.35' | 20.00' | 46° 49' 33" | N31° 08' 44"E | 15.89' |
| C19 | 129.09' | 500.00' | 14° 47' 31" | S0° 20' 12"W | 128.73' |
| C20 | 43.17' | 25.00' | 98° 56' 44" | S56° 31' 56"E | 38.00' |
| C21 | 39.27' | 25.00' | 90° 00' 00" | S28° 59' 42"W | 35.36' |
| C22 | 16.28' | 575.00' | 1° 37' 19" | S15° 11' 39"E | 16.28' |
| C23 | 60.97' | 575.00' | 6° 04' 32" | S11° 20' 43"E | 60.94' |
| C24 | 60.97' | 575.00' | 6° 04' 32" | S5° 16' 11"E | 60.94' |
| C25 | 79.60' | 575.00' | 7° 55' 55" | S1° 44' 02"W | 79.54' |
| C26 | 115.25' | 525.00' | 12° 34' 40" | N1° 26' 37"E | 115.02' |
| C27 | 69.23' | 525.00' | 7° 33' 18" | N8° 37' 22"W | 69.18' |
| C28 | 53.40' | 405.00' | 7° 33' 18" | S8° 37' 22"E | 53.36' |
| C29 | 33.03' | 525.00' | 3° 36' 17" | N14° 12' 10"W | 33.02' |
| C30 | 25.48' | 405.00' | 3° 36' 17" | S14° 12' 10"E | 25.48' |
| C31 | 28.22' | 550.00' | 2° 56' 24" | N14° 32' 06"W | 28.22' |
| C32 | 34.38' | 670.00' | 2° 56' 24" | S14° 32' 06"E | 34.38' |




TYPICAL LOT LAYOUT
N.T.S.



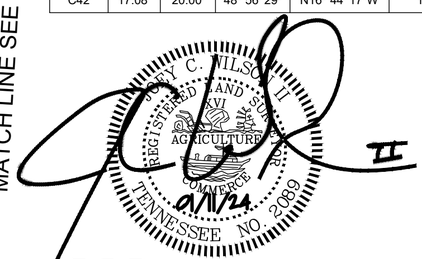

**VICINITY MAP**
NOT TO SCALE

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L14 | 63.19' | N83°06'57"W |
| L15 | 79.69' | N83°06'57"W |
| L16 | 24.71' | N7°43'57"E |
| L17 | 50.28' | N22°01'41"W |
| L18 | 120.00' | N16°00'18"W |
| L19 | 16.80' | S73°59'42"W |
| L20 | 44.76' | N24°52'05"E |
| L21 | 58.31' | N24°52'05"E |
| L22 | 122.90' | N82°16'03"W |
| L52 | 10.32' | N7°43'57"E |
| L53 | 86.01' | N83°11'05"W |
| L54 | 36.16' | S7°43'57"W |
| L55 | 38.45' | N73°59'42"E |
| L56 | 49.50' | S73°59'42"W |
| L57 | 95.00' | S16°00'18"E |
| L58 | 74.50' | S73°59'42"W |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L59 | 46.64' | S16°00'18"E |
| L60 | 196.78' | S75°37'01"W |
| L61 | 207.42' | S81°41'33"W |
| L62 | 170.40' | S87°46'05"W |
| L63 | 129.17' | N82°16'03"W |
| L64 | 120.00' | N85°09'17"E |
| L65 | 120.00' | N77°35'59"E |
| L66 | 29.27' | N16°00'18"W |
| L67 | 120.00' | N73°59'42"E |
| L68 | 29.27' | S16°00'18"E |
| L69 | 56.00' | N16°00'18"W |
| L70 | 120.00' | N73°59'42"E |
| L71 | 56.00' | S16°00'18"E |
| L72 | 56.00' | N16°00'18"W |
| L73 | 120.00' | N73°59'42"E |
| L74 | 56.00' | S16°00'18"E |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L75 | 26.50' | N16°00'18"W |
| L76 | 26.50' | S16°00'18"E |
| L77 | 120.00' | N76°56'06"E |
| L78 | 19.98' | S76°56'06"W |
| L79 | 101.97' | S86°38'16"W |
| L80 | 40.00' | N7°14'08"E |
| L81 | 120.00' | N82°31'02"E |
| L82 | 120.00' | N88°05'58"E |
| L83 | 120.00' | S86°19'05"E |
| L84 | 15.36' | N7°43'57"E |
| L85 | 120.00' | N82°16'03"W |
| L86 | 15.36' | S7°43'57"W |
| L87 | 20.00' | S7°43'57"W |
| L88 | 9.68' | N7°43'57"E |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C33 | 53.59' | 550.00' | 5° 34' 56" | N10° 16' 26"W | 53.57' |
| C34 | 65.28' | 670.00' | 5° 34' 56" | S10° 16' 26"E | 65.25' |
| C35 | 28.79' | 689.98' | 2° 23' 27" | N11° 52' 11"W | 28.79' |
| C36 | 53.59' | 550.00' | 5° 34' 56" | N4° 41' 30"W | 53.57' |
| C37 | 65.28' | 670.00' | 5° 34' 56" | S4° 41' 30"E | 65.25' |
| C38 | 53.59' | 550.00' | 5° 34' 56" | N0° 53' 26"E | 53.57' |
| C39 | 65.28' | 670.00' | 5° 34' 56" | S0° 53' 26"W | 65.25' |
| C40 | 38.88' | 550.00' | 4° 03' 03" | N5° 42' 26"E | 38.88' |
| C41 | 47.37' | 670.00' | 4° 03' 03" | S5° 42' 26"W | 47.36' |
| C42 | 17.08' | 20.00' | 48° 56' 29" | N16° 44' 17"W | 16.57' |




WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

50 0 25 50 100
GRAPHIC SCALE: 1" = 50'

# HILLCREST VILLAGE

## PHASE 1A

RECORDING STAMP HERE

IF YOU CAN READ THIS YOU ARE HOLDING AN UNRECORDED COPY

FINAL SUBDIVISION PLAT

CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
| ACRES NEW RD/ST: | 2.161 (ROW) | L.F. OF NEW RD/ST: | 1897.11 +/- |
| ACRES OPEN SPACE: | 6.613 | CIVIL DISTRICT: | 3RD |
| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 50' | DATE: | 01/11/2024 |

WA PROJECT NO. 22-1861 SHEET 4 0F 4

WILSON&ASSOCIATES, P.C.
Engineering/Surveying/Environmental

108 Beasley Drive
Franklin, Tennessee
615-794-2275
www.wilsonpc.com

January 16, 2024

TO: City of Columbia, TN Planning Commission

RE: Hillcrest Village, Phase 1A Final Plat

On behalf of MI Homes of Nashville, LLC, Wilson and Associates would like to resubmit the Hillcrest Village, Phase 1A Final Plat. Comments have been addressed below in RED.

1. Provide surety in the amount of $645,000 by resubmittal date. – Acknowledged.
2. Install asphalt binder and curbing by resubmittal date. – This has been completed.
3. All grass strips minimum of 4 ft. (see annotation on lot 90). – This has been updated on the plat.
4. Identify and label all critical lots (see ESS 5.10 Critical Lots and Areas) – There are no critical lots within this phase.
5. Lots 1724+, check numbering. – The lot numbering has been updated to match the site plan.
6. Provide standard PUDE note: Public Utility and Drainage Easements (PUDE) shall be required and be ten (10) feet in width on all property lines parallel and abutting public roads or rights-of-way, and five (5) feet in width on all interior lot lines, except for interior lot lines with a zero lot line or a common wall along a lot line. – This has been added as a note to the plat.
7. All site walls, detention, drainage system, and rough grading of the site shall be completed by resubmittal date. – Acknowledged.
8. The lead staff person for this case is Planner Austin Brass, AICP; he will prepare the staff report for this item. Please contact abrass@columbiatn.com with question about the development review process or technical comments. – Acknowledged.
9. Preliminary Plat depicts additional lots in area now noted as stormwater pond (OS 2). In response to comments, please explain why this revision was made. – The stormwater pond needed to be increased as the site plan was developed, so the lots originally within this space were removed.
10. This Final Plat will need to go on PC agenda as a discussion item. – Acknowledged.
11. Please label landscape buffer widths, opacity, and option utilized (Ord. 3638, Section 11.27.B, p. 11-8, 11-9). – Completed.
12. Please show location of mail kiosk. – A callout has been added to show this location.
13. Please provide PLS signature on Final Plat. 2.3.3.B. – Completed.

WILSON&ASSOCIATES, P.C.
Engineering/Surveying/Environmental

108 Beasley Drive
Franklin, Tennessee
615-794-2275
www.wilsonpc.com

If you have any questions or comments about the submittal, please do not hesitate to call me directly.

Sincerely,

Abigail Overstreet

Abigail Overstreet
Wilson & Associates, P.C.
Engineer In Training
aoverstreet@wilsonpc.com
615-794-2275

CITY OF COLUMBIA
TENNESSEE

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, December 12, 2023

**ITEM NO.**
23-0478

**DESCRIPTION:** The purpose of this plat is to create 27 single-family residential lots and 3 open spaces within Hillcrest Village.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

## Engineering

1. Provide surety in the amount of $645,000 by resubmittal date.
2. Install asphalt binder and curbing by resubmittal date.
3. All grass strips minimum of 4 ft. (see annotation on lot 90).
4. Identify and label all critical lots (see ESS 5.10 Critical Lots and Areas)
5. Lots 1724+, check numbering.
6. Provide standard PUDE note: Public Utility and Drainage Easements (PUDE) shall be required and be ten (10) feet in width on all property lines parallel and abutting public roads or rights-of-way, and five (5) feet in width on all interior lot lines, except for interior lot lines with a zero lot line or a common wall along a lot line.
7. All site walls, detention, drainage system, and rough grading of the site shall be completed by resubmittal date.

## Building

8. No comments.

## Police

9. No comments.

## Columbia Power

10. Columbia Power System has an existing power line near your proposed development.
    We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered

provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction.
• Unfortunately, due to current supply chain challenges, no timeframe can be guaranteed regarding the availability of meters or transformers appropriate for your development.

## Public Works

11. No comments.

## ATT

12. ATT intends to serve.

## Maury County E911

13. Hillcrest Villages, Rolling Brook Drive, Sharpstone Drive, Peaceful Valley Drive, Baker Ridge Lane all are reserved with Maury County 911 for this development.

## Planning

14. The lead staff person for this case is Planner Austin Brass, AICP; he will prepare the staff report for this item. Please contact abrass@columbiatn.com with question about the development review process or technical comments.
15. Preliminary Plat depicts additional lots in area now noted as stormwater pond (OS 2). In response to comments, please explain why this revision was made.
16. This Final Plat will need to go on PC agenda as a discussion item.
17. Please label landscape buffer widths, opacity, and option utilized (Ord. 3638, Section 11.27.B, p. 11-8, 11-9).
18. Please show location of mail kiosk.
19. Please provide PLS signature on Final Plat. 2.3.3.B.

## Fire

20. No comments

## Wastewater

21. We have talked with the Owner about this in June of 2023 and during that discussion, Columbia Wastewater said that COs will not be given until the pump station is fully operational. We have also

reached out to MI homes and Womble about getting the pump station under a building permit with Development Services.

## Maury County Schools

22. Brown Elementary School, Whitthorne Middle School, Central High School
    See Attached Capacity Numbers
    The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.

## Duck River Electric Membership Corp

23. No comments.

## Columbia Water

24. "Water infrastructure must be completed in accordance with the approved plans by December 18, 2023. Conduct pressure testing, bacteria testing, walk-through inspection and infrastructure deeded to CPWS by January 10, 2024. Water system must be active in order for the plat to be recorded"

## Atmos Energy

25. No comments provided.

## Maury County Highway Dept.

26. No comments provided.

## CPWS

27. Plan to serve.

**ATTACHMENTS: Final Plat**

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

## Current Enrollment / Capacity

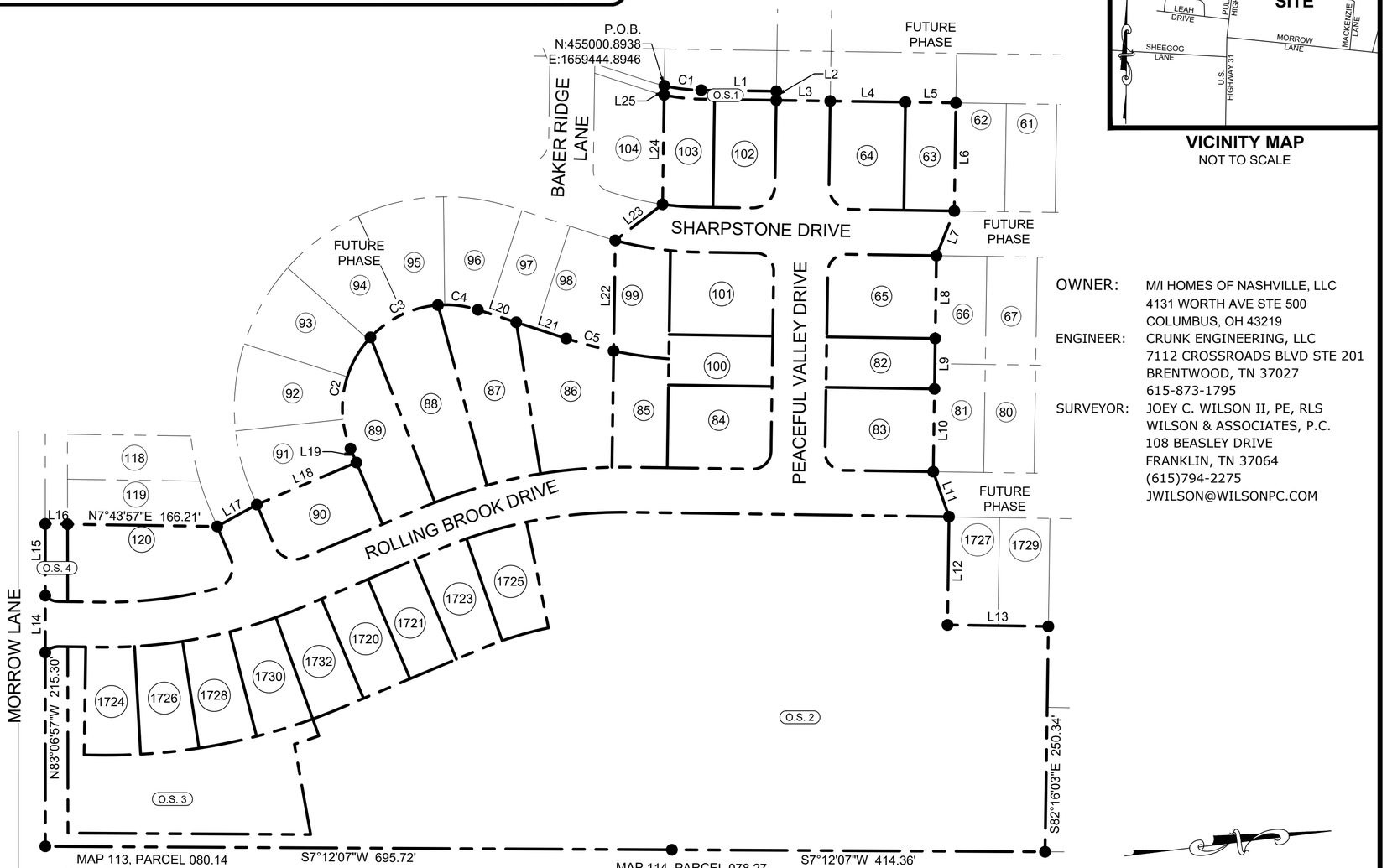
| | Facility Name | Date Constructed | Sq. Ft. | Acreage | Capacity | Current Enrollment | Capacity Used |
|---|---|---|---|---|---|---|---|
| Elementary | Baker | 1960 | 43,920 | 12 | 340 | 325 | 95.6% |
| | Battle Creek | 2019 | 90,000 | 30 | 700 | 638 | 91.1% |
| | Brown | 1968 | 56,720 | 20 | 405 | 361 | 89.1% |
| | Highland | 1986 | 47,800 | 4.5 | 380 | 301 | 79.2% |
| | Howell | 1999 | 81,600 | 17.5 | 700 | 594 | 84.9% |
| | Mt. Pleasant | 1978 | 80,021 | 22 | 630 | 583 | 92.5% |
| | Riverside | 1984 | 71,150 | 14 | 500 | 407 | 81.4% |
| | Spring Hill | 1984 | 69,000 | 10 | 540 | 450 | 83.3% |
| | Woodard | 1990 | 76,200 | 17 | 600 | 559 | 93.2% |
| | Wright | 2005 | 97,765 | 18 | 740 | 598 | 80.8% |
| | | | | | ***5535*** | ***4816*** | ***87.0%*** |
| Middle | Battle Creek | 2019 | 125,000 | 45 | 900 | 726 | 80.7% |
| | Cox | 1997 | 137,200 | 25 | 900 | 655 | 72.8% |
| | Mt. Pleasant | 2001 | 113,938 | 29.2 | 550 | 426 | 77.5% |
| | Spring Hill | 2010 | 158,106 | 39.49 | 950 | 534 | 56.2% |
| | Whitthorne | 1979 | 175,600 | 17 | 1050 | 963 | 91.7% |
| | | | | | ***4350*** | ***3304*** | ***76.0%*** |
| High | Central | 2016 | 296,740 | 55 | 1700 | 1396 | 82.1% |
| | Mt. Pleasant | 1969 | 110,759 | 31 | 600 | 389 | 64.8% |
| | Spring Hill | 1993 | 181,800 | 57 | 1200 | 1238 | 103.2% |
| | | | | | ***3500*** | ***3023*** | ***86.4%*** |
| Unit | Culleoka | 1969 | 205,800 | 34 | 1020 | 875 | 85.8% |
| | Hampshire | 1978 | 83,410 | 13.12 | 500 | 411 | 82.2% |
| | Santa Fe | 1964 | 94,225 | 24 | 650 | 509 | 78.3% |
| | | | | | ***2170*** | ***1795*** | ***82.7%*** |
| Other | Central Office | 1960 | 15,400 | 1.5 | | | |
| | College Hill | 1958 | 42,211 | 2.26 | | 167 | |
| | Maintenance | 1987 | 9,400 | 4.7 | | | |
| | McDowell | | 46,165 | 7 | | | |
| | | | **2,509,930** | **550.27** | **15555** | **13105** | |

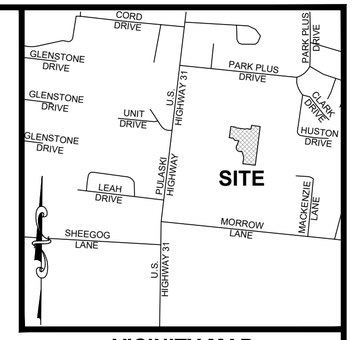
**LEGEND**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IRON PIN FOUND | | FIRE HYDRANT | | UTILITY POLE | | PUBLIC UTIL. & DRAIN ESMT. | P.U.D.E. | | BOUNDARY | | |
| IRON PIN SET | | SANITARY SEWER MH | SS | GUY ANCHOR | | ADDRESSES | 1234 | | CENTERLINE | | |
| CONC. MON. FOUND | | SANITARY SEWER CO | SS | COMMUNICATION BOX | C | HANDICAP SPACE | | | BUFFER | | |
| CONC. MON. SET | | AREA DRAIN | | COMMUNICATION MH | C | SANITARY SEWER | 8" SA | | WATER FEATURE | | |
| CONTROL POINT FOUND | | CURB INLET | | GAS METER | G | WATER | 4" W | | TREE LINE | | |
| CONTROL POINT SET | | STORM MH | ST | GAS VALVE | | UNDERGROUND ELEC | UGE | | R.O.W. | RIGHT OF WAY | |
| BENCH MARK | | ELECTRIC METER-BOX | E | EVERGREEN TREE | | OVERHEAD ELEC | OHE | | PVMT. | EDGE OF PAVEMENT | |
| WATER METER | W | ELECTRIC MH | E | SIDEWALK | | GAS | 4" G | | PUDE | PUBLIC UTILITY AND DRAINAGE EASEMENT | |
| WATER VALVE | | LIGHT POLE | | MIN. BUIDLING SETBACK | M.B.S.L | COMMUNICATIONS | COM | | G.I.E. | GREEN INFRASTRUCTURE EASEMENT | |

## PLAT NOTES

1. THE PURPOSE OF THIS PLAT IS TO CREATE 27 SINGLE-FAMILY RESIDENTIAL LOTS AND 3 OPEN SPACES.
2. SUBJECT PROPERTY IS PRESENTLY IDENTIFIED AS A PORTION OF PARCEL 80.50, ON MAURY COUNTY TAX MAP 113. SAID PARCEL IS FURTHER IDENTIFIED AS A PORTION OF THE PROPERTY DESCRIBED IN BOOK R2874, PAGE 1163, REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE.
3. THE PROPERTY SHOWN HEREON IS LOCATED WITHIN THE CITY OF COLUMBIA, MAURY COUNTY, TN. ALL MATTERS PERTAINING TO CONSTRUCTION, USE, LOCATION OF IMPROVEMENTS, SIGNAGE, PARKING, NOISE, VIBRATION, EMISSIONS, FIRE HAZARDS, RADIATION, ILLUMINATION, SETBACK PROVISIONS, ETC,. ARE SUBJECT TO THE CITY OF COLUMBIA'S ZONING REGULATIONS AS INTERPRETED AND REGULATED BY THE DEPARTMENT OF DEVELOPMENT SERVICES.
4. EXISTING ZONING: CD-4 & RS-40
5. I HEREBY CERTIFY THAT THIS IS A CATEGORY IV SURVEY AND WAS CONDUCTED IN ACCORDANCE WITH RULE 0820-03.11 (GLOBAL POSITION SYSTEMS SURVEYS) ACCORDING TO THE CURRENT TENNESSEE MINIMUM STANDARDS OF PRACTICE AS PROMULGATED BY THE TENNESSEE STATE BOARD OF EXAMINERS FOR LAND SURVEYORS. THIS SURVEY WAS CONDUCTED WITH DUAL-FREQUENCY RTK GPS EQUIPMENT BASED ON THE TDOT CORPS NETWORK.
   a. POSITIONAL ACCURACY: 0.07'
   b. DATE OF SURVEY: 03/24/22
   c. DATUM/EPOCH: TENNESSEE STATE PLANE (NAD83). OCCUPATIONS FOR CONTROL POINTS ARE 3 MINUTES EACH, SIDE SHOTS ARE 3 SECONDS.
   d. GEOID 3, ZONE 7 REVISED
6. NO COMBINED GRID FACTORS WERE USED.
7. BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE STATE PLANE COORDINATE SYSTEM (NAD83). ELEVATIONS SHOWN HEREON ARE BASED ON NAVD88.
8. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN ZONE "X" AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NO. 47119C0285E, WITH AN EFFECTIVE DATE OF APRIL 16, 2007, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE PROGRAM. ZONE "X" IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE "X" HAS TWO DESCRIPTIONS. PLEASE SEE FLOOD PLAIN MAP IF ZONE "X" IS SHADED. ***IF FIELD RUN CONTOURS ARE ESTABLISHED YOU MUST PLOT THE FLOOD LINE BASED ON BFE UNLESS THE PROPERTY IS IN ZONE A
9. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN ZONE "AE" AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NO. 47187C0190F, WITH AN EFFECTIVE DATE OF SEPTEMBER 29, 2006, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE PROGRAM. BASE FLOOD ELEVATION FOR THIS PROPERTY IS 630.9. ZONE "AE" IS AN AREA WHERE BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED. PLEASE MODIFY THIS NOTE FOR THE PROPER ZONE.
10. ALL CORNERS SHOWN ON THE FACE OF THE SURVEY WILL BE SET WITH 5/8 IRON ROD WITH CAP BEARING THIS SURVEYORS COMPANY NAME.
11. THE DEVELOPER ACKNOWLEDGES THAT ALL LOTS HAVE ADEQUATE BUILDING ENVELOPES AND NO VARIANCES WILL BE REQUIRED.
12. STORMWATER MAINTENANCE AGREEMENT RECORDED IN DEED BOOK R2874, PAGE 1163.
13. ALL STREETS AND ALLEYS ARE DESIGNATED AS PUBLIC RIGHT-OF-WAY; THE CITY OF COLUMBIA IS NOT RESPONSIBLE FOR THE REPLACEMENT OR REPAIR OF ANY PRIVATE STRUCTURES WITHIN PUBLIC EASEMENTS SHOULD THE STRUCTURES BE DISTURBED IN THE PROCESS OF THE CITY EXERCISING ITS EASEMEN RIGHTS.
14. STREETS, DRAINAGE EASEMENTS, STRUCTURES, AND CULVERTS SHALL BE MAINTAINED BY THE CITY OF COLUMBIA. DETENTION PONDS AND OUTLET STRUCTURES WITHIN PUBLIC DRAINAGE EASEMENTS ARE TO BE MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.
15. STORMWATER QUALITY SHALL BE ADDRESSED WITH EACH SITE PLAN.
16. OPEN SPACE AREAS, ROADWAY MEDIANS, BRICK PEDESTRIAN CROSSWALKS, BIKE PATHS, SIDEWALKS OUTSIDE OF RIGHT-OF-WAYS, TRAILS AND DETENTION FACILITIES SHALL BE MAINTAINED BY THE HOME OWNER'S ASSOCIATION AND SHALL BE PUBLIC UTILITY, DRAINAGE AND ACCESS EASEMENTS.
17. WITHIN NEW DEVELOPMENTS AND FOR OFF-SITE LINES CONSTRUCTED AS A RESULT OF, OR TO PROVIDE SERVICE TO, THE NEW DEVELOPMENT, ALL UTILITIES, (INCLUDING CABLE TELEVISION, ELECTRICAL, NATURAL GAS, SEWER, TELEPHONE AND WATER LINES) SHALL BE PLACED UNDERGROUND.
18. AT ALL TEMPORARY TURNAROUNDS, A SIGN SHALL BE PLACED STATING, "STREET TO BE EXTENDED BY AUTHORITY OF THE CITY OF COLUMBIA."
19. MAINTENANCE OF ALL STORMWATER MANAGEMENT FEATURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER(S) OR HOA.
20. NO OBSTRUCTIONS OR ENCROACHMENTS WHICH IMPEDE THE FLOW OF STORMWATER SHALL BE PERMITTED WITHIN PUBLIC DRAINAGE EASEMENTS BETWEEN LOTS. THE CITY OF FRANKLIN IS NOT RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY ENCROACHMENTS THAT ARE DAMAGED OR REMOVED IN THE COURSE OF MAINTENANCE ACTIVITY WITHIN EASEMENTS.
21. SIDEWALKS AND TRAILS OUTSIDE OF PUBLIC RIGHT-OF-WAY SHALL BE PUBLIC ACCESS EASEMENTS AND SHALL BE MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.
22. THE CITY OF COLUMBIA WATER MANAGEMENT DEPARTMENT HAS UNRESTRICTED ACCESS TO ITS DOMESTIC WATER, SANITARY SEWER, RECLAIM WATER LINES OR SYSTEM IMPROVEMENTS LOCATED WITHIN ITS EXCLUSIVE EASEMENTS WITHIN THE DEVELOPMENT. IN THE EVENT LANDSCAPING, FENCING, CONCRETE OR OTHER STRUCTURES ARE INSTALLED OR PLACED WITHIN A CITY OF COLUMBIA EASEMENT, THE CITY OF COLUMBIA SHALL HAVE THE RIGHT TO REMOVE SUCH ENCROACHMENTS WITHIN THE EASEMENT AS MAY BE NECESSARY FOR THE CITY OF COLUMBIA TO REPAIR, MAINTAIN OR REPLACE ITS INFRASTRUCTURE WHICH IS NOW OR IN THE FUTURE MAY BE LOCATED WITHIN THE EASEMENT WITHOUT OBTAINING ANY FURTHER PERMISSION FROM THE PROPERTY OWNER OR HOA. THE PROPERTY OWNER OR HOA SHALL BE RESPONSIBLE FOR REPAIRING AND/OR REPLACING ANY SUCH LANDSCAPING, FENCING, CONCRETE, OR OTHER STRUCTURES REMOVED OR DISTURBED BY THE CITY OF COLUMBIA IN COMMON OPEN SPACE LOTS AND IN AREAS OWNED BY THE PROPERTY OWNER OR HOA AT NO EXPENSE TO THE CITY OF COLUMBIA. INDIVIDUAL HOMEOWNERS SHALL BE RESPONSIBLE FOR STRUCTURES REMOVED OR DISTURBED BY THE CITY OF COLUMBIA WITHIN AN EASEMENT ON THE HOMEOWNER'S LOT AT THE HOMEOWNER'S EXPENSE.
23. ALL LOTS WITHIN PHASE 1A REQUIRE A FIRE SPRINKLER SYSTEM INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS.A HORN AND STROBE WILL BE REQUIRED ON THE FRONT OF THE HOUSE. IT WILL ACTIVATE WHEN THE SPRINKLER SYSTEM IS ACTIVATED.




**VICINITY MAP**
NOT TO SCALE

OWNER: M/I HOMES OF NASHVILLE, LLC
4131 WORTH AVE STE 500
COLUMBUS, OH 43219

ENGINEER: CRUNK ENGINEERING, LLC
7112 CROSSROADS BLVD STE 201
BRENTWOOD, TN 37027
615-873-1795

SURVEYOR: JOEY C. WILSON II, PE, RLS
WILSON & ASSOCIATES, P.C.
108 BEASLEY DRIVE
FRANKLIN, TN 37064
(615)794-2275
JWILSON@WILSONPC.COM

GRAPHIC SCALE: 1" = 100'

### CERTIFICATE OF APPROVAL OF WATER SYSTEM

I HEREBY CERTIFY THAT THE WATER SYSTEM(S) OUTLINED OR INDICATED ON THIS FINAL SUBDIVISION PLAT HAS/HAVE BEEN INSTALLED IN ACCORDANCE WITH CURRENT LOCAL AND STATE GOVERNMENT REQUIREMENTS, OR A SUFFICIENT BOND OR OTHER SURETY HAS BEEN FILED TO GUARANTEE SAID INSTALLATION.

NAME, TITLE, AGENCY OF AUTHORIZED APPROVING AGENT _____ DATE _____

### CERTIFICATE OF COMPLIANCE

I HEREBY CERTIFY THAT THE SUBDIVISION PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE COLUMBIA SUBDIVISION REGULATIONS AND OTHER ADOPTED ORDINANCES AND POLICIES.

CITY ENGINEER _____ DATE _____
COLUMBIA, TENNESSEE

### CERTIFICATE OF SURVEY ACCURACY

I (WE) HEREBY CERTIFY THAT TO THE BEST OF MY (OUR) KNOWLEDGE AND BELIEF THIS IS A TRUE AND ACCURATE SURVEY OF THE PROPERTY SHOWN HEREON; THAT THIS IS A CLASS "X" LAND SURVEY AS DEFINED IN TITLE 62, CHAPTER 18, TENNESSEE CODE ANNOTATED, AND THAT THE RATIO OF PRECISION IS GREATER THAN OR EQUAL TO 1: _ _.

DATE _____

JOEY C. WILSON II, TENNESSEE RLS NO. 2089
WILSON & ASSOCIATES, P.C.
ENGINEERING/SURVEYING/ENVIRONMENTAL
108 BEASLEY DRIVE, FRANKLIN, TN 37064
OFFICE: 615.794.2275 FAX 615.794.2176
JWILSON@WILSONPC.COM

### CERTIFICATE OF APPROVAL OF SUBDIVISION NAME & STREET NAMES

SUBDIVISION NAME AND STREET NAMES APPROVED BY THE CITY ENGINEERING DEPARTMENT AND BY E-911 MAURY COUNTY.

MAURY COUNTY E911 _____ DATE _____

### CERTIFICATE OF OWNERSHIP AND DEDICATION

I (WE) HEREBY CERTIFY THAT I AM (WE ARE) THE OWNER(S) OF THE PROPERTY SHOWN AND DESCRIBED HEREON AS EVIDENCED IN BOOK NUMBER 0000, PAGE 0000, MAURY COUNTY REGISTERS OFFICE, AND THAT I (WE) HEREBY ADOPT THIS FINAL SUBDIVISION PLAT OF THE PROPERTY AS SHOWN HEREON AND DEDICATE ALL PUBLIC WAYS AND EASEMENTS AS NOTED WITH MY (OUR) FREE CONSENT.

OWNER _____ DATE _____

### CERTIFICATE OF APPROVAL OF STREETS, DRAINAGE & UTILITIES

I HEREBY CERTIFY THAT THE STREETS, DRAINAGE, AND UTILITIES OUTLINED OR INDICATED ON THIS FINAL SUBDIVISION PLAT HAVE BEEN INSTALLED IN ACCORDANCE WITH CITY SPECIFICATIONS, OR A PERFORMANCE SURETY IN THE AMOUNT OF $ _____ FOR STREETS AND DRAINAGE HAS BEEN POSTED WITH THE CITY OF COLUMBIA, TENNESSEE, TO ASSURE COMPLETION OF SUCH IMPROVEMENTS.

CITY ENGINEER _____ DATE _____
COLUMBIA, TENNESSEE

### CERTIFICATE OF APPROVAL FOR SANITARY SEWER SYSTEM

I HEREBY CERTIFY THAT THE SANITARY SEWER SYSTEM OUTLINED OR INDICATED ON THIS FINAL SUBDIVISION PLAT HAS BEEN INSTALLED IN ACCORDANCE WITH THE CURRENT LOCAL AND STATE GOVERNMENT REQUIREMENTS, OR A SUFFICIENT BOND OR OTHER SURETY HAS BEEN FILED TO GUARANTEE SAID INSTALLATION.

DIRECTOR OF WASTEWATER DEPARTMENT _____ DATE _____
COLUMBIA, TENNESSEE

### CERTIFICATE OF APPROVAL FOR RECORDING

I HEREBY CERTIFY THAT THE SUBDIVISION PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE CITY OF COLUMBIA SUBDIVISION REGULATIONS, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS NOTED IN THE MINUTES OF THE COLUMBIA MUNICIPAL PLANNING COMMISSION, AND THAT IT HAS BEEN APPROVED FOR RECORDING IN THE OFFICE OF THE MAURY COUNTY REGISTER OF DEEDS.

SECRETARY, PLANNING COMMISSION _____ DATE _____
COLUMBIA, TENNESSEE

RECORDING STAMP HERE

IF YOU CAN READ THIS YOU ARE HOLDING AN UNRECORDED COPY

JOEY C. WILSON II — REGISTERED LAND SURVEYOR — AGRICULTURE — COMMERCE — TENNESSEE NO. 2089

WILSON & ASSOCIATES, P.C. — Engineering/Surveying/Environmental

# HILLCREST VILLAGE

## PHASE 1A

## FINAL SUBDIVISION PLAT

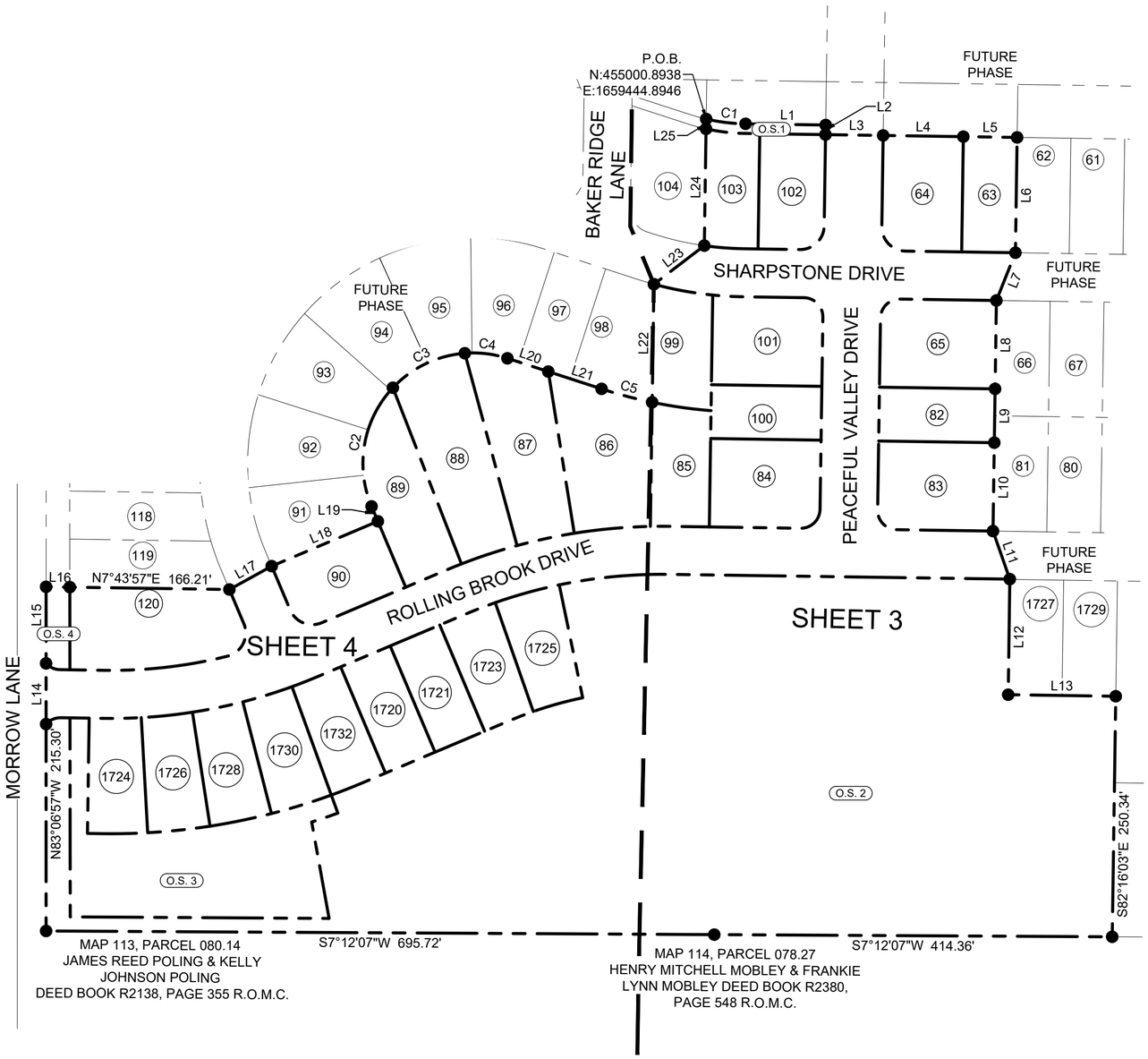
CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

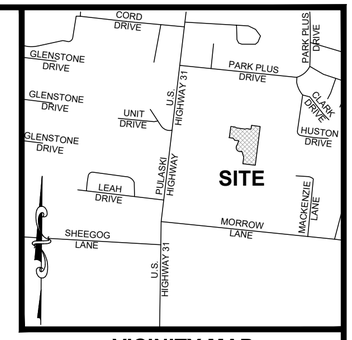
| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
| ACRES NEW RD/ST: | 2.161 (ROW) | L.F. OF NEW RD/ST: | 1897.11 +/- |
| ACRES OPEN SPACE: | 6.613 | CIVIL DISTRICT: | 3RD |
| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 100' | DATE: | 09/20/2023 |

WA PROJECT NO. 22-1861 SHEET 1 0F 4

**LEGEND**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IRON PIN FOUND | | FIRE HYDRANT | | UTILITY POLE | | PUBLIC UTIL. & DRAIN ESMT. | P.U.D.E. | BOUNDARY | |
| IRON PIN SET | | SANITARY SEWER MH | SS | GUY ANCHOR | | ADDRESSES | 1234 | CENTERLINE | |
| CONC. MON. FOUND | | SANITARY SEWER CO | SCO | COMMUNICATION BOX | C | HANDICAP SPACE | | BUFFER | |
| CONC. MON. SET | | AREA DRAIN | | COMMUNICATION MH | C | SANITARY SEWER | 8" SA | WATER FEATURE | |
| CONTROL POINT FOUND | | CURB INLET | | GAS METER | G | WATER | 4" W | TREE LINE | |
| CONTROL POINT SET | | STORM MH | ST | GAS VALVE | | UNDERGROUND ELEC | UGE | R.O.W. | RIGHT OF WAY |
| BENCH MARK | | ELECTRIC METER-BOX | E | EVERGREEN TREE | | OVERHEAD ELEC | OHE | PVMT. | EDGE OF PAVEMENT |
| WATER METER | W | ELECTRIC MH | E | SIDEWALK | | GAS | 4" G | PUDE | PUBLIC UTILITY AND DRAINAGE EASEMENT |
| WATER VALVE | | LIGHT POLE | | MIN. BUIDLING SETBACK | M.B.S.L | COMMUNICATIONS | COM | G.I.E. | GREEN INFRASTRUCTURE EASEMENT |




**VICINITY MAP**
NOT TO SCALE

| Parcel Area Table | | |
|---|---|---|
| Parcel # | Area (SF) | Area (AC) |
| 63 | 6720.00' | 0.154 |
| 64 | 9885.87' | 0.227 |
| 65 | 10992.25' | 0.252 |
| 82 | 6743.19' | 0.155 |
| 83 | 10992.25' | 0.252 |
| 84 | 10494.16' | 0.241 |
| 85 | 7633.64' | 0.175 |
| 86 | 13585.98' | 0.312 |
| 87 | 13593.69' | 0.312 |
| 88 | 14858.87' | 0.341 |
| 89 | 10894.01' | 0.250 |
| 90 | 8805.87' | 0.202 |
| 99 | 7454.81' | 0.171 |
| 100 | 6440.00' | 0.148 |

| Parcel Area Table | | |
|---|---|---|
| Parcel # | Area (SF) | Area (AC) |
| 101 | 10508.15' | 0.241 |
| 102 | 8085.87' | 0.186 |
| 103 | 6741.04' | 0.155 |
| 120 | 14268.47' | 0.328 |
| 1720 | 6720.00' | 0.154 |
| 1721 | 6720.00' | 0.154 |
| 1723 | 7023.35' | 0.161 |
| 1724 | 7018.79' | 0.161 |
| 1725 | 7357.80' | 0.169 |
| 1726 | 7131.86' | 0.164 |
| 1728 | 7131.86' | 0.164 |
| 1730 | 7131.86' | 0.164 |
| 1732 | 6936.45' | 0.159 |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 83.44' | N7°43'57"E |
| L2 | 10.00' | S82°16'03"E |
| L3 | 60.00' | N7°43'57"E |
| L4 | 83.50' | N7°43'57"E |
| L5 | 56.00' | N7°43'57"E |
| L6 | 120.00' | S82°16'03"E |
| L7 | 53.52' | S61°22'29"E |
| L8 | 92.00' | S82°16'03"E |
| L9 | 56.00' | S82°16'03"E |
| L10 | 92.00' | S82°16'03"E |
| L11 | 52.96' | N77°35'45"E |
| L12 | 120.28' | S82°18'54"E |
| L13 | 112.00' | N7°43'57"E |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L14 | 63.19' | N83°06'57"W |
| L15 | 79.69' | N83°06'57"W |
| L16 | 24.71' | N7°43'57"E |
| L17 | 50.28' | N22°01'41"W |
| L18 | 120.00' | N16°00'18"W |
| L19 | 16.80' | S73°59'42"W |
| L20 | 44.76' | N24°52'05"E |
| L21 | 58.31' | N24°52'05"E |
| L22 | 122.90' | N82°16'03"W |
| L23 | 66.09' | N30°29'48"W |
| L24 | 121.55' | N82°16'03"W |
| L25 | 10.22' | N82°16'03"W |

| Open Space Area Table | | |
|---|---|---|
| Parcel # | Area (SF) | Area (AC) |
| O.S. 1 | 1247.94' | 0.029 |
| O.S. 2 | 256804.88' | 5.895 |
| O.S. 3 | 27933.64' | 0.641 |
| O.S. 4 | 2101.35' | 0.048 |

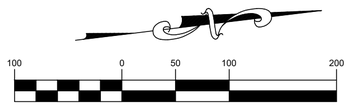
| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 41.37' | 195.00' | 12° 09' 24" | N13° 48' 39"E | 41.30' |
| C2 | 132.75' | 115.00' | 66° 08' 25" | N72° 56' 06"W | 125.50' |
| C3 | 84.97' | 115.00' | 42° 19' 55" | N18° 41' 55"W | 83.05' |
| C4 | 44.96' | 115.00' | 22° 24' 03" | N13° 40' 04"E | 44.68' |
| C5 | 54.51' | 495.00' | 6° 18' 33" | N21° 42' 49"E | 54.48' |


OWNER: M/I HOMES OF NASHVILLE, LLC
4131 WORTH AVE STE 500
COLUMBUS, OH 43219
ENGINEER: CRUNK ENGINEERING, LLC
7112 CROSSROADS BLVD STE 201
BRENTWOOD, TN 37027
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SURVEYOR: JOEY C. WILSON II, PE, RLS
WILSON & ASSOCIATES, P.C.
108 BEASLEY DRIVE
FRANKLIN, TN 37064
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JWILSON@WILSONPC.COM





WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental




GRAPHIC SCALE: 1" = 100'

# *HILLCREST VILLAGE*

## *PHASE 1A*

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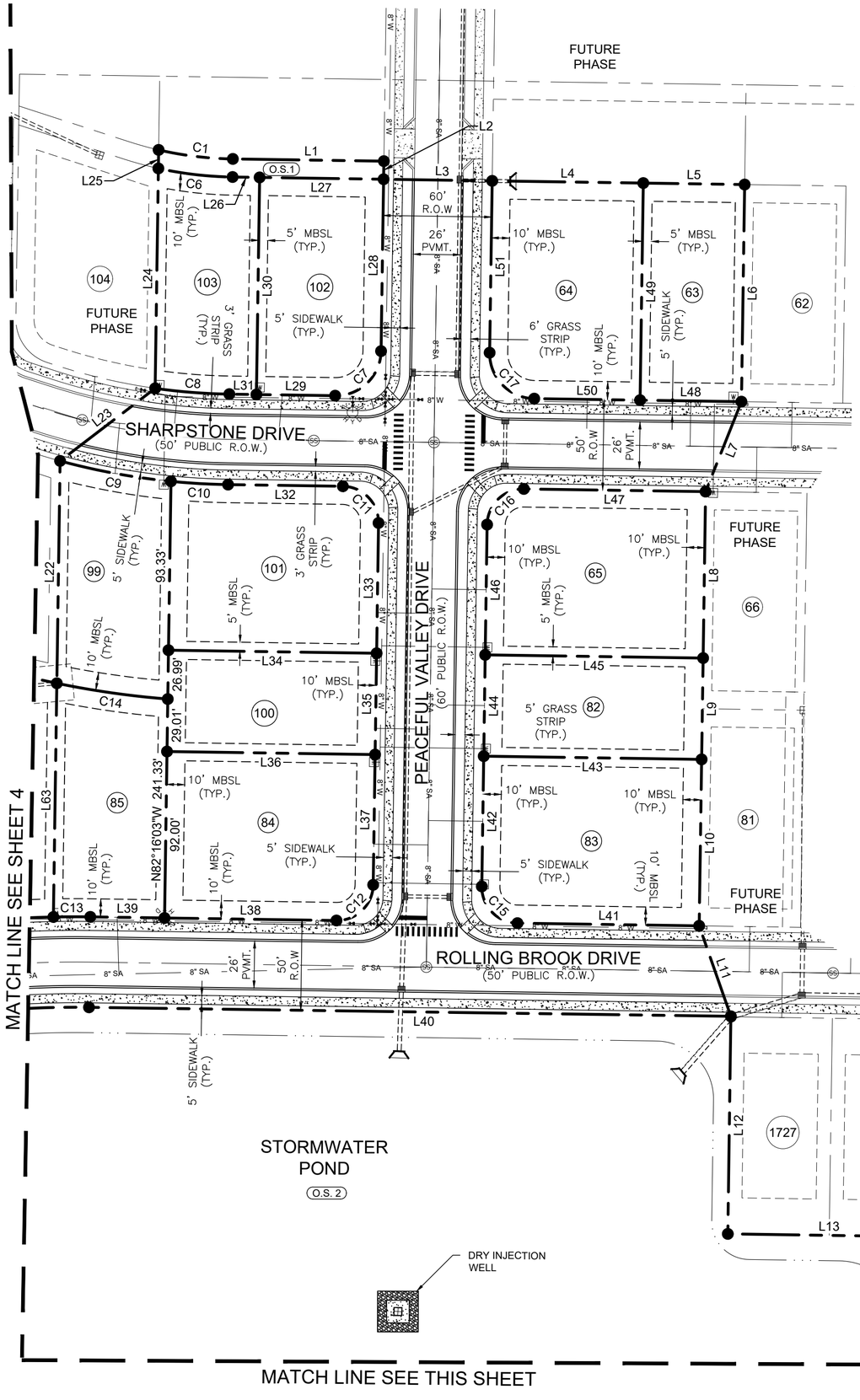
IF YOU CAN READ THIS YOU ARE HOLDING AN UNRECORDED COPY

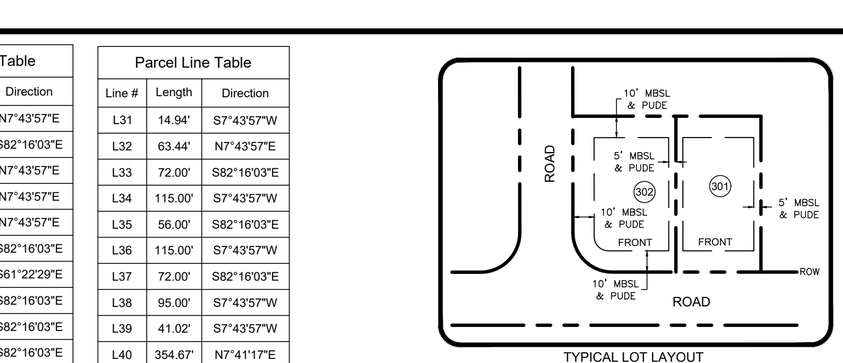
FINAL SUBDIVISION PLAT

CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
| ACRES NEW RD/ST: | 2.161 (ROW) | L.F. OF NEW RD/ST: | 1897.11 +/- |
| ACRES OPEN SPACE: | 6.613 | CIVIL DISTRICT: | 3RD |
| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 100' | DATE: | 09/20/2023 |

WA PROJECT NO. 22-1861 SHEET 2 0F 4



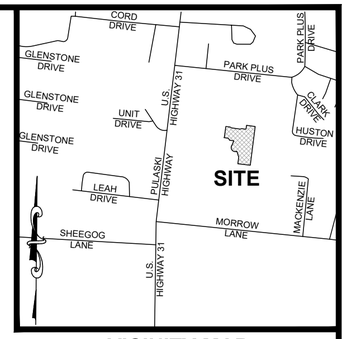




| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L1 | 83.44' | N7°43'57"E |
| L2 | 10.00' | S82°16'03"E |
| L3 | 60.00' | N7°43'57"E |
| L4 | 83.50' | N7°43'57"E |
| L5 | 56.00' | N7°43'57"E |
| L6 | 120.00' | S82°16'03"E |
| L7 | 53.52' | S61°22'29"E |
| L8 | 92.00' | S82°16'03"E |
| L9 | 56.00' | S82°16'03"E |
| L10 | 92.00' | S82°16'03"E |
| L11 | 52.96' | N77°35'45"E |
| L12 | 120.28' | S82°18'54"E |
| L13 | 112.00' | N7°43'57"E |
| L22 | 122.90' | N82°16'03"W |
| L23 | 66.09' | N30°29'48"W |
| L24 | 121.55' | N82°16'03"W |
| L25 | 10.22' | N82°16'03"W |
| L26 | 14.94' | N7°43'57"E |
| L27 | 68.50' | N7°43'57"E |
| L28 | 95.00' | S82°16'03"E |
| L29 | 43.50' | S7°43'57"W |
| L30 | 120.00' | S82°16'03"E |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L31 | 14.94' | S7°43'57"W |
| L32 | 63.44' | N7°43'57"E |
| L33 | 72.00' | S82°16'03"E |
| L34 | 115.00' | S7°43'57"W |
| L35 | 56.00' | S82°16'03"E |
| L36 | 115.00' | S7°43'57"W |
| L37 | 72.00' | S82°16'03"E |
| L38 | 95.00' | S7°43'57"W |
| L39 | 41.02' | S7°43'57"W |
| L40 | 354.67' | N7°41'17"E |
| L41 | 100.41' | S7°43'57"W |
| L42 | 72.00' | N82°16'03"W |
| L43 | 120.41' | S7°43'57"W |
| L44 | 56.00' | N82°16'03"W |
| L45 | 120.41' | S7°43'57"W |
| L46 | 72.00' | N82°16'03"W |
| L47 | 100.41' | N7°43'57"E |
| L48 | 56.00' | N7°43'57"E |
| L49 | 120.00' | S82°16'03"E |
| L50 | 58.50' | N7°43'57"E |
| L51 | 95.00' | S82°16'03"E |
| L63 | 129.17' | N82°16'03"W |




TYPICAL LOT LAYOUT
N.T.S.




**VICINITY MAP**
NOT TO SCALE

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C1 | 41.37' | 195.00' | 12° 09' 24" | N13° 48' 39"E | 41.30' |
| C6 | 41.34' | 205.00' | 11° 33' 19" | N13° 30' 37"E | 41.27' |
| C7 | 39.27' | 25.00' | 90° 00' 00" | S37° 16' 03"E | 35.36' |
| C8 | 41.17' | 325.00' | 7° 15' 32" | S11° 21' 43"W | 41.15' |
| C9 | 62.36' | 375.00' | 9° 31' 39" | N17° 19' 29"E | 62.28' |
| C10 | 31.60' | 375.00' | 4° 49' 42" | N10° 08' 48"E | 31.59' |
| C11 | 31.42' | 20.00' | 90° 00' 00" | N52° 43' 57"E | 28.28' |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C12 | 31.42' | 20.00' | 90° 00' 00" | S37° 16' 03"E | 28.28' |
| C13 | 20.40' | 575.00' | 2° 01' 57" | S6° 42' 59"W | 20.40' |
| C14 | 61.95' | 495.00' | 7° 10' 14" | S14° 58' 26"W | 61.91' |
| C15 | 31.42' | 20.00' | 90° 00' 00" | S52° 43' 57"W | 28.28' |
| C16 | 31.42' | 20.00' | 90° 00' 00" | N37° 16' 03"W | 28.28' |
| C17 | 39.27' | 25.00' | 90° 00' 00" | N52° 43' 57"E | 35.36' |

MAP 114, PARCEL 078.27
HENRY MITCHELL MOBLEY & FRANKIE LYNN MOBLEY DEED BOOK R2380, PAGE 548 R.O.M.C.

GRAPHIC SCALE: 1" = 50'

JOEY C. WILSON II
REGISTERED LAND SURVEYOR
XVI
AGRICULTURE
COMMERCE
TENNESSEE NO. 2089

WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

# *HILLCREST VILLAGE*

## *PHASE 1A*

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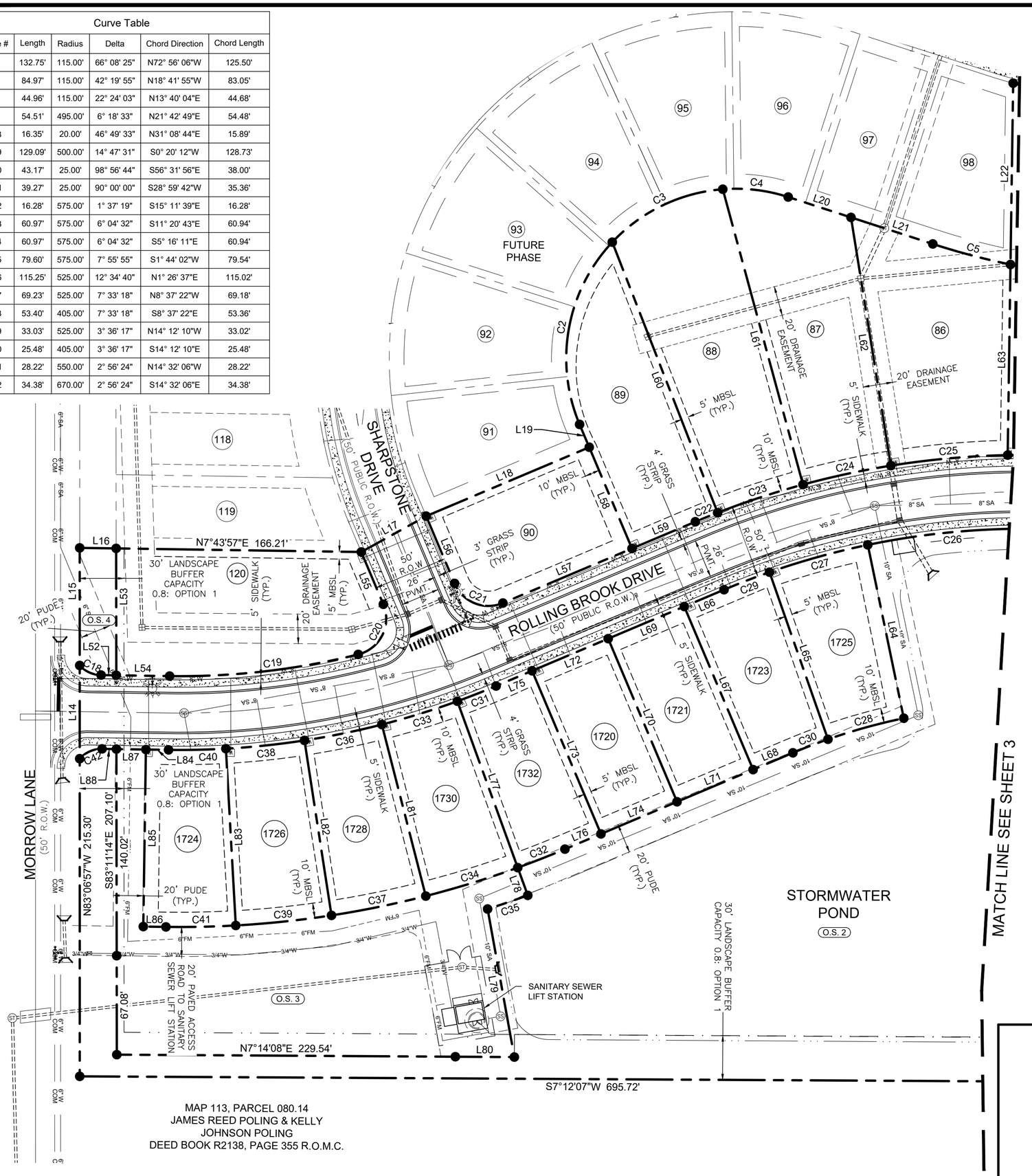
FINAL SUBDIVISION PLAT

CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

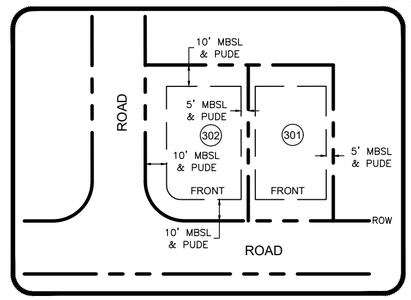
| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
| ACRES NEW RD/ST: | 2.161 (ROW) | L.F. OF NEW RD/ST: | 1897.11 +/- |
| ACRES OPEN SPACE: | 6.613 | CIVIL DISTRICT: | 3RD |
| DRAWN BY: | AS | CLOSURE ERROR: | > 1:10,000 |
| SCALE: | 1" = 50' | DATE: | 09/20/2023 |

WA PROJECT NO. 22-1861 SHEET 3 0F 4

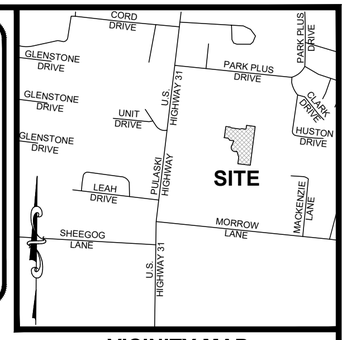
| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C2 | 132.75' | 115.00' | 66° 08' 25" | N72° 56' 06"W | 125.50' |
| C3 | 84.97' | 115.00' | 42° 19' 55" | N18° 41' 55"W | 83.05' |
| C4 | 44.96' | 115.00' | 22° 24' 03" | N13° 40' 04"E | 44.68' |
| C5 | 54.51' | 495.00' | 6° 18' 33" | N21° 42' 49"E | 54.48' |
| C18 | 16.35' | 20.00' | 46° 49' 33" | N31° 08' 44"E | 15.89' |
| C19 | 129.09' | 500.00' | 14° 47' 31" | S0° 20' 12"W | 128.73' |
| C20 | 43.17' | 25.00' | 98° 56' 44" | S56° 31' 56"E | 38.00' |
| C21 | 39.27' | 25.00' | 90° 00' 00" | S28° 59' 42"W | 35.36' |
| C22 | 16.28' | 575.00' | 1° 37' 19" | S15° 11' 39"E | 16.28' |
| C23 | 60.97' | 575.00' | 6° 04' 32" | S11° 20' 43"E | 60.94' |
| C24 | 60.97' | 575.00' | 6° 04' 32" | S5° 16' 11"E | 60.94' |
| C25 | 79.60' | 575.00' | 7° 55' 55" | S1° 44' 02"W | 79.54' |
| C26 | 115.25' | 525.00' | 12° 34' 40" | N1° 26' 37"E | 115.02' |
| C27 | 69.23' | 525.00' | 7° 33' 18" | N8° 37' 22"W | 69.18' |
| C28 | 53.40' | 405.00' | 7° 33' 18" | S8° 37' 22"E | 53.36' |
| C29 | 33.03' | 525.00' | 3° 36' 17" | N14° 12' 10"W | 33.02' |
| C30 | 25.48' | 405.00' | 3° 36' 17" | S14° 12' 10"E | 25.48' |
| C31 | 28.22' | 550.00' | 2° 56' 24" | N14° 32' 06"W | 28.22' |
| C32 | 34.38' | 670.00' | 2° 56' 24" | S14° 32' 06"E | 34.38' |




MAP 113, PARCEL 080.14
JAMES REED POLING & KELLY JOHNSON POLING
DEED BOOK R2138, PAGE 355 R.O.M.C.




TYPICAL LOT LAYOUT
N.T.S.



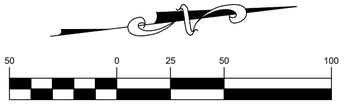

**VICINITY MAP**
NOT TO SCALE

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L14 | 63.19' | N83°06'57"W |
| L15 | 79.69' | N83°06'57"W |
| L16 | 24.71' | N7°43'57"E |
| L17 | 50.28' | N22°01'41"W |
| L18 | 120.00' | N16°00'18"W |
| L19 | 16.80' | S73°59'42"W |
| L20 | 44.76' | N24°52'05"E |
| L21 | 58.31' | N24°52'05"E |
| L22 | 122.90' | N82°16'03"W |
| L52 | 10.32' | N7°43'57"E |
| L53 | 86.01' | N83°11'05"W |
| L54 | 36.16' | S7°43'57"W |
| L55 | 38.45' | N73°59'42"E |
| L56 | 49.50' | S73°59'42"W |
| L57 | 95.00' | S16°00'18"E |
| L58 | 74.50' | S73°59'42"W |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L59 | 46.64' | S16°00'18"E |
| L60 | 196.78' | S75°37'01"W |
| L61 | 207.42' | S81°41'33"W |
| L62 | 170.40' | S87°46'05"W |
| L63 | 129.17' | N82°16'03"W |
| L64 | 120.00' | N85°09'17"E |
| L65 | 120.00' | N77°35'59"E |
| L66 | 29.27' | N16°00'18"W |
| L67 | 120.00' | N73°59'42"E |
| L68 | 29.27' | S16°00'18"E |
| L69 | 56.00' | N16°00'18"W |
| L70 | 120.00' | N73°59'42"E |
| L71 | 56.00' | S16°00'18"E |
| L72 | 56.00' | N16°00'18"W |
| L73 | 120.00' | N73°59'42"E |
| L74 | 56.00' | S16°00'18"E |

| Parcel Line Table | | |
|---|---|---|
| Line # | Length | Direction |
| L75 | 26.50' | N16°00'18"W |
| L76 | 26.50' | S16°00'18"E |
| L77 | 120.00' | N76°56'06"E |
| L78 | 19.98' | S76°56'06"W |
| L79 | 101.97' | S86°38'16"W |
| L80 | 40.00' | N7°14'08"E |
| L81 | 120.00' | N82°31'02"E |
| L82 | 120.00' | N88°05'58"E |
| L83 | 120.00' | S86°19'05"E |
| L84 | 15.36' | N7°43'57"E |
| L85 | 120.00' | N82°16'03"W |
| L86 | 15.36' | S7°43'57"W |
| L87 | 20.00' | S7°43'57"W |
| L88 | 9.68' | N7°43'57"E |

| Curve Table | | | | | |
|---|---|---|---|---|---|
| Curve # | Length | Radius | Delta | Chord Direction | Chord Length |
| C33 | 53.59' | 550.00' | 5° 34' 56" | N10° 16' 26"W | 53.57' |
| C34 | 65.28' | 670.00' | 5° 34' 56" | S10° 16' 26"E | 65.25' |
| C35 | 28.79' | 689.98' | 2° 23' 27" | N11° 52' 11"W | 28.79' |
| C36 | 53.59' | 550.00' | 5° 34' 56" | N4° 41' 30"W | 53.57' |
| C37 | 65.28' | 670.00' | 5° 34' 56" | S4° 41' 30"E | 65.25' |
| C38 | 53.59' | 550.00' | 5° 34' 56" | N0° 53' 26"E | 53.57' |
| C39 | 65.28' | 670.00' | 5° 34' 56" | S0° 53' 26"W | 65.25' |
| C40 | 38.88' | 550.00' | 4° 03' 03" | N5° 42' 26"E | 38.88' |
| C41 | 47.37' | 670.00' | 4° 03' 03" | S5° 42' 26"W | 47.36' |
| C42 | 17.08' | 20.00' | 48° 56' 29" | N16° 44' 17"W | 16.57' |




GRAPHIC SCALE: 1" = 50'

JOEY C. WILSON II
REGISTERED LAND SURVEYOR
XVI
AGRICULTURE
COMMERCE
TENNESSEE NO. 2089

WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

# *HILLCREST VILLAGE*

## *PHASE 1A*

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FINAL SUBDIVISION PLAT

CITY OF COLUMBIA - MAURY COUNTY - TENNESSEE

| | | | |
|---|---|---|---|
| TOTAL ACRES: | 14.300 | TOTAL NO. OF LOTS: | 27 |
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| SCALE: | 1" = 50' | DATE: | 09/20/2023 |

WA PROJECT NO. 22-1861 SHEET 4 0F 4

# Appendix B: Subdivision Development Agreement

This DEVELOPMENT AGREEMENT is made and entered into on this

Fourteenth day of July, 2023,
between THE CITY OF COLUMBIA, TENNESSEE, (hereinafter the "CITY"), and

M/I Homes of Nashville, LLC., the DEVELOPER (hereinafter the "DEVELOPER") named on the Addendum to this Agreement attached hereto and by this reference made a part hereof (hereinafter the "ADDENDUM").

WITNESSETH:

WHEREAS, the DEVELOPER desires to develop the property described on the ADDENDUM (hereinafter the "PROJECT"); and,

WHEREAS, the Development Plan of the PROJECT has been approved by the Columbia Municipal Planning Commission (hereinafter the “CMPC”) on the

8th day of September, 2021,
pursuant to Tennessee Code Annotated Title 13, Chapter 4, and the Subdivision Regulations of Columbia, Tennessee (hereinafter the "SUBDIVISION REGULATIONS”); and,

WHEREAS, the DEVELOPER is the owner of the PROJECT and has authority to engage in such development; and,

WHEREAS, the DEVELOPER desires to develop and improve said PROJECT; and,

WHEREAS, in order to provide for the health, safety, and welfare of future residents of the PROJECT, it will be necessary for certain improvements to the CITY'S utility systems, public infrastructure, and common areas to be constructed within and to serve the PROJECT including but not be limited to roads, bridges, sidewalks, pedestrian facilities, stormwater facilities, street signs, markings, signals, street lighting, recreation and park facilities, landscaping, and the like (hereinafter the “IMPROVEMENTS”); and,

WHEREAS, in order for the IMPROVEMENTS to be fully integrated with the utility systems and public infrastructure of the CITY and to function in a satisfactory manner, the DEVELOPER has agreed to construct, in accordance with the Subdivision Regulations and other rules, regulations, and ordinances of the CITY, the IMPROVEMENTS in said PROJECT and extend utilities to the PROJECT at their own cost; and,

WHEREAS, the CITY is willing to accept the dedication of the streets, utilities, and other improvements as determined in the Development Plan of the PROJECT, subject to the City of Columbia City Council approval by resolution, and subject to the applicant's compliance with all requirements in this agreement and applicable existing laws of the CITY of Columbia and the State of Tennessee,

NOW, THEREFORE, it is agreed and understood as follows:

## B1 General Conditions

### B1.1 Construction Costs

The DEVELOPER shall pay for all material and labor necessary to install and complete the roads, sidewalks, sewers, utilities, and other facilities in accordance with this agreement.

### B1.2 City Ordinances, Rules and Regulations

All currently existing CITY ordinances, rules and regulations, and the Subdivision Regulations adopted by the CMPC are made a part of this agreement. In the event of a conflict between the terms of this agreement and a CITY ordinance, the ordinance shall prevail. In the event of a conflict between the terms of this agreement and the Subdivision Regulations, the Subdivision Regulations shall prevail. All work done under this agreement is to be performed in accordance with plans and specifications approved by the City and made a part, hereof.

### B1.3 Fees

Review fees, inspection fees, and other amounts established by the CITY shall be paid prior to any review of the plans. If the DEVELOPER fails to install the facilities in accordance with the terms of this Agreement, no portion of the review fees, inspection fees, or other amounts paid to the CITY shall be refundable to the DEVELOPER.

### B1.4 Inspection

The CITY shall have a continuous right to inspect the work and facilities to assure that the work and facilities are in accordance with the Subdivision Regulations, approved Construction Plans, and other rules, regulations, and ordinances of the CITY.

### B1.5 Right of Entry

The CITY shall have the right, in case of breach of the Performance Agreement, to enter upon any property of the DEVELOPER and take all necessary actions to complete the work and obligations not completed.

### B1.6 Easements

The DEVELOPER shall obtain and dedicate to the CITY or cause to be dedicated to the CITY, either by dedication on the plat or by easement deed, in either case in a form acceptable to the CITY, permanent easements of such widths as required by the CITY and noted on the Plans. The DEVELOPER further agrees to grant the necessary easements and rights-of-way across the DEVELOPER's properties without expense to the CITY and waive any claim for damages.

### B1.7 Stormwater Maintenance Agreement

If the PROJECT includes any detention or retention ponds, common drainage ditches, water quality facilities, or stormwater facilities outside of the CITY rights-of-way, the DEVELOPER will submit a Stormwater Maintenance Agreement, to be filed with and recorded with the Final Plat.

**B1.8 Attorney Fees and Other Expenses**

The DEVELOPER shall pay all reasonable costs and expenses incurred by the CITY in enforcing or completing this agreement. The DEVELOPER shall pay all costs and expenses, including the CITY'S attorney fees, of any legal proceedings brought by the CITY against the DEVELOPER seeking remedies for the DEVELOPER'S failure to perform any of its obligations hereunder, whether or not any proceedings are prosecuted to judgment.

**B1.9 Agreement Not Assignable**

No third party shall obtain any benefits or rights under this agreement nor shall the rights or duties be assigned by either party.

**B1.10 Revocation and Interpretation**

This agreement shall bind the DEVELOPER when executed by the DEVELOPER and may not be revoked by the DEVELOPER without permission of the CITY, even if the agreement has not been executed by the CITY, or does not bind CITY, for other reasons. This agreement shall be interpreted in accordance with Tennessee law and may only be enforced in the Chancery Court or Circuit Court or Court of competent jurisdiction of Maury County, Tennessee, and Tennessee Appellate Courts.

**B1.11 No Oral Agreement**

This agreement may not be orally amended and supersedes all prior negotiations, commitments, or understandings.

**B1.12 Separability**

If any portion of this agreement is held to be unenforceable, the CITY shall have the right to determine whether the remainder of the agreement shall remain in effect, or whether the agreement shall be void and all rights of the DEVELOPER pursuant to this agreement terminated.

**B 1.13 Transferability**

The DEVELOPER agrees to not transfer the property on which this PROJECT is to be located without first providing the CITY with written notice. The transferee shall provide the CITY an Assumption Agreement of this Agreement, whereby the transferee agrees to perform the IMPROVEMENTS required under this agreement and to provide a performance surety. The DEVELOPER understands that if the DEVELOPER transfers said property without providing the notice of transfer and Assumption Agreement as required herein, they will be in breach of this agreement and in violation of the Subdivision Regulations.

**B1.14 Indemnity**

The DEVELOPER shall indemnify and hold the CITY harmless from all loss, costs, expenses, liability, money damages, penalties, or claims arising out of any work covered by this agreement, including any attorney fees incurred by the CITY in connection therewith. Inspection of the IMPROVEMENTS by an authorized representative of the CITY shall not constitute a waiver by the CITY of any defect or of any of the DEVELOPER'S obligations hereunder.

### B1.15 Binding Effect

This agreement shall be binding upon the DEVELOPER and the DEVELEPOR's heirs, administrators, executors, assigns, and any other successors in interest.

### B1.16 Entire Agreement

This document contains the entire agreement between the parties, and there are no collateral understandings or agreements between them. No variations or alterations of the terms of this agreement shall be binding upon either of the parties, unless the same be reduced to writing and made an amendment to this agreement.

### B1.17 Headings

Paragraph titles and headings contained herein are inserted for convenience only and shall not be deemed a part of the agreement and in no way shall define, limit, extend, or describe the scope or intent of any provision, hereof.

## B2 Performance Surety

At the time of execution of this agreement, the DEVELOPER shall provide the CITY a performance surety, in an amount determined by the City Engineer for the IMPROVEMENTS and other items specified by the Construction Plans, plats, and plans approved by the CMPC. This performance surety shall secure performance of all obligations of the DEVELOPER under this agreement. The performance surety shall meet all requirements established in Chapter 4: Performance Agreement of the Subdivision Regulations and secure full compliance with all terms and conditions of this agreement. The performance surety may be called for failure to comply with the provisions of this agreement in whole or in part according to the terms of the performance surety. The performance surety will not be released, except and until there has been full compliance with this agreement.

## B3 Construction

### B3.1 Construction Plans

The DEVELOPER shall submit to the CITY, Construction Plans describing in reasonable detail all utility systems, all storm water management systems, all street systems, pedestrian facilities, and all IMPROVEMENTS. The Construction Plans shall be designed according to the Engineering Standards and Specifications, all other codes and ordinances enforced by the City, and sound engineering judgment. The design of all utility systems shall follow the State of Tennessee and utility provider design criteria and specifications. In the event of a disagreement as to compliance with or interpretation of the Construction Plans and the CITY'S specifications, the decision of the CITY shall be final and binding on the DEVELOPER. The Construction Plans shall be prepared by a design professional licensed by the State of Tennessee to design all systems and shall bear the seal, signature, date, and license number of the professional preparing the Construction Plans.

**B3.2 Commencement of Construction**

Construction of IMPROVEMENTS may not begin until the following events have occurred:

A. The Preliminary Plat has been approved by the CMPC;
B. The Construction Plans are approved by the CITY;
C. The Tennessee Department of Environment and Conservation has approved the applicable portions of the Plans and has confirmed its approval to the CITY and/or DEVELOPER in writing;
D. The CITY shall have received an appropriately executed Development Agreement; and
E. The DEVELOPER shall give the CITY notice of commencement of construction, in writing at least one (1) working day prior to commencement.

**B3.3 Site Grading**

The DEVELOPER, hereby, agrees to construct all site grading to comply with the approved Construction Plans, including the approved Erosion Control Plan for the PROJECT and to comply with the Engineering Standards and Specifications, Stormwater Ordinance, and all other codes and ordinances enforced by the CITY.

**B3.4 Storm Water Management Systems**

The DEVELOPER shall be responsible for all storm water management work made necessary by the development of this PROJECT. It is understood and agreed that the CITY in its proprietary function is not and could not be expected to oversee, supervise, or direct the construction of all drainage improvements, and the excavation incident thereto. Neither is the CITY vested with the original design responsibility nor the means to formally survey elevations or the locations of improvements at every stage of the construction process. The CITY is vested with the right of periodic inspections, stop work order, and final approval as a measure of secondary or subsequent enforcement. The DEVELOPER has and shall retain the responsibility to properly anticipate, survey, design and construct the subdivision storm water improvements and give full assurance that same shall not adversely affect the flow or quality of surface water from or upon any property. In providing technical assistance, plan and design review, the CITY does not and shall not relieve or accept any liability from the DEVELOPER.

**B3.5 Street Construction**

The DEVELOPER, hereby, agrees to construct and improve the streets shown on the Construction Plans to comply with the CITY's specifications and to the satisfaction and approval of the City Engineer by grading, draining, subgrade preparation, base preparation, curbing, signage, striping, signalization, sidewalk installation, and paving with the required preparation, amounts, and types of material. The DEVELOPER further agrees to pay the cost of all engineering, inspection and laboratory cost incidental to the construction of subdivision streets including but not limited to material and density testing. The DEVELOPER further agrees to make all necessary adjustments to manholes and valve boxes to meet finished surface grade and to repair subsurface or base material, as required, in areas directed by the CITY Engineer, prior to application of final surface.

**B3.6 Time Period for Construction**

The DEVELOPER agrees to be bound to complete, within three (3) years of commencement of construction, all IMPROVEMENTS shown on the plat and plans and all things required by this agreement.

The DEVELOPER further agrees that if due to unforeseen circumstances, he is unable to complete all work included in this agreement within the time specified above, but desires to complete said agreement to the satisfaction of the CITY, the DEVELOPER shall submit a written request for extension of the agreement period to the CITY at least sixty (60) days prior to the expiration of the existing agreement period, specifying the reason for the DEVELOPER's failure to complete the work as agreed and a prospective date for such completion. The DEVELOPER further agrees that if the performance surety executed to secure the value of the work to be performed under this agreement, due to inflation or rising costs, is determined to be inadequate by the City Engineer to secure the cost of said IMPROVEMENTS at the time an extension is sought, the DEVELOPER will provide the additional security to bring the performance surety amount in line with current cost projections as made by the CITY. The DEVELOPER understands that the DEVELOPER's failure to follow the extension procedure constitutes a breach of this agreement and places the DEVELOPER in violation of the Subdivision Regulations. The DEVELOPER further understands, that should the DEVELOPER fail to complete any part of the work outlined in this agreement in a good and workmanlike manner as approved, the CITY shall reserve the right to withhold and withdraw all building permits within the PROJECT until all items of this Agreement have been fulfilled by the DEVELOPER.

**B3.7 Off-Site Improvements**

The DEVELOPER shall construct any and all off-site facilities that may be required to serve the PROJECT. Unless specifically noted in the Construction Plans and made a part of separate agreement with the CITY, the CITY shall not be required to reimburse the DEVELOPER for construction of off-site improvements.

**B3.9 Inspection and Compliance**

After construction begins, the CITY shall provide on-site construction inspection as the CITY deems necessary to ensure that all work is performed and completed in accordance with the Construction Plans, CITY specifications, and the contents of this agreement. In the event of a disagreement as to compliance with or interpretation of the Construction Plans and the CITY'S specifications, the decision of the CITY shall be final and binding on the DEVELOPER. If the DEVELOPER fails to construct in accordance with the approved Construction Plans or to comply with the CITY'S specifications, the CITY may issue a stop-work order and DEVELOPER, hereby, agrees to be bound by such order.

**B3.10 Testing**

The DEVELOPER agrees to pay the cost of all engineering, inspection, and laboratory cost incidental to construction of the streets, sidewalks, utilities, sewers, compacted fill material, and other facilities included within this agreement. Such testing includes, but is not limited to, material and density testing.

**B3.11 Scrap Removal**

The DEVELOPER agrees to comply with all local, state, and federal rules and regulations regarding waste material and debris disposal.

**B3.12 Traffic Control**

The DEVELOPER, hereby, agrees to prepare a traffic control/detour plan where required and shall submit said plan to the CITY for review and approval. All traffic control and safety devices, including

signs, lane markings, and barriers necessitated by construction activity undertaken pursuant to this agreement shall be installed and maintained by the DEVELOPER. All traffic control devices shall meet the standards and be installed in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, published by the United States Department of Transportation.

**B3.13 Temporary Facilities**

The DEVELOPER shall provide all temporary facilities including but not limited to utilities and roadways, that are determined by the CITY to be required in connection with or as a result of interruption of service or access that occurs as a consequence of construction activity associated with the work covered by this agreement. Such temporary services shall in all regards and at all points in time be adequate to assure emergency access and adequate fire flows.

## B4 Acceptance of Improvements

### B4.1 Completion of Improvements

At such time as the improvements have been constructed and installed, in accordance with the Constructions Plans and specifications, required testing and inspections completed and found satisfactory, and all clean-up and cover-up has been done to the satisfaction the City Engineer, a letter requesting preliminary acceptance of the PROJECT will be provided by the DEVELOPER. Formal acceptance shall follow the procedure established in the Subdivision Regulations.

The DEVELOPER agrees the DEVELOPER shall have no claim, direct or implied, in the title or ownership of the IMPROVEMENTS specified in this agreement when the IMPROVEMENTS are complete and thereafter accepted by the CITY. The DEVELOPER will be responsible for construction failures and defects in PROJECT prior to final acceptance. During this period, it shall remain the responsibility of the DEVELOPER to correct and cure these defects and failures.

### B4.2 As-Built Drawings and Post-Completion Items

The DEVELOPER agrees to furnish to the CITY as-built plans, on a reproducible, stable media, of the sanitary sewer, storm water management, water mains and service system, and streets within the subdivision before the CITY shall accept the subdivision.

### B4.3 Acceptance of Facilities

Upon final acceptance of all or part of the IMPROVEMENTS in the PROJECT, then those IMPROVEMENTS shall become the property of the CITY free from all claims from any person or entity without the necessity of any further writing, agreement, or deed. The DEVELOPER further agrees that any facilities placed within a public or platted right-of-way or dedicated public easement are irrevocably dedicated to the public use without any right of reimbursement or compensation of any kind.

### B4.4 Failure to Install

In the event the DEVELOPER fails to install the facilities in accordance with the terms of this agreement, the CITY may, in its sole discretion, elect to accept all or a portion of the IMPROVEMENTS in the PROJECT. Should the CITY choose to accept all or a portion of these IMPROVEMENTS, the CITY shall become the sole owner of these facilities. The CITY may give notice of acceptance by writing delivered to the DEVELOPER or recorded in the Register’s Office of Maury County, Tennessee. No further writing or deed shall be required.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in multiple originals by persons properly authorized so, to do on or as of the day and year first given.

Hillcrest Village (Baker Property)

PROJECT

| *Completed by the Developer* | *Completed by the City* |
|---|---|
| M/I Homes of Nashville, LLC. | |
| DEVELOPER NAME | |
| David Cumming, P.E. | |
| AUTHORIZED AGENT NAME | CITY ENGINEER |
| SIGNATURE | SIGNATURE |
| 7/14/23 | |
| DATE | DATE |
| 3020 Stansberry Ln. St. 202 | |
| STREET | |
| Franklin, TN 37069 | |
| CITY, STATE, ZIP | |
| (919) 763-4630 | |
| PHONE | |
| EJordon@mihomes.com | |
| EMAIL | |
| *Attest* | *Attest* |
| Eli Jordon | |
| ATTEST NAME | ATTEST NAME |
| ATTEST SIGNATURE | ATTEST SIGNATURE |
| 7/14/23 | |
| DATE | DATE |

# MILL AND OVERLAY AGREEMENT

This Mill and Overlay Agreement (the "Agreement") is made and entered into as of the Effective Date.

WHEREAS, M/I Homes of Nashville, LLC ("M/I Homes") is currently developing property within the City of Columbia, Tennessee (the "City") known as Hillcrest Village (the "Project");

WHEREAS, the City is in the process of annexing from the Maury County, Tennessee (the "County") that certain portion of Morrow Lane depicted on Exhibit A hereto (the "ROW"); and

WHEREAS, in connection with M/I Homes' development of the Project, the City has requested that M/I Homes mill and overlay the ROW (the "Work") at the same time M/I Homes installs the final surface course of asphalt for Phase 1A of the Project.

NOW, THEREFORE, for the good and valuable consideration of the promises and covenants contained here, the receipt and sufficiency of which is hereby acknowledged, it is agreed:

1. Incorporation of Recitals. The above recitals are made part of this Agreement as if fully restated herein.

2. Performance of the Work. M/I Homes agrees to perform, or cause to be performed, the Work in a good, workmanlike and lien-free manner, and in conformance with all applicable laws and specifications for the Work. At all times M/I Homes shall maintain, and shall cause any contractors involved in the performance of the Work to maintain, a commercial general liability policy of insurance with limits commercially reasonable and proportional to the Work.

3. Surety. The Surety provided for the Hillcrest Village Phase 1A final plat will also ensure the completion of milling and paving the portion of Morrow Lane depicted on Exhibit A.

4. Acceptance. Upon M/I Homes' completion of the Work, M/I Homes shall notify the City and provide the City an opportunity to inspect the Work (the "Completion Notice"). The City shall have fourteen (14) days from its receipt of the Completion Notice (the "Inspection Period") to accept or reject the Work. The City's failure to reject or otherwise request correction of the Work during the Inspection Period shall be deemed acceptance of the Work.

5. Warranty. Upon the City's acceptance of the Work as provided herein, M/I Homes hereby assigns to the City any and all contractor warranties covering the Work.

6. Authorization. The City has undertaken or shall have undertaken, as the case may be, all necessary votes, approvals, and/or authorizations required for this Agreement, including but not limited to securing exemptions for the Work from public bidding or prevailing wage laws, if applicable.

**(REST OF PAGE LEFT INTENTIONALLY BLANK, SIGNATURE PAGE TO FOLLOW)**

**IN WITNESS WHEREOF,** this Agreement has been executed as of the _____ day of _____ 2023 (the "Effective Date").

**M/I HOMES OF NASHVILLE, LLC**

By: DAVID M. CUMMING

Its: VP of Land 11/14/23

**IRREVOCABLE LETTER OF CREDIT**

DATE: **(Date)**
LETTER OF CREDIT NO: **(LOC #)**
EXPIRATION DATE: **(Expiration Date)**

We will have the LOC completed by Oct 10th.

TO: CITY OF COLUMBIA
700 NORTH GARDEN STREEET
COLUMBIA, TENNESSEE 38401

RE: Irrevocable Standby Letter of Credit for **(Developer Name)** for **(Subdivision Name Phase and Section)**, Columbia, Tennessee.

This Bank hereby issues in your favor its Irrevocable Standby Letter of Credit for the account of **(Developer Name)** for an amount not to exceed in the aggregate U.S. Dollars $**(LOC Amount)** effective **(Effective Date)** and expiring automatically at this Bank's Office at **(Bank's Address)** on **(Expiration Date)**. The purpose of this Letter of Credit is to ensure the completion of roads, striping, signage, curbing sidewalks, drainage, grading and street lighting for **(Subdivision Name Phase and Section)**, Columbia, Tennessee 38401 as required by the City of Columbia.

Funds under this credit are available only against your drafts drawn on this Bank, each bearing on its face the clause "Drawn under Letter of Credit No.**(LOC #)** presented at sight at Bank's above office, on or before the above expiration date, accompanied by the following documents, and in strict compliance with the following terms and conditions:

> A statement executed by an authorized official of the City of Columbia certifying that **(Developer Name)**, LLC has failed to perform the completion of roads, striping, signage, curbing, sidewalks, drainage, grading or street lighting for **(Subdivision Name Phase and Section)**, Columbia, Tennessee 38401 as required by the City of Columbia.

Your issuance or negotiation of any drafts hereunder shall be considered a guaranty to this Bank that all of the foregoing terms and conditions have been fulfilled.

Furthermore, this original letter of credit must accompany the above documents required under this credit. No rights hereunder may be transferred, negotiated or assigned in any manner, as this credit is hereby extended solely for your benefit.

It is a condition of the Letter of Credit that it shall be deemed automatically extended, without amendment for a one (1) year period from the expiration date shown here on, or any future expiration date unless at least (60) days prior to any expiration date we send notice to the City of Columbia by Registered Mail that we elect not to renew this Letter of Credit for any such additional period.

This Bank agrees with you that your drafts under and in strict compliance with the terms of this letter of credit will be duly honored if property presented to this Bank before the above expiration date.

Sincerely,

(Bank officer to sign).

## OWNER AFFIDAVIT
## CITY OF COLUMBIA, MAURY COUNTY, TENNESSEE

I/we, DAVID M. CUMMINGS
(Print Name(s) in Full)

being duly sworn, depose and say(s) that I/we am/are the owner(s) of the property described as:

Tax Map 113, Parcel 80.50
(Property Parcel/Tax ID Number)

and located at:

2643 Pulaski Hwy, Columbia, TN 38401
(Street Address)

am fully aware of the request for development approval in the City of Columbia, Tennessee. Furthermore, I/we hereby appoint:

Wilson & Associates - Joey Wilson, Sean McGowan, Abigail Overstreet
(Print Name(s) in Full)

to act as my/our authorized agent on my/our behalf on all matters pertaining to the processing and obtaining the application with the exception of legal documents for recording purposes.

Signature

3020 Stansberry Lane, Suite 202
Property Owner Mailing Address

Franklin, TN 37069
City, State, & Zip

Subscribed and sworn to before me this 11 day of July, 2023.

Notary Public

My Commission Expires: 11-19-2025

PAIGE SELLERS
STATE OF TENNESSEE NOTARY PUBLIC
WILLIAMSON COUNTY
My Commission Expires 11-19-2025

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | 2643 Pulaski Hwy, Columbia, TN 38401 | | |
| | TAX MAP: 113 | GROUP: | PARCEL: 80.50 |
| SUMMARY OF NATURE OF REQUEST AND WORK | The purpose of this plat is to create 27 single-family residential lots and 3 open spaces. | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | 6/7/2023 | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ❑ Annexation<br>❑ Rezoning<br>❑ Preliminary Plat<br>☑ Final Plat<br>❑ PUD Preliminary Master Plan<br>❑ PUD Final Site Plan<br>❑ Multi-Family Site Plan<br>❑ Other:<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>❑ Written Legal Description copy<br>❑ Requested Zone Listed<br>❑ Compliance with Comprehensive Plan<br>❑ Annexation Permission Form<br>❑ Plans and/or Plats conforming to City standards with check list completed<br>❑ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>❑ Project Name (include Sections & Phases)<br>Hillcrest Village - Phase 1A<br>❑ Total Number of Lots<br>30<br>❑ Total acreage<br>14.3 |

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

All communications go to the Applicant's email that is provided.

| | | | |
|---|---|---|---|
| NAME | Abigail Overstreet | PHONE | 615-749-0740 |
| ADDRESS | 108 Beasley Dr, Franklin, TN 37064 | EMAIL | aoverstreet@wilsonpc.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | M/I Homes of Nashville, LLC. | PHONE | (919)763-4630 |
| ADDRESS | 3020 Stansberry Ln. St. 202, Franklin TN 37069 | EMAIL | EJordon@mihomes.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

| | | |
|---|---|---|
| Abigail Overstreet | Abigail Overstreet | 9/25/2023 |
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |
| M/I Homes of Nashville, LLC. | Dave Cumming | 9/25/2023 |
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |

**From:** Keli Frymire
**To:** Paul Keltner; Austin Brass; Kevin McCarthy
**Cc:** Joshua Gibbs; Ty; Greg Gamble; Brad Snyder; Tyler Gray
**Subject:** [Caution External Email] - Columbia Bluffs - Planning Commission Deferral Request
**Date:** Monday, February 12, 2024 4:43:14 PM
**Attachments:** image001.png

---

Good afternoon all,
I spoke with Kevin today on the phone and am sending this email as a follow up to that conversation.

We request to defer the Columbia Bluffs PUD-R and Columbia Bluffs CD-4 annexation and rezoning projects from the February 14, 2024 Planning Commission agenda to the March 13, 2024 agenda. We would like to ensure that we have the appropriate time to work through the late sewer comments and remove any uncertainty surrounding this issue. Additionally, Kevin and I discussed the Land Use policy amendment for the CD-4 parcel and will need to also use this time to update this request to include the land use policy change.

Thank you again for working with us on these projects.

Keli Frymire | PLA
Mailing: 3020 Stansberry Lane, Suite 201; Franklin, TN 37069
Physical: Freeport, FL
keli@gdc-tn.com
Mobile: (706) 566-6480
www.gdc-tn.com

# Columbia Bluffs Planned Unit Development

| | | | |
|---|---|---|---|
| Project #: | 23-0414 | Location: | Tax Map 90 Parcel 12.01 |
| Applicant: | Greg Gamble | Case Type(s): | Annex, RZ, Pre. PUD Master Plan |
| Staff Planners: | Kevin C. McCarthy, AICP<br>Austin Brass, AICP | Proposed Use: | Single-Family Homes & Daycare |

## PROJECT SUMMARY

The applicant requests annexation with a plan of services and rezoning of a 409.92-acre site to Planned Unit Development Residential (PUD-R). The subject site is located along the Duck River between Iron Bridge Road and Bear Creek. The applicant further requests approval of a Preliminary PUD Master Plan to develop 800 homes and a daycare facility. The subject property is part of a larger existing parcel. The extent of the proposed PUD is located outside the city but within its Urban Growth Boundary. The subject site includes most a larger parcel, a small portion of which is located within Columbia's corporate limits. The Zoning Ordinance requires the Planning Commission and City Council to determine that a Planned Unit Development is warranted prior to approving the rezoning and Preliminary Master Plan. The zoning conformity section of the report addresses these criteria.

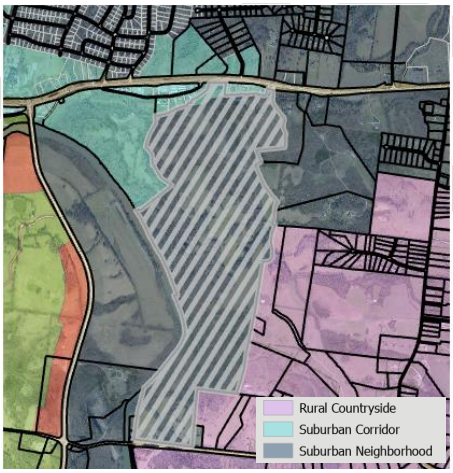
- The applicant proposes a customized set of standards which deviate from the PUD-R standards and offers justification for each deviation.
- The Architectural Design Review Team evaluated proposed elevations and made a recommendation to the Planning Commission. The recommendation includes deviations from the PUD-R standards.
- The Development Review Committee evaluated the proposal twice. City staff communicated with the applicant on multiple occasions as the proposal progressed through the review process. The applicant incorporated some recommendations from staff and declined others.
- The Parks & Greenways element of Connect Columbia indicates that development of this parcel should include a greenway and other park space.
- The Wastewater Department has advised the applicant to minimize the use of pump stations.
- The Planning Commission is the **recommending body** for the annexation, rezoning, and PUD Master Plan.
- Professional planning staff commentary identifies recommended conditions of approval.
- Templates are provided at the end of the report to assist the Planning Commission in crafting properly formatted motions.

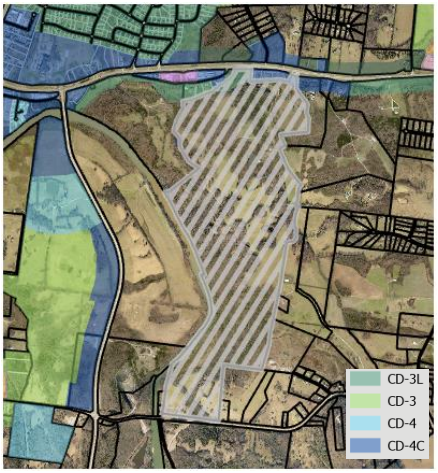
## SITE INFORMATION

| CURRENT ZONING | EXISTING USE | EXISTING IMP. | LAND AREA |
|---|---|---|---|
| Unincorporated | Vacant | Various Structures | +/- 409.92 |



| FUTURE LAND USE MAP | ZONING MAP |
|---|---|



| SITE CONTEXT/ADJACENT PROPERTIES | | | |
|---|---|---|---|
| | Future Land Use | Zoning | Current Use |
| Subject Property | Suburban Neighborhood | Unincorporated | Vacant |
| North | Suburban Corridor | CD-3L/CD-4C | Single Family |
| South | Suburban Neighborhood | Unincorporated | County Park |
| East | Suburban Corridor | CD-3L/Unincorporated | Single Family |
| West | Rural Countryside | Unincorporated | Single Family/Duck River |

## CONSISTENCY WITH CONNECT COLUMBIA

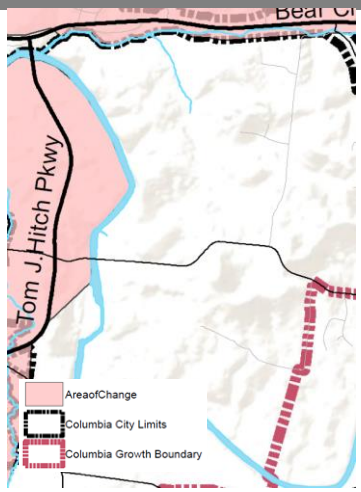
**Suburban Neighborhood:** The future land use of the subject site is Suburban Neighborhood. The Character Area is characterized by a residential development and neighborhoods, with limited, intermixed and compatible civic uses (Connect Columbia, p. 22). The Future Land Use Plan indicates that "the general development pattern is defined by a single use activity on individual lots" (Connect Columbia, p. 22). Green space is largely incorporated on individual lots; neighborhood and community parks should be located within neighborhoods to enhance the quality of life. Development should emphasize connectivity and housing diversity (Connect Columbia, p. 23). The Character Area Matrix from page twenty-two of the Future Land Use Plan (excerpted below) is a guide to approving requests for zoning map amendments and Planned Unit Developments. The future land use classification is implemented by the CD-3L and CD-3 character districts, as well as PUDs.

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| CHARACTER AREA MATRIX | | | | |
|---|---|---|---|---|
| | **Development Pattern** | **Zoning Category and Uses** | **Infrastructure** | **Design Standard** |
| **SUBURBAN NEIGHBORHOOD** | **Is the property in an Area of Change?**<br><br>**No:**<br>The development pattern is established. Changes to overall character of the area should rarely occur.<br><br>**Yes:**<br>The development pattern is evolving. Changes to the area are likely as development occurs. New development should respect both the natural environment and blend with existing, surrounding neighborhood assets. | **Residential Uses Zoning Category:**<br>Low Density Residential District and Medium Residential.<br><br>**Public and Civic Uses Zoning Category:**<br>Religious Facilities, Government Facilities (low impact), and Educational Facilities. | **Not in an Area of Change:**<br>Limited new services, with mostly in-fill enhancements to existing infrastructure.<br><br>**Within an Area of Change:**<br>Extensions to transportation, water, sewer, and other services should be expected. New service or extensive redevelopment of existing services should be vetted and reviewed by Planning Commission and City Council as a primary element of approval. | Scale: New dwellings and structures should be compatible with the established character of the area.<br><br>Architecture: New developments should include a mix of architectural styles. Residential garages, if front-facing, should be recessed from the front façade of the structure. Civic use should respect the residential character, while providing architectural interest. |

## AREA OF CHANGE

The subject site **is not located** in an Area of Change (Connect Columbia Map 3). In 2017 the Planning Commission determined that the development pattern was established. Changes to overall character of the area should rarely occur. The designation does not necessarily mean that any particular development proposal is inconsistent with Connect Columbia. It does mean that the Planning Commission may pause to ensure the context of the area surrounding the subject property is considered fully in the review process. (Connect Columbia p. 14).



## CONFORMITY WITH ZONING ORDINANCE

- **The Planning Commission may determine that the condition of the subject site and the innovative nature of the proposed development presents an exceptional situation as described in §8.5.21.B.2 of the Zoning Ordinance.**
    - The Ordinance requires that that Planning Commission and City Council make formal, written findings regarding each of the criteria listed in §8.5.21.B.2.
    - Under **§8.5.21.B.2.a**, the Planning Commission must determine that the Preliminary Master PUD Development Plan is necessary to implement the Comprehensive Plan is consistent with Connect Columbia, the Comprehensive Plan.
        - The applicant maintains that the proposed alternative standards are consistent with Connect Columbia's visions for the Suburban Neighborhood future land use.
    - Under **8.5.21.B.2.b**, the Planning Commission must determine that due to unique site conditions or the necessary and intrinsic uses, size, or form of the Development, such Development cannot under any other plan, design, or circumstances conform to one of more of the character districts specified in the Ordinance.
        - The applicant maintains that the uniqueness of the land and its proximity to the Duck River warrants use of special customized standards which provide for greater environmental protection.
        - The applicant posits that by using smaller lots and customized Throughfare standards, the proposed development will provide high quality housing and amenities in less environmentally impactful manner than a development under CD-3L or CD-3.
        - The applicant also suggests that the bulk and design standards of the character districts within the zoning ordinance are not conducive to the age-restricted portion of the community.
    - Under **8.5.21.B.2.c**, the Planning Commission must determine that the Master PUD Development Plan provides an innovative plan of development that is harmonious with the features of the subject property and character of adjacent property. The Commission must determine that the plan promotes quality design and environmentally sensitive development by taking advantage of special site characteristics, locations and land uses.
        - The applicant emphasizes the uniqueness of the land and its proximity to the Duck River. The applicant believes that the proposed customized

standards provide for greater environmental protection and higher quality development than can be achieved without a PUD.

- Under **8.5.21.B.2.d**, the Planning Commission must determine that there are sufficient existing infrastructure, services, and utilities available to the site prior to Development.
  - The applicant obtained will-serve and availability letters from utility providers. Additional comments were identified in the Development Review Committee comments. A traffic impact study identifies improvements necessary to maintain the established level of service. Staff has additional concerns related to the impact of the development on parks and greenways level of services and the sanitary sewer design for the development (see planning staff commentary below). The Planning Commission must determine that sufficient existing infrastructure, services, and utilities are available to the site prior to development.

**Blocks, Thoroughfares & Connectivity**

- **The proposed PUD Preliminary PUD Master Plan proposes a customized alternative set of Throughfare assemblies which do not conform to the standard assemblies in Article 5 of the Zoning Ordinance.**
  - Table 5.2.2.G-1 indicates that the Urban Neighborhood Street (70' wide), Urban Center Street (65' wide), and 2-Lane Avenue (90' wide) are appropriate Throughfare assemblies for PUD-R.
  - Table 5.2.2.G-1 establishes the elements of the Thoroughfares, Internal Drives and Alleys.
  - The applicant has proposed several alternatives to the prescribed standards. These alternatives use the same width of right-of-way and provide the same elements as the prescribed standards but modify the dimensions of some features (e.g. a 5' wide sidewalk with a 10' multiuse path rather than two 5' wide sidewalks).

- **The applicant proposes to provide Bikeways via Share Use Lanes.**
  - The Zoning Ordinance requires developments greater than 80 acres to provide a bicycle network comprised of bikeway types listed in Table 5.2.4.B. Except for the roadway sections containing the multiuse path, the applicant proposes to utilize shared use lanes.
  - Bicycles and motor vehicles utilize the same travel lane in a shared use lane.



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**Shared Use Lane**

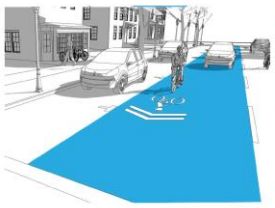


Illustration is provided for illustrative purposes only.

**Permitted Districts**

CD-2 | CD-3L | CD-3 | CD-4 | CD-4C | CD-5 | CD-5C | SD-int | SD-LI | SD-HI | PUD-R | PUD-MU

| | |
|---|---|
| Riding Surface Width | Same as Vehicular Lane |
| Buffer | N/A |
| Movement | With Traffic |
| Intersection Detailing | Signed, signalized |
| Bicycle Parking | Opportunistic, rack, Bicycle Shelter |

**Shared Use Path**

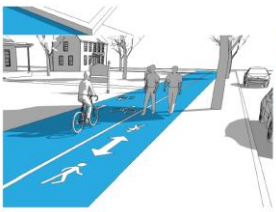


Illustration is provided for illustrative purposes only.

**Permitted Districts**

CD-2 | CD-3L | CD-3 | CD-4 | CD-4C | CD-5 | CD-5C | SD-int | SD-LI | SD-HI | PUD-R | PUD-MU

| | |
|---|---|
| Riding Surface Width | 10 ft min |
| Buffer | 3 ft min, curb or planter strip |
| Movement | With traffic or dual direction |
| Intersection Detailing | Signed, signalized, Peg-a-Track |
| Bicycle Parking | Rack, bicycle shelter, bicycle station |

- **The proposed PUD Preliminary Master Plan generally conforms to the standard for block formation and size**.
    - The Zoning Ordinance requires that Thoroughfares on development sites be arranged to form blocks (§ 5.2.2.D, p.308).
    - A block perimeter may not exceed 2,000 feet (Table 4.3.1-K, p. 157; Table 5.2.2.D, p. 308).
    - The term block is defined in § 9.3 (p. 482) to include lots and building sites circumscribed by thoroughfares and alleys.
    - For the most part, the proposed master plan depicts lots arranged into conforming blocks.
    - Some of the perimeter lots, as well as some of the larger lots in the southern portion of the development, are not part of the blocks. This is permitted at the edge of a development parcel under § 5.2.2.D. Several lots in the southern portion of the site are located outside of blocks to account for the shape and topography of the site.

**Civic Spaces**

- **The proposed Preliminary PUD Master Plan provides the required Civic Space in the form of Playgrounds, Greens, Pocket Parks and other Civic Space types dispersed throughout the development.**
    - Section 5.3.1 of Zoning Ordinance requires any development parcel[1] to utilize at least 5% but no more than 20% of its gross acreage as Civic Space conforming to the standards of Table 5.3.3-A.

[1] Development Parcel: a parcel of land: (1) which, either alone or together with one or more other parcels under a common Development scheme, program or plan, is ten (10) or more gross acres; (2) with respect to the Development of which any new Thoroughfare, Internal Drive, or extension or change of the design of any existing Thoroughfare or Internal Drive is required or will be made or proposed; or (3) with respect to which any District assignment or any Thoroughfare or Internal Drive or alignment thereof is proposed to be made or changed by a Zoning Map or Zoning Map amendment. (§ 9.3, p. 490).

- The applicant proposes to dedicate 84.89 acres (20.7%) of the 409-acre site to formal Civic Space meeting the standards of the Ordinance.
- The applicant proposes to provide additional amenitized open space, in excess of the 20% Civic Space maximum.
- Section 5.3.3 offers eight Civic Space types that include green space, natural areas, pocket parks, etc.
- Each Civic Space type has its own standards for intent, size, frontage, character, and typical facilities.
- Section 5.3.3.B further requires civic space designed and equipped as a playground within 800 feet of every lot or building site within a PUD-R development.
- The applicant proposes to provide ten Civic Spaces. All of them are Greens; some include playgrounds. The proposed master plan depicts typical facilities including playground equipment, benches, dog park, community garden, trails, and water features.

| Space | Area |
|---|---|
| A | 5.89 acres |
| B | 0.59 acres |
| C | 0.90 acres |
| D | 6.12 acres |
| E | 3.68 acres |
| F | 0.51 acres |
| G | 1.24 acres |
| H | 0.64 acres |
| I | 1.64 acres |
| J | 63.68 acres |

- The largest of these spaces, Green J, is much larger than the maximum area of a Green allowed by Table 5.3.3-B of the Ordinance. The applicant proposes to deviate from the standard Civic Space type as part of the PUD process. The proposed Civic Space places the most sensitive portions of the site outside the area of development. It also features extensive primitive walking trails and a multipurpose field.

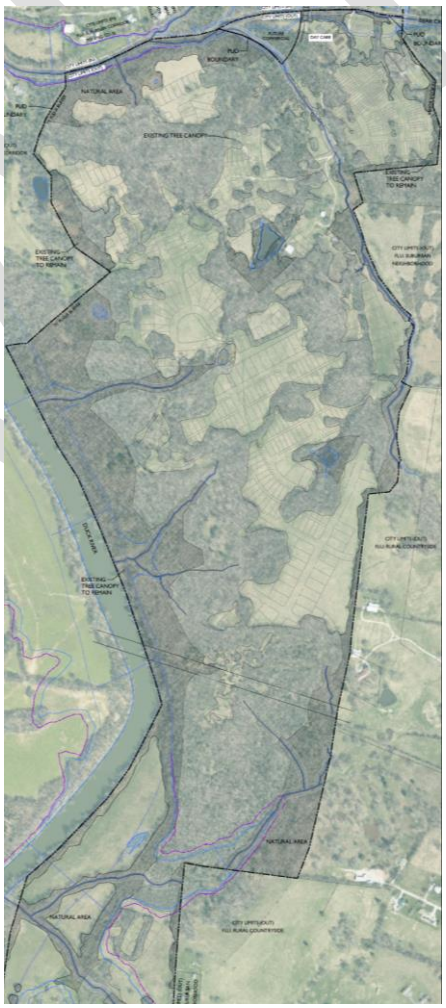
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**Tree Preservation**

- **Section 4.3.16 of the Zoning Ordinance requires a percentage of existing tree cover to be preserved based upon the existing canopy on the development site.**
  - The applicant's tree preservation plan identifies 262.4 acres (64%) of the 409-acre site as existing tree canopy.
  - Table 4.3.16.L of the Ordinance requires retention of at least 36% of the existing canopy.
  - The applicant's tree preservation plan proposes to preserve and/or replant 39% of the existing tree canopy and identifies 101.5 acres of tree save areas.
  - Much of the area shown as tree save area is on the southern and western portions of the site. At the request of planning staff, the applicant adjusted the grading plan in part to ensure maximum tree preservation in this portion of the property.

| Existing Tree Canopy Cover (as % of Total Development, Lot or Building Site Size) | Minimum Tree Canopy Retention by Zoning District (as % of Total Tree Canopy Cover) [1] [2] | | |
|---|---|---|---|
| | CD-2<br>CD-3L<br>CD-3<br>CD-4 [3]<br>CD-4C [3]<br>CD-5C [3]<br>SD-MHP<br>SD-INT [3]<br>PUD-R<br>PUD-MU [3] | CD-4 [4]<br>CD-4C [4]<br>CD-5C [4]<br>SD-INT [4]<br>PUD-MU [4] | SD-LI [4]<br>SD-HI |
| 80% – 100% | 30% | 15% | 10% |
| 60% – 79% | 36% | 18% | 11% |
| 40% – 59% | 45% | 22% | 12% |
| 20% – 39% | 48% | 24% | 13% |
| 19% – less | 54% | 26% | 14% |

[1] Additional tree canopy retention may be required under other provisions of this Ordinance.
[2] CD-5 and CV do not have a minimum tree canopy retention requirement.
[3] Residential portion of Development or construction in noted Districts.
[4] Non-Residential portion of Development or construction in noted Districts.



If the Preliminary Master Plan is approved, Development Services staff will confirm conformity with the standards of § 4.3.16 during subsequent reviews when more is known about condition of existing canopy, including the location of heritage/specimen trees, and any factors which may impact tree save areas.

**Architecture**

- **Prior to review by the Planning Commission, the Architectural Design Review Team must review and make a recommendation on the design of all buildings in a Planned Unit Development (§ 8.5.21.L, p. 457).**
    - On January 9th, 2024, the City of Columbia Architectural Design Review team conducted a thorough assessment of this proposal in accordance with the standards outlined in the Zoning Code.
    - The Architectural Design Review team recommended approval of this request, including deviations from the design standards, which have been highlighted in red below.
    - This recommendation is being presented to the Planning Commission with this request as part of the Planned Unit Development process. Notably, this development parcel comprises a total of 800 dwelling units, consisting of:
        - 296 active adult homes;
        - 151 rear-loaded single-family homes;
        - 93 courtyard homes;
        - 94 large lot homes; and
        - 166 townhomes.

      In addition, a 12,000-14,000 SF daycare facility is proposed utilizing a commercial budling type including a clubhouse amenity space.

    - Both of these uses are permitted within the PUD-R district. It's important to note that the highlighted text in red indicates deviations from the base standards of the PUD-R Character District.
    - The Architectural Design Review Team (ART) recommended approval of the facades of the proposed single-family homes with modifications to the PUD-R standards as summarized in the table below. The applicant's proposed deviation are noted in red.

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| (PUD-R) District Standards : Single-Family Homes | | |
|---|---|---|
| **Design Standards:** | **Required** | **Proposed** |
| **Vertical Composition:** | Identifiable Base, Middle, & Cap | All elevations indicate a defined base. This may with a brick rowlock course at foundations for brick elevations and a brick or stone base for non-brick elevations. |
| **Finished Floor Elevation:** | Min 18 inches above finished grade | Active Adult Homes: **0 inches above finished grade at façade for ADA accessibility;** all other homes consist of a minimum of 18 inches above finished grade. |
| **Façade Position & Façade Articulation:** | Main entrance at façade & position parallel to frontage line | All lots/home sites front a street section. |
| **Façade Openings:** | 20 ft. or less spacing for windows/doors | All windows appear to be 20 ft. or less with no blank facades. |
| **Façade Glazing:** | 20-60 % | Glazing appears to be at least 20 percent. |
| **Window Shape:** | Square or vertical proportions | All windows are square or vertical proportioned |
| **Window Alignment:** | Upper floor windows and other features must be aligned with those of first floor | All upper-level windows align with lower-level windows. |
| **Window Types:** | Single-hung, double-hung, casement | All windows adhere to the window type standards as described. |
| **Window Glazing Material:** | Clear | All windows proposed are clear glass. |
| **Window Trim in 1st Layer:** | Min 4 in. trim with sill and top plate/ soldier course above lintel and rowlock course below sill | Elevations are consistent with window trim details and rowlock course below window sills and soldier course above windows for brick elevations. |
| **Shutters:** | Functional to cover half of window width/ shutter dogs | Elevations do not indicate the use of shutters. |
| **Façade Window Sill Height:** | 5 ft. min above grade | Active Adult Homes: **2ft. min above grade**<br>Courtyard Homes: **3 ft. min above grade**<br>All other homes: 5 ft. min above grade |
| **Porch Frontages:** | Min. 6ft. clear depth, excluding rails, pillars, columns | A note has been provided that indicate a porch width minimum of 6’ |
| **Façade Variety:** | No façade may exist more than once on a block face | A detail has been provided to indicate variety of facades to ensure that a façade is not present |

| | | |
|---|---|---|
| | or within view of same façade | more than once on a block face or in view of the same façade. |
| **Roof Type & Pitch:** | Hip/ Gable | All roofs appear to be of a hip and gable design. |
| **Primary Building Materials:** | Brick, Fiber Cement Board, Wood | All elevations indicate a primary façade material of brick & fiber cement board. |
| **Foundation Cladding:** | Brick or Natural Stone | Some elevations that are fiber cement board do indicate a foundation cladding of brick or natural stone |
| **Porch Pier/ Chimney Cladding:** | Brick or Natural Stone & any space under porch concealed by lattice/ brick or natural stone for chimney | All elevations indicate a porch pier that is clad in brick or natural stone; **cladding excluded if column is a 6 X 6 cedar column from roof line to porch.** |
| **Garage Location:** | 3rd Layer *(20 ft. behind primary façade)* | **Active Adult Homes: 2nd Layer**<br>**Courtyard Homes: 2nd Layer**<br>**Large Lot Homes: 2nd Layer**<br>Single Family Alley Loaded: 3rd Layer |
| **Garage Design:** | Min. interior dimensions 10 X 20 per vehicle Parking Space. Garage door must have ornamental lighting above with a carriage house door design. | Garage design indicates a 10 X 20 per vehicle parking space. Noting that each garage will have an ornamental lighting fixture above it. |
| **Garage Door Width:** | 9ft width with 2ft separation between door | **Elevations exceed the 9' garage door maximum width requirements with a 16' maximum width proposed.** |

- The Architectural Design Review Team (ART) recommended approval of the facades of the proposed townhome designs with modifications to the PUD-R standards as summarized in the table below. The applicant's proposed deviation are noted in red.

| (PUD R) District Standards : Townhomes | | |
|---|---|---|
| **Design Standards:** | **Required** | **Proposed** |
| **Vertical Composition:** | Identifiable Base, Middle, & Cap | Elevations indicate a defined base, middle, and cap for all townhomes. |
| **Finished Floor Elevation:** | Min 18 inches above finished grade | Min 18 inches |
| **Façade Position & Façade Articulation:** | Main entrance at façade & position parallel to frontage line | All townhomes enfront a street section |
| **Façade Openings:** | 20 ft. or less spacing for windows/doors | All windows appear to be 20 ft or less with no blank facades. |
| **Façade Glazing:** | 20-60 % | Glazing appears to be at least 20 percent. |
| **Window Shape:** | Square or vertical proportions | All windows are square or vertical proportioned. |
| **Window Alignment:** | Upper floor windows and other features must be aligned with those of first floor | All windows align with those on the first floor. |
| **Window Types:** | Single-hung, double-hung, casement | All windows adhere to the window type standards as described. |
| **Window Glazing Material:** | Clear | All windows proposed are clear glass. |
| **Window Trim in 1st Layer:** | Min 4 in. trim with sill and top plate/ soldier course above lintel and rowlock course below sill | Elevations appear to consist of window trim details and rowlock course below window sills and soldier course above windows for brick elevations. |
| **Shutters:** | Functional to cover half of window width/ shutter dogs | All shutters will be functional with shutter dogs |
| **Façade Window Sill Height:** | 5 ft. min above grade | 5 ft. min above grade |
| **Porch Frontages:** | Min. 6ft. clear depth, excluding rails, pillars, columns | A note has been provided that indicate a porch width minimum of 6' |
| **Façade Variety:** | No façade may exist more than once on a block face | A detail has been provided to indicate variety of facades to ensure that a façade is not present more than once on a block face or in view of the |

| | | |
|---|---|---|
| | or within view of same façade | same façade for single-family homes. This detail was not provided for the townhome section but can apply. |
| **Roof Type & Pitch:** | Hip/ Gable | Hip & gable elements are provided for roof type and pitch. |
| **Primary Building Materials:** | Brick, Fiber Cement Board, Wood | Brick and fiber cement board have been indicated as the primary materials for townhomes. |
| **Foundation Cladding:** | Brick or Natural Stone | Elevations that are fiber cement board indicate a foundation cladding of brick or natural stone. |
| **Porch Pier/ Chimney Cladding:** | Brick or Natural Stone & any space under porch concealed by lattice/ brick or natural stone for chimney | Brick or natural stone. |
| **Garage Location:** | 3rd Layer (20 ft. behind primary façade) | All townhomes are proposed to be rear loaded with garages being located in the 3rd layer in adhered to this design standard. |
| **Garage Design:** | Min. interior dimensions 10 X 20 per vehicle Parking Space. Garage door must have ornamental lighting above with a carriage house door design. | All unites are proposed to be rear loaded with garages located in the 3rd layer. |
| **Garage Door Width:** | 9ft width with 2ft separation between door | N/A, garages located in 3rd layer and will be rear loaded. |

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- The Architectural Design Review Team (ART) recommended approval of the facades of the proposed day care facility design with modifications to the PUD-R standards as summarized in the table below. The applicant's proposed deviation are noted in red.

| (PUD R) District Standards : Day Care Facility | | |
|---|---|---|
| **Design Standards:** | **Required** | **Proposed** |
| **Vertical Composition:** | Identifiable Base, Middle, & Cap | All structure indicates a defined base, middle, and cap. |
| **Finished Floor Elevation:** | Min 18 inches above finished grade | **That finished floor elevation match finished grade for ADA accessibility with no knee wall.** |
| **Façade Position & Façade Articulation:** | Main entrance at façade & position parallel to frontage line | The proposed daycare enfronts a proposed street section with entrance. |
| **Façade Openings:** | 20 ft. or less spacing for windows/doors | All windows appear to be 20 ft or less with no blank facades |
| **Façade Glazing:** | 20-60 % (70% glazing for shopfront elevation) | Shopfront elevation will require a 70 percent glazing requirement. |
| **Window Shape:** | Square or vertical proportions | All windows are square or vertical proportioned. |
| **Window Alignment:** | Upper floor windows and other features must be aligned with those of first floor | All windows align with those on the first floor. |
| **Window Types:** | Single-hung, double-hung, casement except in shopfront or galley | Windows appear to be fixed glass at all elevations |
| **Window Glazing Material:** | Clear | All windows proposed are clear glass. |
| **Window Trim in 1st Layer:** | Min 4 in. trim with sill and top plate/ soldier course above lintel and rowlock course below sill | Elevations appear to consist of window trim details and rowlock course below window sills and soldier course above windows for brick elevations. |
| **Shutters:** | Functional to cover half of window width/ shutter dogs | N/A |
| **Façade Window Sill Height:** | 5 ft. min above grade | N/A; daycare facility is a non-residential use |
| **Porch Frontages:** | Min. 6ft. clear depth, excluding rails, pillars, columns | Min 6ft. |

| | | |
|---|---|---|
| **Façade Variety:** | No façade may exist more than once on a block face or within view of same façade | This use proposed is a single site use that consists of one façade. |
| **Roof Type & Pitch:** | Hip/ Gable | Roof type & pitch proposed is hip & gable |
| **Primary Building Materials:** | Brick, Fiber Cement Board, Wood | Elevations consists of a primary façade material of brick with a stone base including fiber cement board |
| **Foundation Cladding:** | Brick or Natural Stone | Foundation cladding indicated is stone |
| **Porch Pier/ Chimney Cladding:** | Brick or Natural Stone & any space under porch concealed by lattice/ brick or natural stone for chimney | Porch piers indicate a stone base |
| **Building Height:** | 2 Stories min- 4 stories max | 2 stories |

**Bulk & Site Standards**

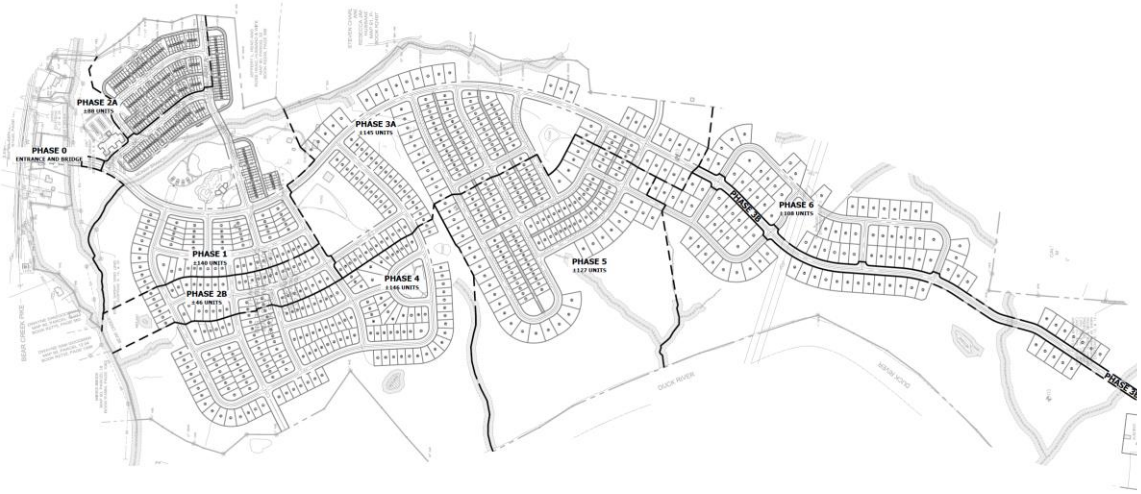
- **The Revised Final PUD Master Plan proposes a customized set of bulk and site standards which deviate from the prescriptive PUD-R standards in Table 4.3.1-K.**
- The prescribed and proposed standards are summarized in the table below. The applicant's proposed deviation are noted in **red**.

| **PUD-R District Bulk Standards** | | |
|---|---|---|
| **Bulk Standards:** | **Required** | **Proposed** |
| **Minimum Lot/ Building Site Width Minimum and Maximum:** | 38 ft. min/ 180 ft. max<br>Townhomes: 18-36 ft.<br>Single-Family Homes: 38 ft. min | All lots exceed a 38' minimum & townhomes are within 18-36 ft' lot width/building site parameters. |
| **Density:** | 12 density units per acre maximum | 1.96 density units per acre |
| **Lot/Building Enfrontment:** | Facades must have main entrance in principle of building frontage/ 20 percent of less may enfront pedestrian path. | All lots enfront a throughfare street section with townhome lots 200-205 enfronting a pedestrian path. |

| | | |
|---|---|---|
| **Principal Building:** | 6 max. per lot/building site for townhomes/ 1 max per lot other | 1 single-family home per lot/ 6 townhomes per row. Amenity & Daycare Facility on individual lots |
| **Building Height:** | 1-2 Stories for House/2-3 stories for Townhomes | 1-2 Stories for Houses/ 2 story townhomes |
| **Frontage Buildout:** | 60% minimum | 60% minimum |
| **Parking:** | 1.5 spaces per dwelling unit/ 2 spaces per single-family homes | All single-family homes utilize 2 parking spaces per dwelling including 1.5 space for townhome unts. |
| **Max. Impervious:** | 70% max; 90% max for attached townhome units | Does not exceed maximum impervious surface coverage |
| **Setbacks:** | **Front:** – 15 ft- 35 ft.<br><br>**Side:** – 0 ft. min for townhomes; 10 ft. min<br><br>**Rear:** 10 ft. min | **Front:** 15-20 ft. (all uses)<br><br>**Side:**<br>**Active Adult Homes: 5 ft.**<br>**Courtyard Homes: 7.5 ft.**<br>**Large Lot Homes: 7.5 ft.**<br>**Single-Family Alley Loaded Homes: 5 ft.**<br>**Townhomes (end units): 7.5 ft.**<br>**Daycare Facility:** N/A *(Triple Corner Lot)*<br><br>**Rear:** 10-20 ft. (all uses) |
| **Driveway:** | 10 ft max. in 1st layer if residential; 24 ft. max if non-residential | **Active Adult Homes: 18 ft. max in 1st layer**<br>**Courtyard Homes: 12 ft. max in 1st layer**<br>**Large Lot Homes: 12 ft. max in 1st layer**<br>**Single-Family Alley Loaded Homes:** N/A (3rd layer)<br>**Townhomes:** N/A (3rd layer)<br>**Day Care Facility**: 24' maximum |

**Phasing of the Development**

- **At Final PUD Master Plan, the phasing plan will require Planning Commission approval to provide the daycare and amenities early enough to serve residents and the community.**
    - Section 8.5.21.F.4 of the Zoning Ordinance authorizes the Planning Commission to approve phasing which would allow the establishment of non-residential uses even if no residential construction takes place.
    - The applicant provided a phasing plan which indicates that most of the amenities and recreation facilities of the development will be construed in Phase 1 and 3A.
    - The phasing plan does not make clear when the daycare facility will be constructed. It is the strong preference of staff that it be constructed in an early phase of the development.
    - The phasing plan indicates that 419 homes will be constructed in Phases 0 through 3A prior to completion of the spine road through the development connecting Bear Creek Pike and Iron Bridge Road. The connection will be available during the construction of Phases 4 – 6.
    - In discussion with the Planning Commission, the applicant should confirm when it intends to construct the bridge over Bear Creek, connecting the development to Bear Creek Pike.




*Phasing Plan Provided by the Applicant*

## REVIEW PROCESS

The Development Review Committee evaluated the proposed Preliminary Plat at its November 2023 meeting, as directed by § **8.3.7** of the Zoning Ordinance. At the request of the Zoning Administrator, the Development Review Committee reviewed the proposal for a second time at its January 2024 meeting. Staff has been in continuous communication with the applicant. A summary of those communications is provided below. Technical comments are provided in the agenda package and summarized in the next section.

- November 7, 2023 Architectural Design Review Team Meeting (deferred).
- November 7, 2023 Development Review Committee Meeting.
    - November 8, 2023 Development Services staff provided partial comments immediately while waiting for outside reviewers to provide notes.
    - November 10, 2023 staff provided full technical comments to applicant.
- November 13 – 21, 2023 Development Services staff and the applicant team had extensive communication about alternative thoroughfare assemblies.
- December 5, 2023 Meeting of Development Services Staff and Applicant team to discuss technical comments and resubmittal.
- January 9, 2024 Architectural Design Review Team Meeting (recommendation of approval).
- January 9, 2024 Development Review Committee Meeting.
- January 16, 2024 Discussion between applicant team and City Planner/Zoning Administrator to discuss the format of the second resubmittal to technical comments.
- January 31, 2024 Development Services and Parks & Recreation staff discussed the development's impact on the level of service for park facilities in Columbia.
    - February 1, 2024 Development Services staff met with the applicant team to review the Parks & Recreation request.
- February 3, 2024 the Columbia Wastewater Department notified the applicant team that the proposed plan for sanitary sewer did not meet city standards for pump stations.
    - February 5, 2024 Wastewater and Development Services staff met with the applicant team to discuss solutions to the pump station.
    - February 8 – 9, 2024 Wastewater and Development Services staff continued to communicate with the applicant about pump station alternatives.
- February 9, 2024 the applicant provided clarification related to the phasing plan.

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As required by § **8.5.d.D** of the Zoning Ordinance, staff posted signs on the subject property, mailed letters to adjacent property owners, and published notice of the Planning Commission's meeting in newspapers of general circulation.

The Planning Commission is the **recommending body** for all Annexations, Rezonings, and Preliminary PUD Master Plans under **§ 8.3.3.B.1** of the Zoning Ordinance. The City Council is the Decision-Making Authority.

Sections **8.5.21.B**, **8.5.21.M**, **8.5.18** and **8.5.19** of the Zoning Ordinance establishes the criteria for Planning Commission review and action for a rezoning to Planned Unit Development with a Preliminary PUD Master Plan.

For rezoning, the Planning Commission must determine:

a. *the rezoning is consistent and not in conflict with the comprehensive plan or other applicable approved local plans for the area;*
b. *It has been determined that the legal purposes for which zoning exists, as set forth in Section 1.5 [, are not contravened];* [2]
c. *It has been determined that there will be no adverse effect upon adjoining property owners unless such effect can be justified by the overwhelming public good or welfare;*
d. *It has been determined that no one property owner or small group of property owners will benefit materially from the change to the detriment of the general public;*
e. *It has been determined that conditions affecting the area have changed to a sufficient to warrant the zoning map amendment or that the existing zoning of the property was the result of a mistake; and*
f. *It has been determined that adequate school, road, parks, wastewater treatment, water supply, and stormwater drainage facilities are available.*

For the customized set of standards (which are reviewed as a zoning text amendment), the Planning Commission must determine:

a. *The extent to which the proposed Zoning Ordinance Amendment is consistent with the remainder of this Ordinance, including, specifically, any purpose and intent statements;*
b. *The extent to which the proposed Zoning Ordinance Amendment represents a new idea not considered in this Ordinance, or represents a revision necessitated by*

[2] Ordinance 4400 contains this incomplete sentence. The previous ordinance contained a nearly identical list of criteria at § 3.18.7.B. The corresponding criterion in Ordinance 3638 read "the legal purposes for which zoning exists are not contravened."

*changing circumstances over time;*

c. *Whether or not the proposed Zoning Ordinance Amendment corrects an error in this Ordinance; and*
d. *Whether or not the proposed Zoning Ordinance Amendment revises this Ordinance to comply with state or federal statutes or case law.*

For the Planned Unit Development Master Plan the Planning Commission must determine that the property and the proposed development meet the uniqueness criteria at 8.5.21.B.2, that the development cannot be accomplished under any base character district, and that the proposal :

a. *conform to all applicable standards and requirements of the Ordinance,*
b. *would be compatible with other development permitted under all applicable provisions of the Ordinance;*
c. *will not significantly interfere with the use and enjoyment of other land in the vicinity;*
d. *adequately conserve woodland and the protect water courses from erosion and siltation;*
e. *maximize safety, convenience, and amenities for the residents and visitors of the Development; and*
f. *adequately address all such other matters as they may find to have a material bearing upon the stated standards and objectives of the Ordinance.*

## SUMMARY OF DEVELOPMENT REVIEW COMMITTEE COMMENTS

The DRC reviewed this proposal at its November 2023 and January 2024 meetings. A full list of comments, and the applicant's responses, is provided in the agenda packet. Some key comments are noted below.

- **Planning** requested a more complete justification for utilizing the PUD process and specific explanation of how the proposed standards will produce a high quality development.
- Planning also requested the elimination of cul-de-sacs and improvement of the block and lot configuration of the development.
- At the second DRC review, planning staff provided direction related to the requested deviations in bulk and design standards, indicating staff's analysis of the proposals.
- Planning requested changes to the tree preservation plan.
- Planning requested specific formatting of resubmittals., clarification of the phasing plan, and reclassification of some open space as Civic Space.
- Together with Engineering, Planning requested improvements to the proposed alternative Throughfare assemblies.

- **Engineering** indicated that all approvals are subject to completion of specific improvements recommended by the Traffic Impact Study (TIS).
- The City Engineer also requested a stub for future connection to east.
- Engineering indicated that if the Preliminary PUD Master Plan is approved, a geotechnical assessment and geotechnical analysis and recommendation of all closed depressions will be required at Final Master Plan and Preliminary Plat. Engineering further requested evaluation and clarification regarding the feature depicted as a small wetland as well as other small depressions on the western portion of the site.
- Engineering commented on the slope of building sites and the preference's of city staff regarding adequate drainage of lots.
- The City Engineer initially noted that many walls may not be constructable in the locations depicted in the proposed Master Plan without encroaching on wetland buffers. The applicant revised these plans accordingly.
- Columbia Water System's (**CPWS**) consultant (Inflow) noted that the applicant's water availability letter was dated October 13, 2023 and would expire before the date of the Planning Commission meeting. The applicant provided an updated letter.
- **Wastewater** noted that all sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission. Wastewater later expanded on these comments in order to make the applicant aware that the initial plan for sewerage would not meet the department's requirements. Wastewater offered these additional comments in order to sav time and expense for the applicant under subsequent reviews.
- **Public Works** indicated that the townhomes will utilize dumpster service; the City will provide trashcans for single-family detached homes.
- Columbia Power (**CPWS**) noted that supply chain concerns could affect the timing of any development. This is a standard comment from the utility.
- **Maury County Schools** noted that the site is currently in the attendance zones of Howell Elementary, Cox Middle School, Battle Creek High School. New construction or realignment of school attendance zones may be necessary to accommodate new students. This is a standard comment from the school system.

DRAFT

## COMMENTARY FROM PROFESSIONAL PLANNING STAFF

**The Preliminary PUD Master Plan, if approved by City Council, should be formatted in the same manner as the Character District tables in 4.3.1 of the Ordinance.** A PUD Master Plan effectively creates a new zoning standard. Historically, PUDs approved in Columbia have varied substantially in format and detail. This has led to uncertainly and ambiguity as the approvals age and properties develop and change ownership. This is the first new PUD request under the current ordinance. The customizable format of Tables 4.3.1-A though U is a useful feature of the ordinance. If the Preliminary PUD Master Plan is approved, the standards should be depicted in a format similar to the 10-page summary provided for each character district. Similarly, alternative Civic Space and Thoroughfare designs should be prepared in the format utilized at Table 5.3.3-B and 5.2.2.G-1.

**The Civic Space and open space plan provided by the applicant includes alternative standards which are consistent with the overall framework of Article 5.** The applicant proposes to exceed the 20% maximum Civic Space and to provide alternative Civic Space types. The Civic Spaces proposed by the applicant meet and exceed the standards of the Ordinance. Planning staff believes the additional civic space is appropriate for the context and utilizes the site's natural features.

**The applicant revised the grading plan and throughfare layout at the request of planning staff.** **The initial PUD** justification letter provided by the applicant described the conservation benefits of the proposed PUD-R achieved by clustering. However, the initial plans depicted significant alteration of the site, effectively flattening portions of the landscape in order to create additional single-family lots. Many of the lots enfronted cul-de-sacs and formed ill-shaped blocks. The applicant revised the plan according to the staff recommendation. This resulted in a reduction of the overall number of lots requested, as well as a better conforming pattern of blocks and lots.

**The applicant proposes alternative Thoroughfare assemblies which deviate from the prescriptions of Article 5 of the Zoning Ordinance**. The Zoning Administrator generally agrees that the alternative Thoroughfare assemblies proposed by the applicant are tailored to the purposes of the proposed PUD and appropriate for the site, provided the City Engineer deems them an acceptable equivalent to the prescribed thoroughfare assemblies.

**Staff is concerned that some of the proposed customization of setback standard will provide inadequate spacing between structures.** The Zoning Administrator has no advice to Planning Commission regarding reduction of setbacks from 10' to 7.5'. However, the Zoning Administrator does not support a reduction of side setbacks from 10' to 5' on detached alley loaded homes and active adult homes.

**The applicant requests a customized standard which would permit garages to be located in the second layer for courtyard style homes. The applicant also requests to utilize wider garage doors and driveways than permitted by the PUD-R standards.** The Zoning Administrator has no advice to Planning Commission regarding the request except to note that this would be allowed in base Character Districts and does not by itself diminish the street-scape. The apparent intent of requiring garages to be located in the third layer is to discourage the use of PUDs. The wider garage doors are appropriate where placed perpendicular to the frontage but inappropriate where they face the street.

**The Wastewater Department has worked with the applicant to design a plan for sewerage which meets city standards for efficiency and long-term maintenance costs.** Wastewater indicated that the sewerage plan presented in the Preliminary PUD Master Plan does not meet the city's standards for good municipal practices. Specifically, the proposal utilizes two pump stations. The southernmost pump station only serves eighty-one lots. The wastewater engineer determined that the design was inefficient and may create inordinate long-term maintenance costs for the city. After receiving these comments, the applicant provided a markup of the plans indicating that it is feasible to combine the two pump stations. The wastewater engineer, with the assistance of Development Services staff, has continued to discuss sewerage design preferences with the applicant team. If the Preliminary PUD Master Plan is approved, the sewerage specifications can be finalized during Final Preliminary PUD Master Plan and Preliminary Plat review. Conditional approval of the Preliminary PUD Master Plan subject to technical comments should require development of the site in compliance with standard sewer specifications, no sanitary sewer depths greater than twenty feet, longitudinal and perpendicular grades which accommodate access for maintenance, and utilization of a single pump station.

**Planning staff urges the Planning Commission to condition approval of the requested PUD Master Plan on dedication of a public park and greenway space to the City of Columbia in order to maintain the parks and recreation level of service in the city.** The future Bicycle and Greenway Plan within Connect Columbia indicates a proposed greenway trail on the subject site located at the east side of the Duck River connecting with Yanahli Park to the south. The plan also indicates that additional park space is needed along the Bear Creek Pike corridor in order to maintain the level of service established in the Comprehensive Plan. The applicant's proposal depicts primitive trails in the general location of the planned greenway. The applicant also intends to construct a multiuse path along a significant portion of the north-south spine road within the development. Staff has met with the applicant to communicate these concerns and requests that any approval be conditioned on:

1) Dedication of parkland on the adjacent and related property on the north side of Bear Creek and construction of appropriate facilities as specified by the Department of Parks & Recreation; as well as
2) Dedication and construction of a greenway on the western portion of the property, the precise location, materials, and design specifications to be determined by the City Engineer based on topography and feasibility of construction.

There is an essential nexus between the proposed development and the need for an additional park and greenway. The Planning Commission can establish the timing of these improvements as part of the Final PUD Master Plan. The City of Columbia has an interest in maintaining the established level of parks and recreation services for residents. In 2017, as part of the process of creating a Parks & Greenways plan, the city evaluated existing facilities and additions necessary to maintain the level of service. The evaluation determined that an additional park (Connect Columbia Parks & Greenways Plan p.33) and a greenway (p. 29) would be needed in the vicinity of the subject site if growth occurred in the area. The applicant proposes to bring that growth the area, triggering the need for additional facilities.

Dedication of the park and greenway is roughly proportional to the impact of the development and the increased entitlements requested by the applicant. The proposed PUD, by itself, will increase the total number of households in Columbia by approximately 4.6%.[3] Furthermore, in order to entitle the land and accomplish the land developer's goals, the applicant requests approval to use the PUD process with substantial deviation from the PUD-R standards.

**The illustrative elevations provided by the applicant do not fit on the typical lots proposed.** The pattern book proposed by the applicant depicts illustrations of residential structures of various sizes and types. When scaled according to the known door width, the illustrations seem to depict buildings which will not fit within the building envelope area depicted in the typical lot layouts. This may be a topic of discussion between the applicant and the Planning Commission. Staff understands to pattern book provided at preliminary PUD Master Plan as an indication of design intent rather than a binding standard. The materials and designs will be reviewed again at the time of Final PUD Master Plan and any subsequent revisions. The decision-making authority for design review will make a binding determination at that time.

[3] The applicant proposes to develop 800 homesites. The 2022 ACS 5-year estimate indicates that there are 17,041 households in corporate limits of Columbia.

## SAMPE MOTIONS

**Approve:**

Move to find, based on the information presented by the applicant and the analysis provided by city staff, that the criteria listed in sections **8.5.21.B**, **8.5.21.M**, **8.5.18** and **8.5.19** of the City of Columbia Zoning Ordinance have been satisfied, and recommend approval of the Annexation with a Plan of Services and Rezoning to PUD-R with Preliminary Planned Unit Development Master Plan as presented *[,subject to technical comments and other conditions presented by planning staff*].

**Approve Subject to Conditions:**

Move to find, based on the information presented by the applicant and the analysis provided by city staff, that the criteria listed in sections **8.5.21.B**, **8.5.21.M**, **8.5.18** and **8.5.19** of the City of Columbia Zoning Ordinance have been satisfied, and recommend approval of the Annexation with a Plan of Services and Rezoning to PUD-R with Preliminary Planned Unit Development Master Plan, subject to the following conditions: [*list conditions of approval crafted by Planning Commission*].

**Deny:**

Move to recommend denial of the Annexation with a Plan of Services and Rezoning to PUD-R having found, based on the information presented by the applicant and the analysis provided by city staff, that the criteria listed in sections **8.5.21.B**, **8.5.21.M**, **8.5.18** and **8.5.19** of the City of Columbia Zoning Ordinance, are not satisfied [*list specific reasons for denial*].

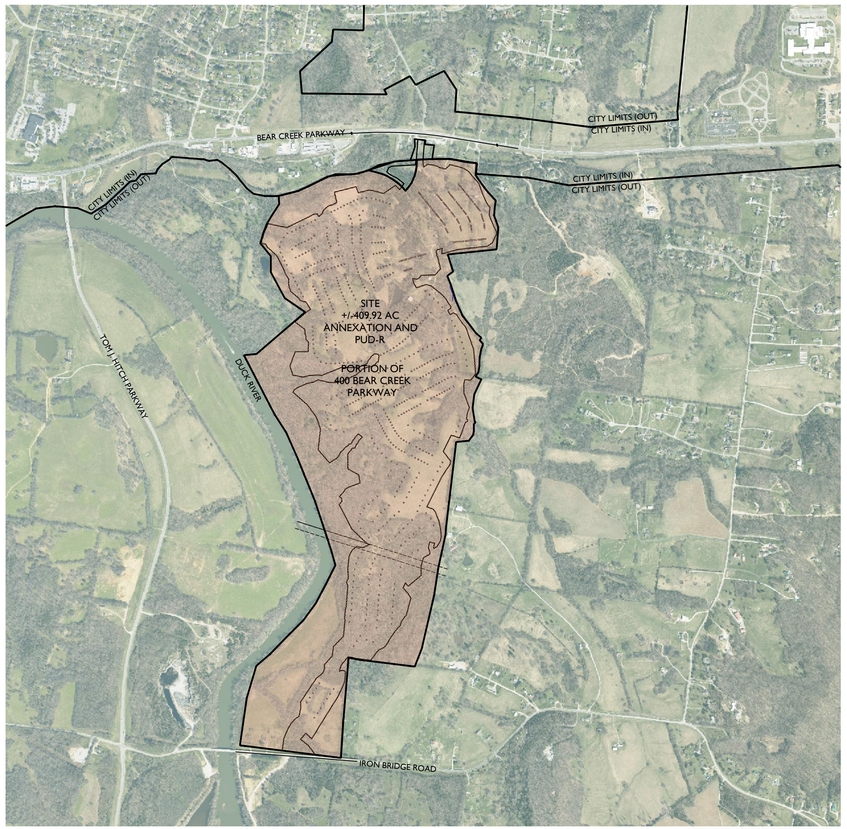
**Defer:**

Move to find that there is insufficient information to make a decision, defer the matter to the next regularly scheduled meeting of the Planning Commission, and request that the [*applicant/staff*] provide: [*list additional information*] for review at a future meeting.

DRAFT

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 BEAR CREEK PARKWAY
COLUMBIA, TENNESSEE




LOCATION MAP

0 500 1000 2000
GRAPHIC SCALE 1"=1,000'-0"


**OWNER:**
HK BIG BEAR BLUFFS, LLC
14025 RIVEREDGE DRIVE, SUITE 175
TAMPA, FL33637
JIM HARVEY

**DEVELOPER:**
KOLTER LAND
14025 RIVEREDGE DRIVE, SUITE 175
TAMPA, FL33637
JIM HARVEY
615.582.3253
jgibbs@kolter.com

**APPLICANT/ LAND PLANNER:**
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37064
GREG GAMBLE
615-975-5765
greg.gamble@gdc-tn.com

**ENGINEER:**
CSDG
2305 KLINE AVENUE, SUITE 300
NASHVILLE, TN 37211
JIM HARRISON
615-248-9999
jimh@csdgtn.com


## COMMITMENT TO ENVIRONMENTAL STEWARDSHIP

1. **Strategy for Resource Protection utilizing a PUD Planning and Design Approach**

   a. Establish a Limits of Disturbance along the Duck River and its tributaries based upon slopes, natural drainage ways, floodplain areas, and mature tree canopy.

   b. Design new development around open space areas to highlight them as community amenities with pedestrian systems that will connect the entire conservation design open space throughout the community.

   c. Pedestrian circulation and trails are highly encouraged along the river, along stream corridors, and through scenic areas.

   d. The quantity of Open Space preservation should greatly exceed any established base zone district.

   e. New home lots should generally be smaller, clustered areas away from the protected banks of the Duck River.

   f. Document on-site natural resources through a State approved Hydrologist and concurrence reports with local, state, and federal agencies.

   g. Remove debris removal along creek banks to prevent impact to Bear Creek (shoes, clothing, random bottles, containers, fencing, wood)

   h. Use Best Management Practices for Stormwater Pollution Prevention Plans during construction.

   i. Use only one crossing point (< less than approx. 50' - 60' feet that spans the creek with no structures within Bear Creek (similar to several crossings visible from US (Highway 412).

2. **Strategy for Protection through Construction**

   Implementation of the Plan requires protective measures. PUD phasing and areas of disturbance should be documented and considered through the PUD process. Protection practices shall include:

   A. Storm water erosion control applications I.E.

      i. Stormwater Detention Areas,

      ii. natural riparian buffers

      iii. silt fencing

      iv. sediment ponds

      v. Check dams

      vi. Ongoing stormwater monitoring of Environmental Controls of water runoff areas and tributaries

   B. Compliance with CGP, ARAP and NPDES permitting to address the protections that provide additional oversight to the project.

   Throughout the duration of the project, these types of practices within the action areas will ensure environmental compliance with local, state and federal requirements.

3. **Strategy for Protection when construction is completed.**

   Once development is completed permanent storm water detention areas and water out fall locations will be cleaned and stabilized in accordance with the local, state, and federal guidelines.

## SHEET INDEX


| | |
|---|---|
| C0.0 | COVER SHEET |
| C0.01 | EXISTING CONDITIONS |
| C1.0 | PHASING PLAN |
| C2.0 | OVERALL PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.1 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.2 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.3 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.3 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.4 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.5 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.6 | PROPOSED LOT DIAGRAMS |
| C2.7 | STREET SECTIONS |
| C2.8 | STREET SECTIONS |
| C2.9 | TREE CANOPY COVERAGE |
| C3.00 | OVERALL SITE UTILITY PLAN |
| C3.01 | SITE UTILITY PLAN |
| C3.02 | SITE UTILITY PLAN |
| C3.03 | SITE UTILITY PLAN |
| C3.04 | SITE UTILITY PLAN |
| C4.00 | OVERALL GRADING & DRAINAGE PLAN |
| C4.01 | GRADING & DRAINAGE PLAN |
| C4.02 | GRADING & DRAINAGE PLAN |
| C4.03 | GRADING & DRAINAGE PLAN |
| C4.04 | GRADING & DRAINAGE PLAN |
| C4.05 | LOT DRAINAGE DIAGRAMS |
| L1.0 | OVERALL CIVIC SPACE PLAN |
| L1.1 | CIVIC SPACE ENLARGEMENT |
| L1.2 | CIVIC SPACE ENLARGEMENT |
| L1.3 | CIVIC SPACE ENLARGEMENT |
| L1.4 | CIVIC SPACE ENLARGEMENT |
| L1.5 | CIVIC SPACE ENLARGEMENT |
| L1.6 | CIVIC SPACE ENLARGEMENT |


GREGORY C. GAMBLE
REGISTERED
LANDSCAPE ARCHITECT
1-23-24

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE


PRE-APP: August 30, 2023
INITIAL SUBMITTAL: October 16, 2023
RESUBMITTAL: December 18, 2023
RESUBMITTAL: January 23, 2024




CSDG
Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL

JAMES T. HARRISON IV
REGISTERED
LANDSCAPE
ARCHITECT
No. 02199
STATE OF TENNESSEE
10-23-24

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
Review Comments
ISSUE DATE: 01/23/24

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |
| 3 | Tech Review Comments | 01/23/24 |

DRAWN BY: TWG
CHECKED BY: TWG

EXISTING CONDITIONS PLAN

C0.01

PROJECT NO.: 21-160-01

Jan 23, 2024 - 9:16am T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C0.01 - Existing Conditions Plan.dwg

**PHASING BREAKDWON:**

PHASE 1: LOT NUMBERS 100-161 (62 SINGLE FAMILY LOTS)
LOT NUMBERS 200-277 (78 TOWNHOME LOTS)

PHASE 2A: LOT NUMBERS 300-387 (88 TOWNHOME LOTS)
PHASE 2B: LOT NUMBERS 400-445 (46 SINGLE FAMILY LOTS)

PHASE 3A: LOT NUMBERS 500-644 (145 SINGLE FAMILY LOTS)

PHASE 4: LOT NUMBERS 700-845 (146 SINGLE FAMILY LOTS)

PHASE 5: LOT NUMBERS 900-1026 (127 SINGLE FAMILY LOTS)

PHASE 6: LOT NUMBERS 1100-1207 (108 SINGLE FAMILY LOTS)

*PHASE 3B INCLUDES MAIN COLLECTOR ROAD CONNECTION TO IRON BRIDGE ROAD

**PROJECTED TIMELINE*:**

| | | |
|---|---|---|
| PHASE 1 (±140 UNITS) | | |
| | 2024-2025 | FINAL MASTER PLAN |
| | 2025-2026 | BEGIN CONSTRUCTION |
| | 2025-2026 | PLATTING |
| | 2028-2029 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 2 (±134 UNITS) | | |
| | 2025-2026 | FINAL MASTER PLAN |
| | 2026-2027 | BEGIN CONSTRUCTION |
| | 2026-2027 | PLATTING |
| | 2029-2030 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 3 (±145 UNITS) | | |
| | 2026-2027 | FINAL MASTER PLAN |
| | 2027-2028 | BEGIN CONSTRUCTION |
| | 2027-2028 | PLATTING |
| | 2031-2032 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 4 (±146 UNITS) | | |
| | 2027-2028 | FINAL MASTER PLAN |
| | 2028-2029 | BEGIN CONSTRUCTION |
| | 2028-2029 | PLATTING |
| | 2032-2033 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 5 (±127 UNITS) | | |
| | 2029-2030 | FINAL MASTER PLAN |
| | 2031-2032 | BEGIN CONSTRUCTION |
| | 2031-2032 | PLATTING |
| | 2033-2034 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 6 (±108 UNITS) | | |
| | 2030-2031 | FINAL MASTER PLAN |
| | 2032-2033 | BEGIN CONSTRUCTION |
| | 2032-2033 | PLATTING |
| | 2033-2034 | VERTICAL CONSTRUCTION COMPLETE |

*PROJECTED TIMELINE IS AN ESTIMATE ONLY. TIMING OF ACTUAL COMMENCEMENT OF HORIZONTAL & VERTICAL CONSTRUCTION FOR ALL PHASES WILL BE PREDICATED ON LOCAL AND STATE APPROVALS.

PHASE 0
ENTRANCE AND BRIDGE

PHASE 2A
±88 UNITS

PHASE 1
±140 UNITS

PHASE 2B
±46 UNITS

PHASE 3A
±145 UNITS

PHASE 4
±146 UNITS

PHASE 5
±127 UNITS

PHASE 6
±108 UNITS

PHASE 3B

BEAR CREEK PIKE — U.S. 412 - SR99 (R.O.W. VARIES)

IRON BRIDGE ROAD (VIEW VARIES)

DUCK RIVER

BEAR CREEK

N

0 300 600
SCALE: 1"= 300'


CSDG
Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com


SEAL

JAMES T. HARRISON
REGISTERED
ENGINEER
01-23-24
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS

PMDP

Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

Review Comments

ISSUE DATE: 01/23/24

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| 1 | Initial Submittal | 10/16/23 |
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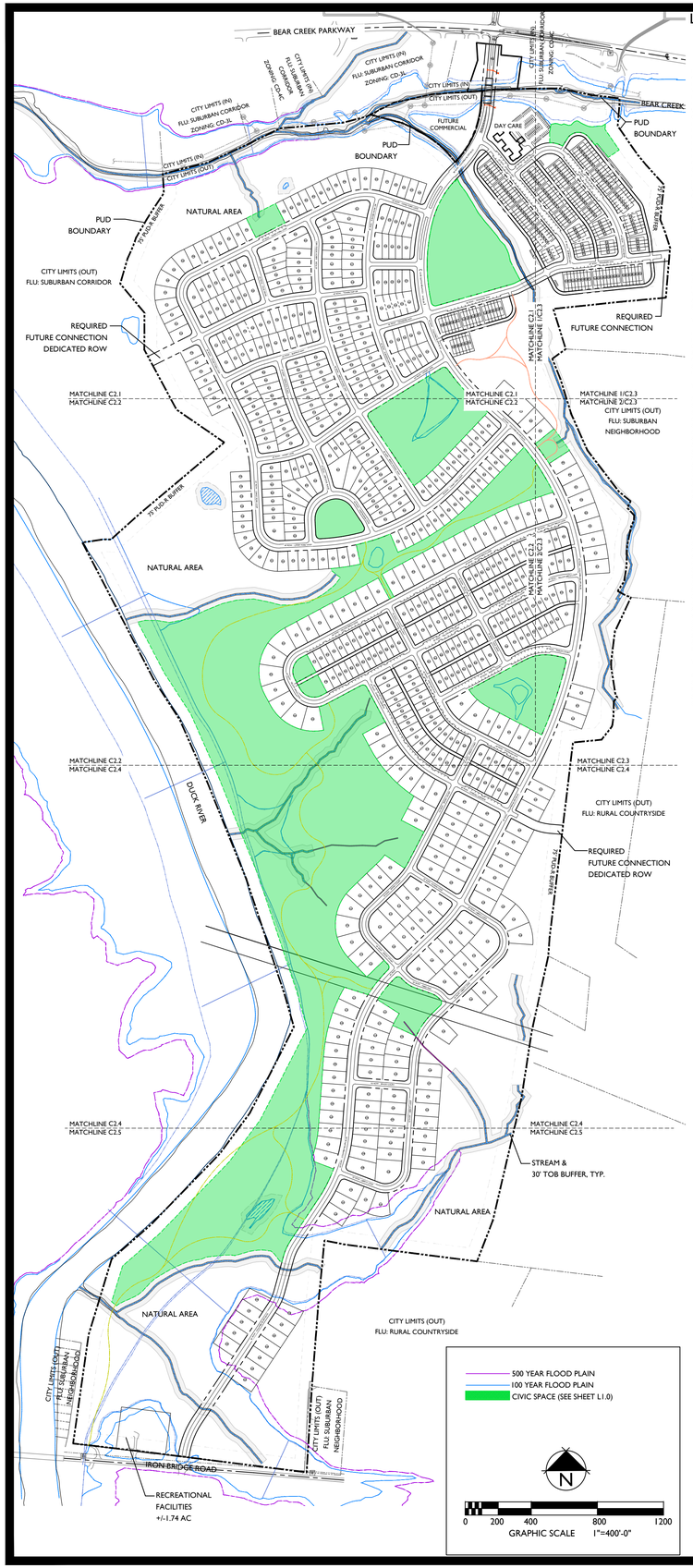
DRAWN BY: TWG
CHECKED BY: TWG

PHASING PLAN

C1.00

PROJECT NO.: 21-160-01

Jan 23, 2024 - 8:53am T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C1.00 - Phasing Plan.dwg




# LEGAL DESCRIPTION OF PROPERTY:

**LEGAL DESCRIPTION FOR ANNEXATION OF 409.92 ACRES TO PUD**
**FOR PART OF MAP 90, PARCEL 12.01**
**DEED BOOK R2051, PAGE 792**
**BIG BEAR BLUFFS, LLC**

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY BEAR CREEK PIKE, ROCK 'N' ROLL JESUS, LLC, AS OF RECORD IN DEED BOOK R2727, PAGE 1242 OF THE REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN); AMIT J. PATEL AND WIFE, MINAXIBEN G. PATEL AS OF RECORD IN DEED BOOK R2411, PAGE 1348, ROMCTN; HK BIG BEAR BLUFFS, LLC (R BOOK 2878, PAGE 961, ROMCTN; ON THE EAST BY JEFFERY L. HEAD AND ROSE HEAD, WIFE & HUSBAND AS OF RECORD IN DEED BOOK R2230, PAGE 388, ROMCTN, STEVEN CHARLES FOSTER AND REBECCA JANE FOSTER, HUSBAND & WIFE AS OF RECORD IN DEED BOOK R2497, PAGE 1334, ROMCTN, BARRY C. BLACKBURN, TRUSTEE FOR BARRY C. BLACKBURN REVOCABLE TRUST AS OF RECORD IN DEED BOOK R2301, PAGE 1492, ROMCTN, BRENT W. THORNTON AND WIFE TERRI L. THORNTON AS OF RECORD IN DEED BOOK R2096, PAGE 766, ROMCTN, CALVIN DEAN JOHNSON FORMERLY CARL JOHNSON AND WIFE, BARBARA D. JOHNSON AS OF RECORD IN DEED BOOK 375, PAGE 543, ROMCTN, AND CALVIN DEAN JOHNSON AND WIFE SHERYL GAY JOHNSON AS OF RECORD IN DEED BOOK R747, PAGE 602, ROMCTN; ON THE SOUTH BY IRON BRIDGE ROAD; AND ON THE WEST BY JIMMY MATHEWS AS OF RECORD IN DEED BOOK 1311, PAGE 80, DAVID LUNN HARRIS ETUX AS OF RECORD IN DEED BOOK R2415, PAGE 1148, ROMCTN, DUCK RIVER, AND MARK A. SEAGO AND WIFE TINA SEAGO AS OF RECORD DEED BOOK R2369, PAGE 973 ROMCTN; AND CONTINUED TO THE NORTH BY MIKE BIKES AS OF RECORD IN DEED BOOK R1884, PAGE 1082, DWAYNE SAM GOODMAN AS OF RECORD IN DEED BOOK R2732, PAGE 1288, AND IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT AN 1 INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.95 EAST 1,872,344.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 05°01'16" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 21°32'47" E, FOR A DISTANCE OF 51.20 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK N ROLL JESUS;
THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFFS, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 85°53'31" E, 307.86 FEET TO THE TRUE POINT OF BEGINNING;

THENCE, CONTINUING WITH BEAR CREEK, THE FOLLOWING CALLS:

N 85°53'31" E, FOR A DISTANCE OF 85.49 FEET TO A POINT;
N 83°39'27" E, FOR A DISTANCE OF 218.80 FEET TO A POINT;
S 89°57'56" E, FOR A DISTANCE OF 168.93 FEET TO A POINT;
S 71°59'31" E, FOR A DISTANCE OF 77.46 FEET TO A POINT;
S 78°01'13" E, FOR A DISTANCE OF 120.71 FEET TO A POINT;
S 83°35'45" E, FOR A DISTANCE OF 172.70 FEET TO A POINT ALONG THE WEST BOUNDARY OF JEFFERY L. HEAD;

THENCE, WITH THE WEST BOUNDARY OF HEAD, THE FOLLOWING CALLS:

S 0°56'50" W, FOR A DISTANCE OF 40.52 FEET TO AN IRON PIN;
S 04°40'44" W, FOR A DISTANCE OF 127.32 FEET TO A 1-1/2" PIPE FOUND;
S 34°29'27" E, FOR A DISTANCE OF 153.87 FEET TO A T-POST;
S 35°04'16" E, FOR A DISTANCE OF 55.17 FEET TO A T-POST;
S 39°22'56" E, FOR A DISTANCE OF 84.02 FEET TO A T-POST;
S 42°05'33" E, FOR A DISTANCE OF 106.39 FEET TO A T-POST;
S 42°31'20" E, FOR A DISTANCE OF 55.23 FEET TO AN 1-1/2" PIPE FOUND;
S 7°06'58" W, FOR A DISTANCE OF 101.11 FEET TO A 3" METAL POST;
S 5°45'07" W, FOR A DISTANCE OF 110.19 FEET TO AN 1-1/2" PIPE FOUND;
S 21°14'47" E, FOR A DISTANCE OF 78.14 FEET TO A T-POST;
S 17°34'01" E, FOR A DISTANCE OF 102.59 FEET TO A 24" CEDAR;
S 4°57'22" W, FOR A DISTANCE OF 172.54 FEET TO A T-POST;
S 4°32'31" W, FOR A DISTANCE OF 130.65 FEET TO 36" OAK;
S 84°46'29" W, FOR A DISTANCE OF 270.35 FEET TO 20" MAPLE;
S 84°01'38" W, FOR A DISTANCE OF 414.11 FEET TO A FENCEPOST;
S 17°15'39" E, FOR A DISTANCE OF 254.68 FEET TO A 6" ROTTED HACKBERRY FENCE POST TIED TO THE SOUTHWEST CORNER OF HEAD;

THENCE, WITH THE WEST BOUNDARY OF FOSTER, THE FOLLOWING CALLS:

S 54°11'5" W, FOR A DISTANCE OF 100.29 FEET TO 6' ROTTED HACKBERRY FENCE POST;
S 21°03'18" E, FOR A DISTANCE OF 130.86 FEET TO A CEDAR FENCE POST;
S 17°11'57" E, FOR A DISTANCE OF 221.38 FEET TO A 12" ELM;
S 23°49'07" E, FOR A DISTANCE OF 240.66 FEET TO A T-POST;
S 37°24'05" E, FOR A DISTANCE OF 315.73 FEET TO 14" ELM;
S 50°37'42" E, FOR A DISTANCE OF 91.73 FEET TO 60" TWIN OAK;
S 29°59'39" W, FOR A DISTANCE OF 35.62 FEET TO 60" OAK;
S 40°35'26" W, FOR A DISTANCE OF 9.08 FEET TO A T-POST;
S 42°52'20" E, FOR A DISTANCE OF 62.79 FEET TO A POINT;
S 1°50'17" W, FOR A DISTANCE OF 30.25 FEET TO A POINT;
S 23°53'47" W, FOR A DISTANCE OF 42.59 FEET TO 14" HACKBERRY;
S 11°25'58" W, FOR A DISTANCE OF 117.73 FEET TO A T-POST;
S 2°03'52" W, FOR A DISTANCE OF 130.94 FEET TO ROTTED HACKBERRY;
S 9°12'29" W, FOR A DISTANCE OF 87.18 FEET A POINT;
S 33°58'56" W, FOR A DISTANCE OF 69.04 FEET TO A 30" HACKBERRY;
S 61°19'48" E, FOR A DISTANCE OF 54.74 FEET TO A 24" HACKBERRY;
S 70°11'17" E, FOR A DISTANCE OF 34.53 FEET TO 12" CEDAR POST AT THE SOUTHWEST CORNER OF FOSTER;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN, THE FOLLOWING CALLS:

S 25°13'18" W, FOR A DISTANCE OF 225.44 FEET TO A 36" HACKBERRY;
S 7°09'46" W, FOR A DISTANCE OF 177.84 FEET TO A 8" DOGWOOD;
S 0°16'28" W, FOR A DISTANCE OF 41.40 FEET TO A 24" HACKBERRY FLAGGED;
S 8°53'22" E, FOR A DISTANCE OF 173.37 FEET TO A T-POST;
S 50°40'30" E, FOR A DISTANCE OF 13.02 FEET TO 6' FENCE POST;
S 39°18'12" W, FOR A DISTANCE OF 34.16 FEET TO A POINT;
S 1°12'16" W, FOR A DISTANCE OF 95.58 FEET TO A 12" OSAGE;
S 7°58'27" W, FOR A DISTANCE OF 43.94 FEET TO A 6" ROTTED TREE;
S 9°41'30" W, FOR A DISTANCE OF 13.75 FEET TO A 4-5" TREE USED AS FENCE POST;
S 38°17'00" W, FOR A DISTANCE OF 100.34 FEET TO A 14" ROTTEN CEDAR;
S 84°35'04" W, FOR A DISTANCE OF 173.30 FEET TO FENCE CORNER PK FOUND;
S 6°40'35" W, FOR A DISTANCE OF 1187.64 FEET TO A POINT;
S 4°03'46" W, FOR A DISTANCE OF 112.89 FEET TO A 26" CEDAR;
S 12°22'22" W, FOR A DISTANCE OF 465.96 FEET TO A 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN AND CONTINUING TO THORNTON, THE FOLLOWING CALLS:

S 8°47'46" W, FOR A DISTANCE OF 411.13 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY THORNTON, THE FOLLOWING CALLS:

S 13°08'41" W, FOR A DISTANCE OF 759.59 FEET TO 1" PIPE FOUND;
S 21°10'50" W, FOR A DISTANCE OF 265.00 FEET TO 1" PIPE FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

N 82°44'49" W, FOR A DISTANCE OF 800.97 FEET TO 1" PIPE FOUND;
N 78°43'22" W, FOR A DISTANCE OF 130.34 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

S 5°33'34" W, FOR A DISTANCE OF 375.75 FEET TO 1" PIPE FOUND;
S 4°27'28" W, FOR A DISTANCE OF 508.55 FEET TO A POINT;
S 5°35'19" W, FOR A DISTANCE OF 523.31 FEET TO 5/8" IRON PIN FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF IRON BRIDGE ROAD RIGHT-OF-WAY, THE FOLLOWING CALLS:

N 82°45'55" W, FOR A DISTANCE OF 501.29 FEET TO AN 5/8" IRON PIN FOUND;
N 82°46'22" W, FOR A DISTANCE OF 525.64 FEET TO RAILROAD SPIKE PK FOUND;
N 83°23'15" W, FOR A DISTANCE OF 396.04 FEET TO 5/8" IRON PIN FOUND AT SOUTHEAST CORNER OF MATTHEWS;

THENCE, WITH THE EAST BOUNDARY OF MATHEWS, HARRIS AND DUCK RIVER, THE FOLLOWING CALLS:

N 8°06'23" E, FOR A DISTANCE OF 864.54 FEET TO 1/2" IRON PIN FOUND;
N 1°16'09" E, FOR A DISTANCE OF 478.23 FEET TO A POINT;
N 48°48'57" E, FOR A DISTANCE OF 312.04 FEET TO A POINT;
N 44°09'58" E, FOR A DISTANCE OF 600.70 FEET TO A POINT;
N 36°27'00" E, FOR A DISTANCE OF 305.02 FEET TO A POINT;
N 27°21'22" E, FOR A DISTANCE OF 284.62 FEET TO A POINT;
N 26°51'38" E, FOR A DISTANCE OF 301.40 FEET TO 1" PIPE FOUND;

N 15°43'20" W, FOR A DISTANCE OF 197.42 FEET TO A POINT;
N 18°27'24" W, FOR A DISTANCE OF 744.16 FEET TO A POINT;
N 21°50'04" W, FOR A DISTANCE OF 031.16 FEET TO A POINT;
N 23°44'52" W, FOR A DISTANCE OF 409.10 FEET TO A POINT;
N 32°40'41" W, FOR A DISTANCE OF 286.98 FEET TO A POINT;
N 27°28'08" W, FOR A DISTANCE OF 932.36 FEET TO A POINT;

THENCE, DIRECTING RIGHT AWAY FROM DUCK RIVER TO THE SOUTH AND EAST BOUNDARY OF SEAGO, THE FOLLOWING CALLS:

N 85°09'29" E, FOR A DISTANCE OF 22.00 FEET TO A POINT;
N 81°22'35" E, FOR A DISTANCE OF 109.60 FEET TO A POINT;
S 87°29'25" E, FOR A DISTANCE OF 42.46 FEET TO 26" OAK;
N 46°08'47" E, FOR A DISTANCE OF 244.67 FEET TO A POINT;
N 46°56'39" E, FOR A DISTANCE OF 291.18 FEET TO 10" HACKBERRY AND 8" CEDAR;
N 49°46'28" E, FOR A DISTANCE OF 367.28 FEET TO 1" PIPE FOUND;
N 55°27'24" W, FOR A DISTANCE OF 350.42 FEET TO A POINT;
N 28°16'29" W, FOR A DISTANCE OF 411.36 FEET TO A 1" PIPE FOUND;
N 7°17'50" E, FOR A DISTANCE OF 220.64 FEET TO AN IRON PIN FOUND;
N 39°56'42" W, FOR A DISTANCE OF 228.86 FEET TO AN IRON PIN FOUND;
N 16°17'40" E, FOR A DISTANCE OF 158.31 FEET TO A POINT;
N 24°10'55" E, FOR A DISTANCE OF 52.03 FEET TO A POINT;
N 25°26'46" E, FOR A DISTANCE OF 28.14 FEET TO 1" PIPE IRON PIPE;
N 19°40'08" E, FOR A DISTANCE OF 57.72 FEET TO A 12" CEDAR;
N 30°13'56" E, FOR A DISTANCE OF 123.71 FEET TO A POINT;
N 32°10'27" E, FOR A DISTANCE OF 87.89 FEET TO A POINT;
N 33°44'57" E, FOR A DISTANCE OF 105.82 FEET TO 1" PIPE FOUND;
N 3°11'17" W, FOR A DISTANCE OF 116.30 FEET TO A POINT AT THE NORTHEAST CORNER OF SEAGO AND THE CENTER OF BEAR CREEK;

THENCE, ALONG BEAR CREEK AND SOUTHERN BOUNDARY OF MIKES BIKES, THE FOLLOWING CALLS:

N 75°48'45" E, FOR A DISTANCE OF 280.14 FEET TO A POINT;
N 85°23'51" E, FOR A DISTANCE OF 281.90 FEET TO A POINT AT THE SOUTHEAST CORNER OF BIKES;

THENCE, ALONG SOUTH BOUNDARY OF GOODMAN, N 83°42'14" E, 199.86 FEET TO A POINT;

THENCE, CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:

N 84°40'48" E, FOR A DISTANCE OF 385.89 FEET TO A POINT;
N 75°36'41" E, FOR A DISTANCE OF 141.99 FEET TO A POINT;
N 83°11'05" E, FOR A DISTANCE OF 28.87 FEET TO A POINT AT AN INTERSECTION OF MCKAY BRANCH
CONTINUING ALONG MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:
S 7°51'27" E, FOR A DISTANCE OF 201.29 FEET TO A POINT;
S 65°15'03" E, FOR A DISTANCE OF 74.45 FEET TO A POINT;
S 61°08'47" E, FOR A DISTANCE OF 61.78 FEET TO A POINT;
S 68°09'42" E, FOR A DISTANCE OF 42.46 FEET TO A POINT;
S 81°12'54" E, FOR A DISTANCE OF 86.37 FEET TO A POINT;
S 45°49'08" E, FOR A DISTANCE OF 65.41 FEET TO A POINT;
S 39°48'13" E, FOR A DISTANCE OF 73.31 FEET TO A POINT;

THENCE, LEAVING MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:

NORTHEASTERLY ALONG A CURVE THROUGH A CENTRAL ANGLE OF 38°33'55", AN ARC DISTANCE OF 380.30 FEET TO A POINT OF TANGENCY, SAID CURVE IS CONCAVE NORTHWESTERLY AND HAS A RADIUS OF 565.50 FEET, CHORD BEARING N 24°33'52" E WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT OF TANGENCY;
N 05°15'54" E, 84.04 FEET TO THE POINT OF BEGINNING CONTAINING 409.92 ACRES (17,855,971 SQ.FT.) AND BEING A PORTION OF THE PROPERTY DOWN ON TAX MAP 90 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFFS, LLC BY DEED OF RECORD IN BOOK R2827, PAGE 287 IN THE REGISTER'S OFFICE OF MAURY COUNTY, TENNESSEE.

# ANNEXATION AND REZONING REQUEST:

REQUEST TO ANNEX +/-409.92 ACRES AND REZONE TO PUD-R
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

CONNECT COLUMBIA FINDINGS:

*Annexation should provide for a continuation of orderly, planned development of the City. Lot sizes and development scale should be compatible with surrounding development. If proposed development abuts land that is undeveloped or has low density/intensity, the density and intensity of the proposed development should taper towards the periphery to provide compatibility of the development pattern. Land annexed into the City should follow the transect and Character Area Matrix to provide the most appropriate land uses and zoning for the newly annexed land.*

Response: The proposed Columbia Bluffs subdivision is 2 miles from the downtown core. Density and lot size transitions from higher density/intensity at the north, along the Bear Creek Parkway corridor to the south, where a more rural character is appropriate adjacent to Iron Bridge Rd and the Yanahli Park. The properties along Bear Creek Parkway have been identified as "area of change." With the development along this corridor, residential development in close proximity to downtown and new commercial development along Tom Hitch Parkway is a logical progression of development pattern.

*Connectivity, directly through street, sidewalks, bikeways, greenways, and trails, and indirectly, through a mixture of housing and business types, should be encouraged throughout Columbia..*

Response: In addition to roadway and sidewalk connections, Columbia Bluffs proposes nature trails through out the property. The development will also provide a roadway connection between Bear Creek Parkway and Iron Bridge Road. A variety of housing types are proposed, including an age restricted Active Adult neighborhood.

*Suburban Neighborhood: Future development should emphasize connectivity and housing diversity.*

Response: Columbia Bluffs proposes a variety of housing styles

*Near-term Priorites: HOUSING MIX/TYPES: Promote mastered planned housing opportunities for a "full-life cycle" community to accommodate retirees and young professionals. Review Zoning standards to permit smaller lot and home sizes to encourage such developments.*

# DEVIATIONS FROM PUD-R ZONING STANDARDS REQUEST:

**PUD-R Table 4.3.1-K District Standards: Planned Unit Development - Residential District**

| Bulk Standard | Required | Proposed |
|---|---|---|
| **Side Setback** | 0 feet minimum on attached side of attached buildig types, otherwise 10 feet minimum; 24 feet maximum per side | Active Adult Homes: 5 feet<br>Courtyard Homes: 7.5 feet<br>Large Lot Homes: 7.5 feet<br>Single Family Alley Loaded Homes: 5 feet<br>Town Homes: 7.5 feet |
| **Finished Floor Level** | Minimum 18 inches above finished grade at façade. | Active Adult Homes: 0 inches above finished grade at façade for ADA accessibility; All other homes a mimimum of 18 inches above finished grade at façade. |
| **Façade Window Sill Height** | If Residential: 5 ft. min. above avg. grade at Facade | Active Adult Homes: 24 inches minimum above average grade at façade;<br>Courtyard Homes: 36 inches minimum above average grade at façade. All other homes 5 ft. minimum above average grade at façade. |
| **Shopfront Frontages** | 12 in.-24 in. knee wall required at Frontage | For Clubhouse and Pre-School: finished floor elevation may match finished grade for ADA accessibility; no knee wall required. |
| **Porch Peir Cladding** | brick or natural stone, with any space under Porch concealed by painted or stained latticework between piers | brick or natural stone, with any space under porch concealed by painted or stained latticework between peirs; cladding may be excluded if column appears as a 6" x 6" cedar column from roof line to porch. |
| **Garage Location** | in 3rd Layer Only | Active Adult Homes: 2nd Layer<br>Courtyard Homes: 2nd Layer<br>Large Lot (side loaded): 2nd Layer<br>Single Family Alley Loaded: 3rd Layer<br>Town Homes: 3rd Layer |
| **Garage Design** | Min. interior dimensions 10 ft. x 20 ft. per vehicle Parking space. If Garage faces Street: max. Garage door width 33% of total of Garage + Facade width. Garage must be detailed, finished, & designed like rest of Building with carriage house doors; max. Garage door width 9 ft.; each Garage door must have ornamental lighting fixture above it; min. 2 ft. separation between Garage doors | Active Adult Homes: 10 ft x 20 ft per vehicle parking space; Garage Door width 67% pf total of garage + façade width; Garage must be detailed, finished, & designed like rest of Building with carriage house doors with windows; Single garage door width of 16 feet maximum; each Garage door must have ornamental lighting fixture above it;<br><br>Courtyard Homes: 10 ft x 20 ft per vehicle parking space; Garage Doors are not permitted to face the public street and must be perpendicular to the right of way; Garage must be detailed, finished, & designed like rest of Building with carriage house doors with windows; Single garage door width of 16 feet maximum; each Garage door must have ornamental lighting fixture above it;<br><br>Large Lot Homes: 10 ft x 20 ft per vehicle parking space; Garage Doors are not permitted to face the public street unless they are located in the 3rd Layer; Garage doors in the must be perpendicular to the right of way; Garage must be detailed, finished, & designed like rest of Building with carriage house doors with windows; Single garage door width of 16 feet maximum; each Garage door must have ornamental lighting fixture above it; |
| **Driveway / Vehicular Entrance Maximum Width** | 10 ft max. in 1st Layer if Residential; 24 ft max. in 1st Layer if non-Residential, regardless if shared or not | Active Adult Homes: 18 ft max. in 1st Layer<br><br>Courtyard Homes: 12 ft max in 1st Layer<br>Large Lot Homes: 12 ft max in 1st Layer<br>Single Family Alley Loaded: Not Applicable<br>Town Home: Not Applicable |
| **Non-Building Components** | Recreation or Play Equipment NP in 1st or 2nd Layer | Recreation or Play Equipment Permitted in 1st and 2nd layer if provided in HOA maintained Civic Space or on the Day Care parcel. |

**Article 5: Development Parcel Plans and Standards. Table 5.2.2.G-1 Urban Neighborhood Street**

| Bulk Standard | Required | Proposed |
|---|---|---|
| **Right of Way Width** | 70 ft | See Sheet C2.7 |
| **Pavement Width** | 38 ft | See Sheet C2.7 |

**Article 5.3.1.A - Percentage of Civic Space**

| Bulk Standard | Required | Proposed |
|---|---|---|
| **Civic Space Requirement** | Any Development Parcel shall include at least 5% but not more than 20% of its gross acreage assigned as Civic Space(s). The Civic Space provided pursuant to this Section 5.3.1.A shall be in addition to all Yard, Setback, and Impervious Surface area required not permitted to be covered under this Ordinance and the Subdivision Regulations. | Remove: "but not more than 20%": Any Development Parcel shall include at least 5% of its gross acreage assigned as Civic Space(s). The Civic Space provided pursuant to this Section 5.3.1.A shall be in addition to all Yard, Setback, and Impervious Surface area required not permitted to be covered under this Ordinance and the Subdivision Regulations. |

**Table 5.3.3-A Civic Space Types - Summary**

| Bulk Standard | Required | Proposed |
|---|---|---|
| **Civic Space Types - Green** | An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre and the maximum is 8 acres. | Remove: "and the maximum is 8 acres": An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre. |

**Table 5.3.3-B Civic Space Types - Specific Standards**

| Bulk Standard | Required | Proposed |
|---|---|---|
| **Civic Space Types - Green** | An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre and the maximum is 8 acres. | Remove: "and the maximum is 8 acres" from Intent and Specification Size: An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre. |

**Article 5.5.5 Civic Spaces Required**

| Bulk Standard | Required | Proposed |
|---|---|---|
| **B. Playground** | A Civic Space designed and equipped as a Playground conforming to Table 5.3.3-B (Civic Spaces – Playground) (1) within 800 feet of every Lot or Building Site in Residential Use in all Districts except CD-2, CD-3L, SD-INT, and SD-LI; and (2) within 1300 feet of every Lot or Building Site in Residential Use in Districts CD-2, CD-3L, and SD-LI; and | Add: A Civic Space designed and equipped as a Playground conforming to Table 5.3.3-B (Civic Spaces – Playground) (1) within 800 feet of every Lot or Building Site, excluding Active Adult lots, in Residential Use in all Districts except CD-2, CD-3L, SD-INT, and SD-LI;and (2) within 1300 feet of every Lot or Building Site in Residential Use in Districts CD-2, CD-3L, and SD-LI; and |
| **C. Thoroughfare Enfrontment** | Each Civic Space shall have a minimum of 50% of its perimeter Enfronting a Thoroughfare, except for Playgrounds or Community Gardens. | Remove the minimum perimeter requirement. |

NOTE: ARCHITECTURAL DESIGN REVIEW BOARD APPROVED THE ARCHITECTURAL ELEVATIONS, WITH THE ABOVE LISTED DEVIATIONS AT THE JANUARY 9, 2024 MEETING.

# PROJECT DESCRIPTION AND SITE DATA:

REQUEST TO ANNEX AND REZONE THE COLUMBIA BLUFFS PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN.

THE PUD-R PLAN PROPOSES AN ENVIRONMENTALLY SENSITIVE MASTER PLAN FOR A DIVERSE RESIDENTIAL DEVELOPMENT. APPROXIMATELY ONE-THIRD OF THE PROPOSED DEVELOPMENT IS RESERVED FOR ACTIVE ADULT/AGE RESTRICTED SINGLE-FAMILY HOMES. ADDITIONALLY, TOWN HOMES AND A VARIETY OF DETACHED SINGLE-FAMILY HOMES ARE PROPOSED.

IN ADDITION TO THE RESIDENTIAL COMPONENT, THE PUD-R PLANS PROPOSES A DAY CARE FACILITY AND A VARIETY OF NEIGHBORHOOD AMENITIES.

TOTAL SITE AREA: 409.92 ACRES
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

TOTAL AREA OF ROWS/ALLEY EASEMENTS: 60.34 AC; 14.7% OF GROSS AREA
OPEN SPACE: 214.93 AC; 52.4% OF GROSS AREA
ESTIMATED SITE ISR: 47.6%

TOTAL DWELLING UNITS: 800 HOMES
OVERALL SITE DENSITY: 1.96 DUA

| RESIDENTIAL BREAKDOWN | | NON RESIDENTIAL |
|---|---|---|
| ACTIVE ADULT HOMES: | 296 | DAYCARE 12,000 - 14,000 SF |
| TOWNHOMES: | 166 | RECREATION FACILITY LOT - 75,789 SF |
| ALLEY SINGLE-FAMILY: | 151 | CLUBHOUSE |
| COURTYARD HOMES: | 93 | |
| LARGE LOT HOMES: | 94 | |

EXISTING TREE CANOPY COVERAGE: 262.4 AC; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%; SEE SHEET C2.9

TOTAL OPEN SPACE PROVIDED: 214.93 AC; 52.4% OF GROSS SITE AREA
OPEN SPACE BREAKDOWN
CIVIC SPACE: 84.89 AC
ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC
ALL OTHER OPEN SPACE: 55.04 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC
CIVIC SPACE PROVIDED: 20.7%; 84.89 AC (SEE SHEET L1.0)

PARKING: SEE LOT DIAGRAMS (C2.6) FOR PROPOSED RESIDENTIAL PARKING;
AND SHEETS L1.0-L1.6 FOR CIVIC SPACE PARKING
RESIDENTIAL: 2 PARKING SPACES PER UNIT
DAYCARE: 1 PER STAFF + 0.5 PER CHILD
CIVIC SPACE: 1 PER 5,000 SF

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

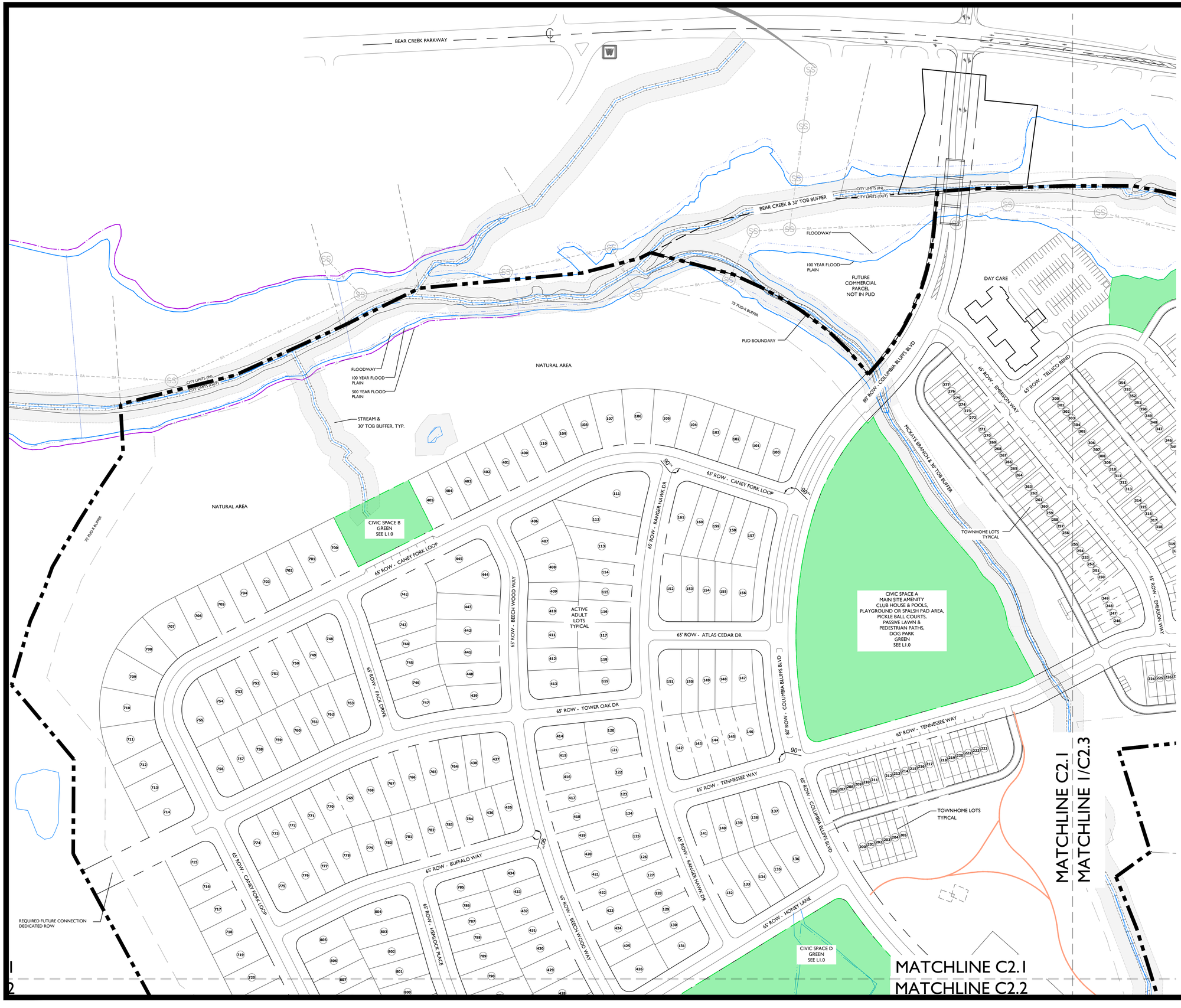
GREGORY C. GAMBLE
REGISTERED
LANDSCAPE ARCHITECT
282

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
| 2 January 23, 2024 |
| 3 |

OVERALL PUD-R PMDP

SHEET
C2.0




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT 1023

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
| 2 January 23, 2024 |
| 3 |

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

ENLARGED PUD-R PMDP

SHEET
C2.1

MATCHLINE C2.1
MATCHLINE C2.2

MATCHLINE C2.1
MATCHLINE C2.2

MATCHLINE C2.2
MATCHLINE C2.4

65' ROW - HONEY LANE
65' ROW - HEMLOCK PLACE
65' ROW - WESTBORNE COVE
65' ROW - CANEY FORK LOOP
65' ROW - BEECHWOOD WAY
65' ROW - COLUMBIA BLUFFS BLVD
60' ROW - YELLOW BIRCH LOOP
55' ROW - WATAUGA WAY
55' ROW - PACK DRIVE
65' ROW - PIGEON COURT
60' ROW - OVERHILL GARDENS
55' ROW - EMORY COURT

ACTIVE ADULT LOTS TYPICAL
COURTYARD LOTS TYPICAL
ALLEY HOMES TYPICAL
LARGE LOTS TYPICAL

CIVIC SPACE D
MAIL KIOSK
SEATING, PASSIVE LAWN & PEDESTRIAN PATHS,
GREEN
SEE L1.0

CIVIC SPACE G
ACTIVE ADULT AMENITY
COVERED SEATING, PASSIVE LAWN &
PEDESTRIAN PATHS,
DOG PARK,
COMMUNITY GARDEN,
GREEN
SEE L1.0

CIVIC SPACE H
PASSIVE LAWN & PEDESTRIAN PATHS,
PLAYGROUND
GREEN
SEE L1.0

CIVIC SPACE J
TRAIL HEAD, SEATING,
PASSIVE LAWN &
PEDESTRIAN PATHS,
GREEN
SEE L1.0

CIVIC SPACE E
MAIL KIOSK, PASSIVE LAWN &
PEDESTRIAN PATHS,
PLAYGROUND
GREEN
SEE L1.0

NATURAL AREA

75' M.D.E. BUFFER

FLOODWAY
100 YEAR FLOOD PLAIN

STREAM &
30' TOB BUFFER, TYP.

DUCK RIVER

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

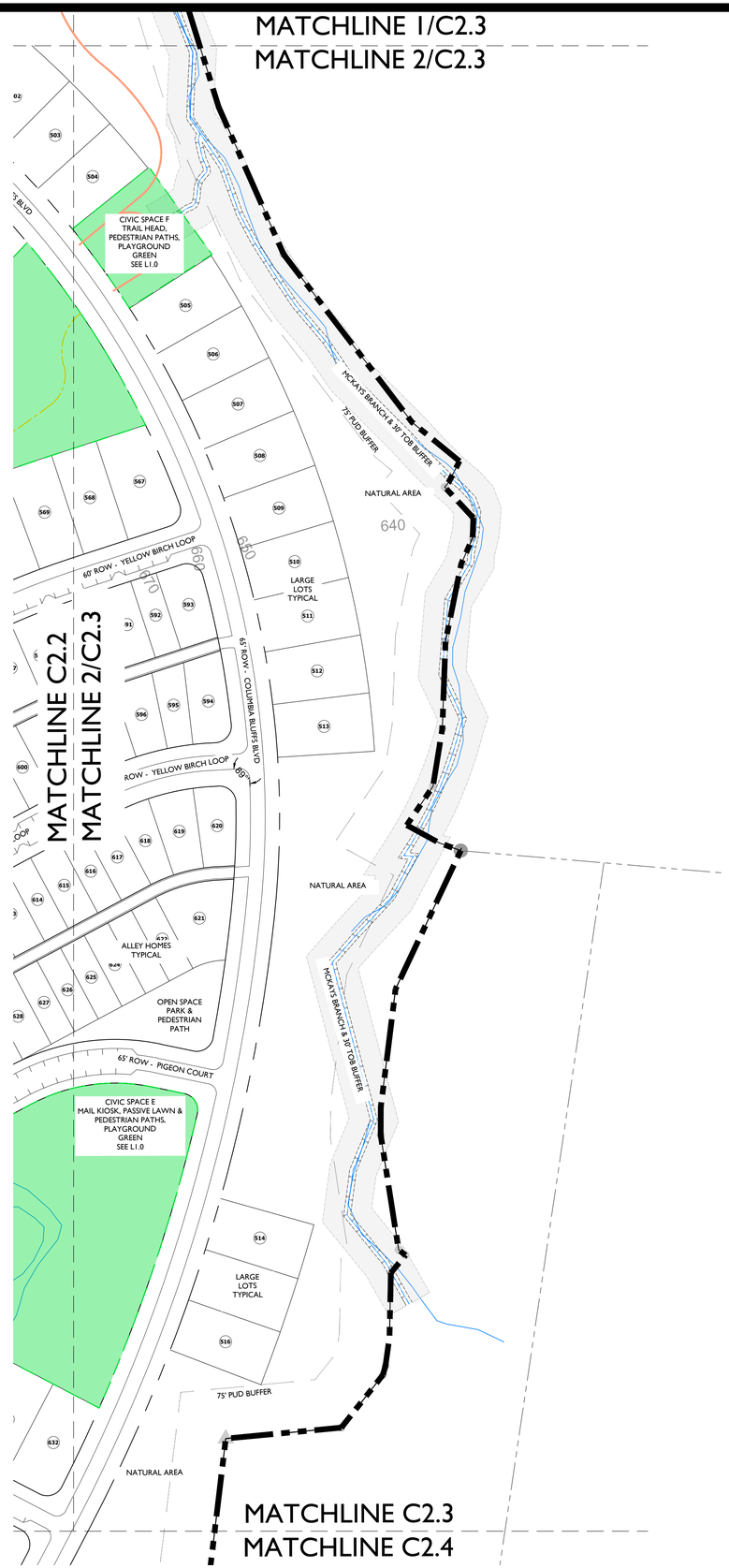
GREGORY C. GAMBLE
REGISTERED
TENNESSEE
LANDSCAPE ARCHITECT
128

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
| 2 January 23, 2024 |
| 3 |

ENLARGED
PUD-R PMDP
SHEET
C2.2




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE
REGISTERED LANDSCAPE ARCHITECT
10.25.24

Date: October 16, 2023

Revision Date
- 1 December 18, 2023
- 2 January 23, 2024
- 3

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

ENLARGED PUD-R PMDP

SHEET
C2.3

MATCHLINE C2.3
MATCHLINE C2.4

75' PLOA BUFFER
FLOODWAY
100 YEAR FLOOD PLAIN
DUCK RIVER
CIVIC SPACE J
TRAIL HEAD, SEATING, PASSIVE LAWN & PEDESTRIAN PATHS, GREEN
SEE L1.0
LARGE LOTS TYPICAL
COURTYARD LOTS TYPICAL
55' ROW - EMORY COURT
60' ROW - OVERHILL GARDENS
65' ROW - COLUMBIA BLUFFS BLVD
55' ROW - ACADIA COVE
55' ROW - LIBERTY LOOP
DEDICATED ROW REQUIRED FUTURE CONNECTION
75' PLOA BUFFER
OHE
100' TVA LINE AND EASEMENT
NATURAL AREA
CIVIC SPACE I
MAIL KIOSK, SEATING, PASSIVE LAWN & PEDESTRIAN PATHS, PLAYGROUND
GREEN
SEE L1.0
55' ROW - OBED WAY
55' ROW - BAYOU COURT
STREAM & 30' TOB BUFFER, TYP.

MATCHLINE C2.4
MATCHLINE C2.5

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

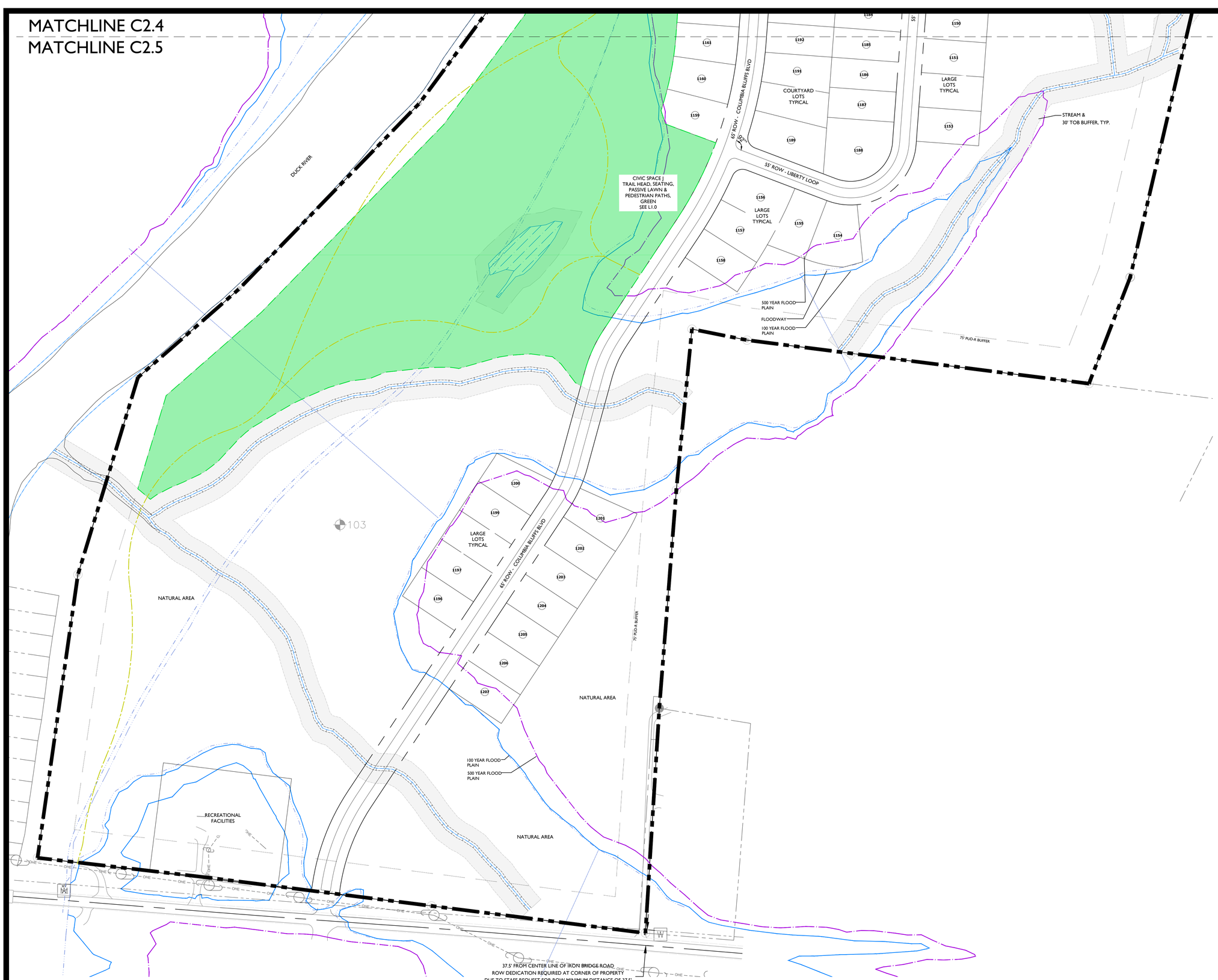
GREGORY C. GAMBLE
REGISTERED
TENNESSEE
LANDSCAPE ARCHITECT
1023

Date: October 16, 2023

| Revision | Date |
|---|---|
| 1 | December 18, 2023 |
| 2 | January 23, 2024 |
| 3 | |

ENLARGED PUD-R PMDP
SHEET
C2.4

MATCHLINE C2.4
MATCHLINE C2.5




500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE
REGISTERED
TENNESSEE
LANDSCAPE ARCHITECT
1.23.24

Date: October 16, 2023

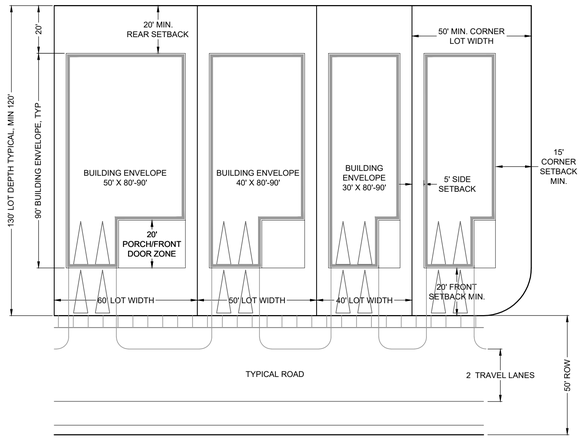
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ENLARGED PUD-R PMDP

SHEET
C2.5

ACTIVE ADULT/ AGE RESTRICTED DETACHED SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 40' X 120'; 50' X 120'; 60' X 120'

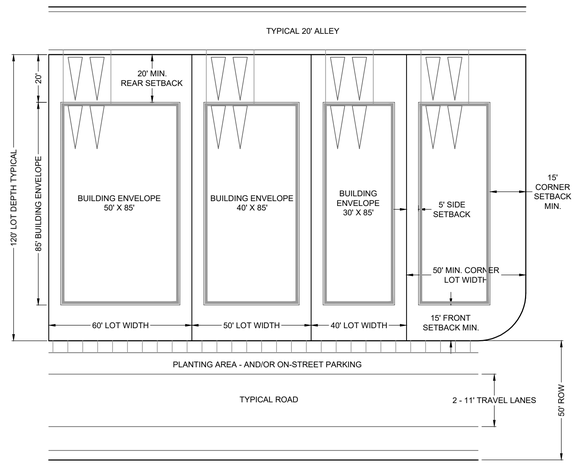
| SETBACKS: | MODIFICATION REQUESTS: | LOT DISTRIBUTION: | TYPICAL ISR: |
|---|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 18' WIDE IN FIRST LAYER<br>WINDOW SILL HEIGHT 3' ABOVE MIN. GRADE AT FACADE | 60' LOTS: 60<br>50' LOTS: 139<br>40' LOTS: 97 | 60% |



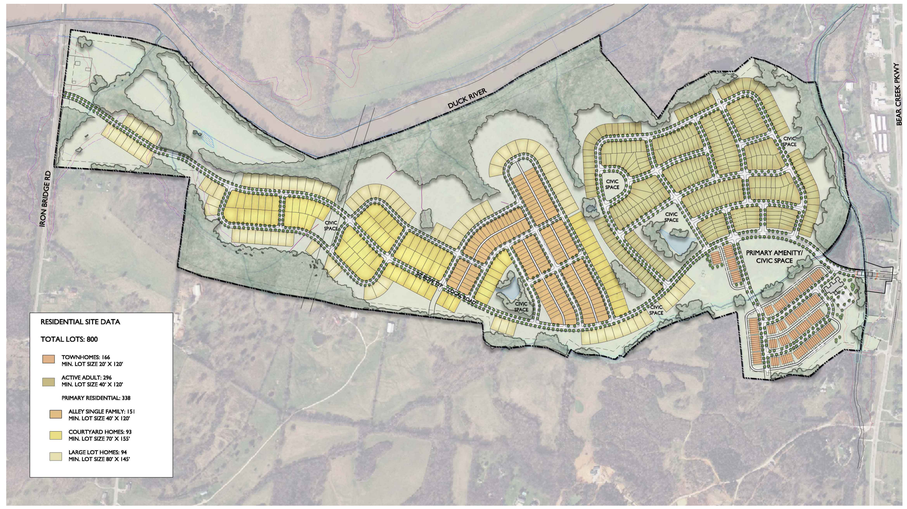

1 C2.6 ACTIVE ADULT LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL - ALLEY LOADED DETACHED SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 40' X 120'; 50' X 120'; 60' X 120'

| SETBACKS: | MODIFICATION REQUESTS: | LOT DISTRIBUTION: | TYPICAL ISR: |
|---|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 5' | 50' LOTS: 60<br>40' LOTS: 91 | 63% |



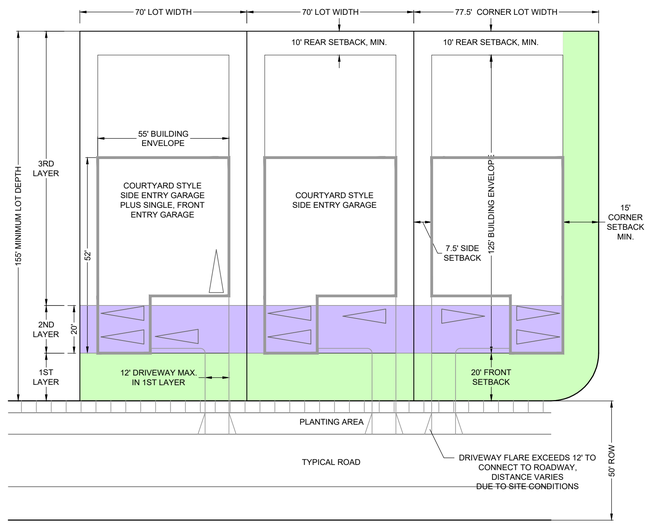

2 C2.6 SINGLE-FAMILY ALLEY LOT DIAGRAM N.T.S




3 C2.6 KEY MAP N.T.S

PRIMARY RESIDENTIAL COURTYARD SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 70' MIN. X 155'

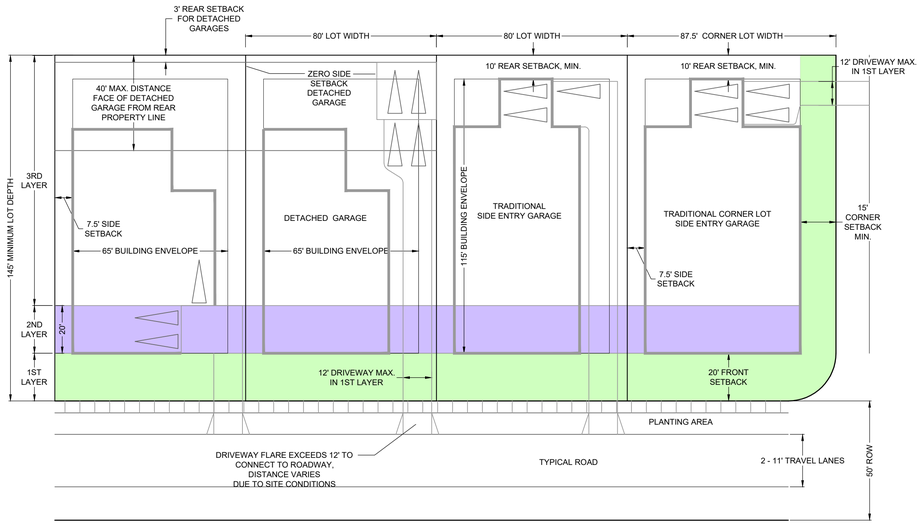
| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 10' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 12' WIDE IN FIRST LAYER<br>WINDOW SILL HEIGHT 3' ABOVE FINISHED GRADE MIN. | 30% |




4 C2.6 COURTYARD HOME LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL LARGE LOT SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 80' MIN. X 145'

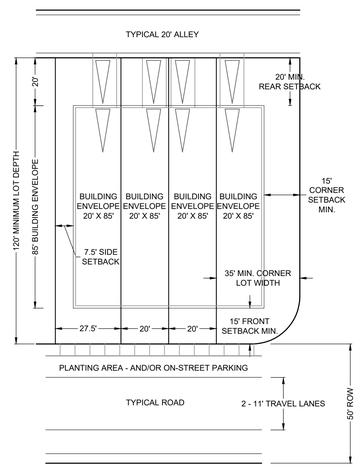
| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 10' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 12' WIDE IN FIRST LAYER | 60% |




5 C2.6 LARGE LOT HOME LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL ALLEY LOADED TOWN HOMES
TYPICAL INTERIOR LOT DIMENSIONS 20' MIN. X 120'
UNITS PER BUILDING: 4, 6, 7, OR 8

| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 15' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5' | 80% INTERIOR UNITS |




6 C2.6 TOWN HOME LOT DIAGRAM N.T.S

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

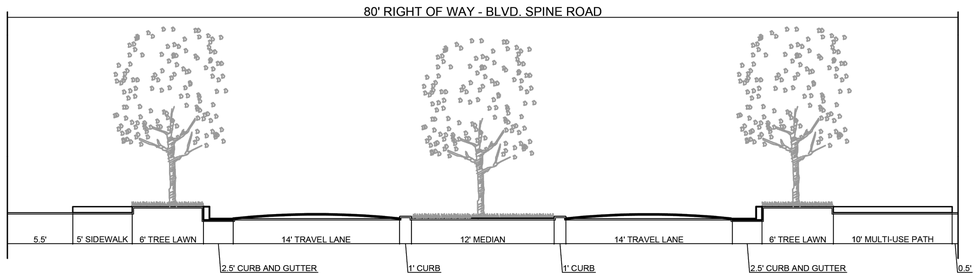



Date: October 16, 2023

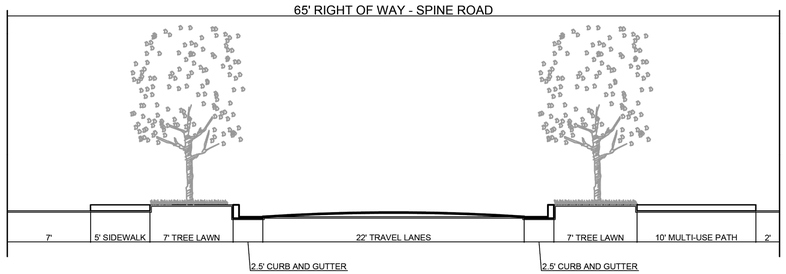
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LOT DIAGRAMS

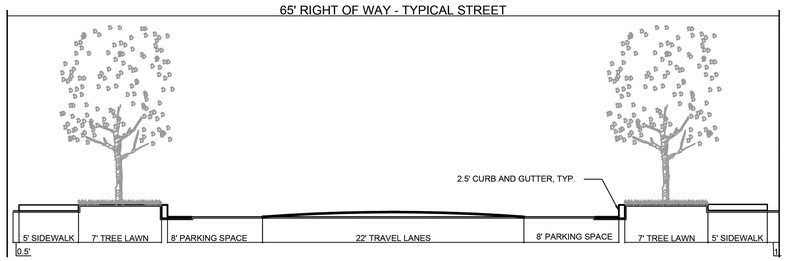
SHEET C2.6



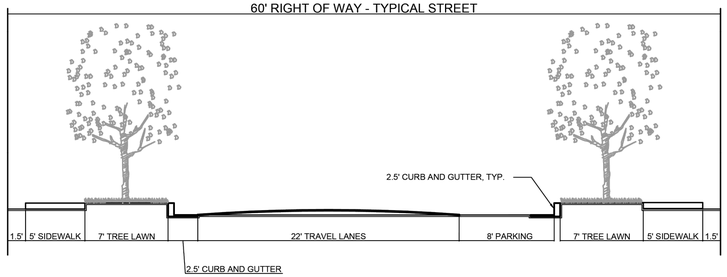

1 C2.7 80' ROW - COLUMBIA BLUFFS BLVD STREET SECTION N.T.S



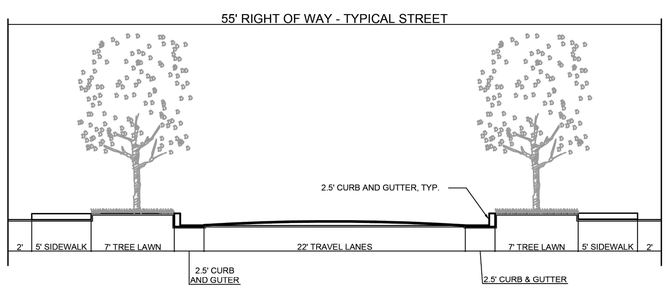

2 C2.7 65' ROW - COLUMBIA BLUFFS BLVD STREET SECTION N.T.S




3 C2.7 65' ROW - CD3 STREET SECTION W/ ON-STREET PARKING N.T.S




4 C2.7 60' ROW - CD3 STREET SECTION WITH ON STREET PARKING N.T.S




5 C2.7 55' ROW - CD3 STREET SECTION N.T.S

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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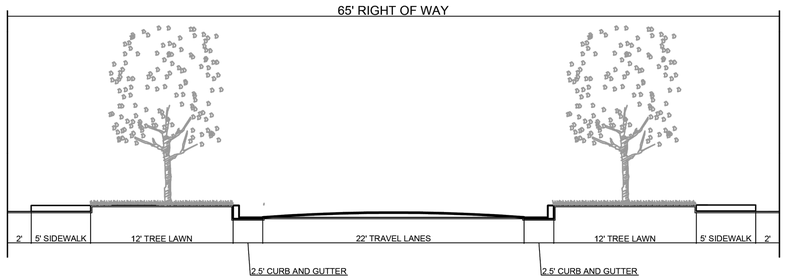
GREGORY C. GAMBLE — REGISTERED LANDSCAPE ARCHITECT — 1.25.24

Date: October 16, 2023

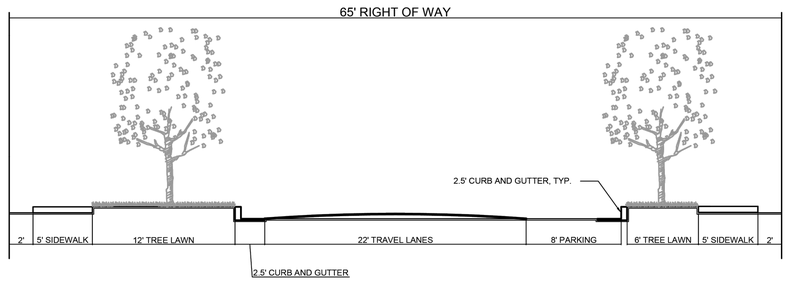
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STREET SECTIONS

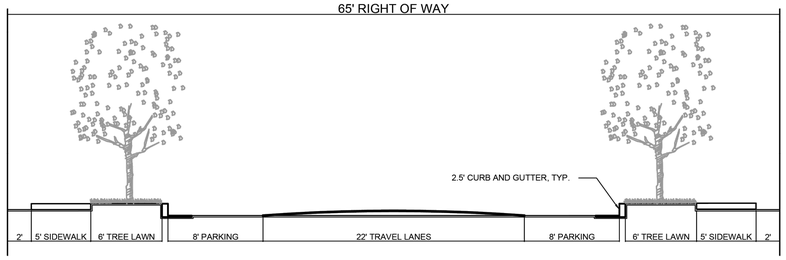
SHEET C2.7



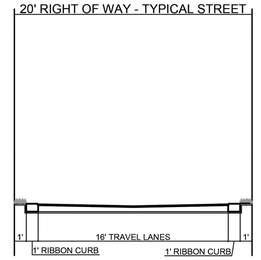

1 C2.8 65' ROW - CD4 STREET SECTION - NO ON-STREET PARKING N.T.S




2 C2.8 65' ROW - CD4 STREET SECTION W/ ON-STREET PARKING N.T.S



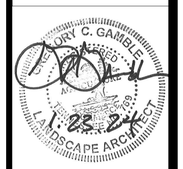

3 C2.8 65' ROW - CD4 STREET SECTION W/ ON-STREET PARKING N.T.S




4 C2.8 20' ROW - ALLEY STREET SECTION N.T.S

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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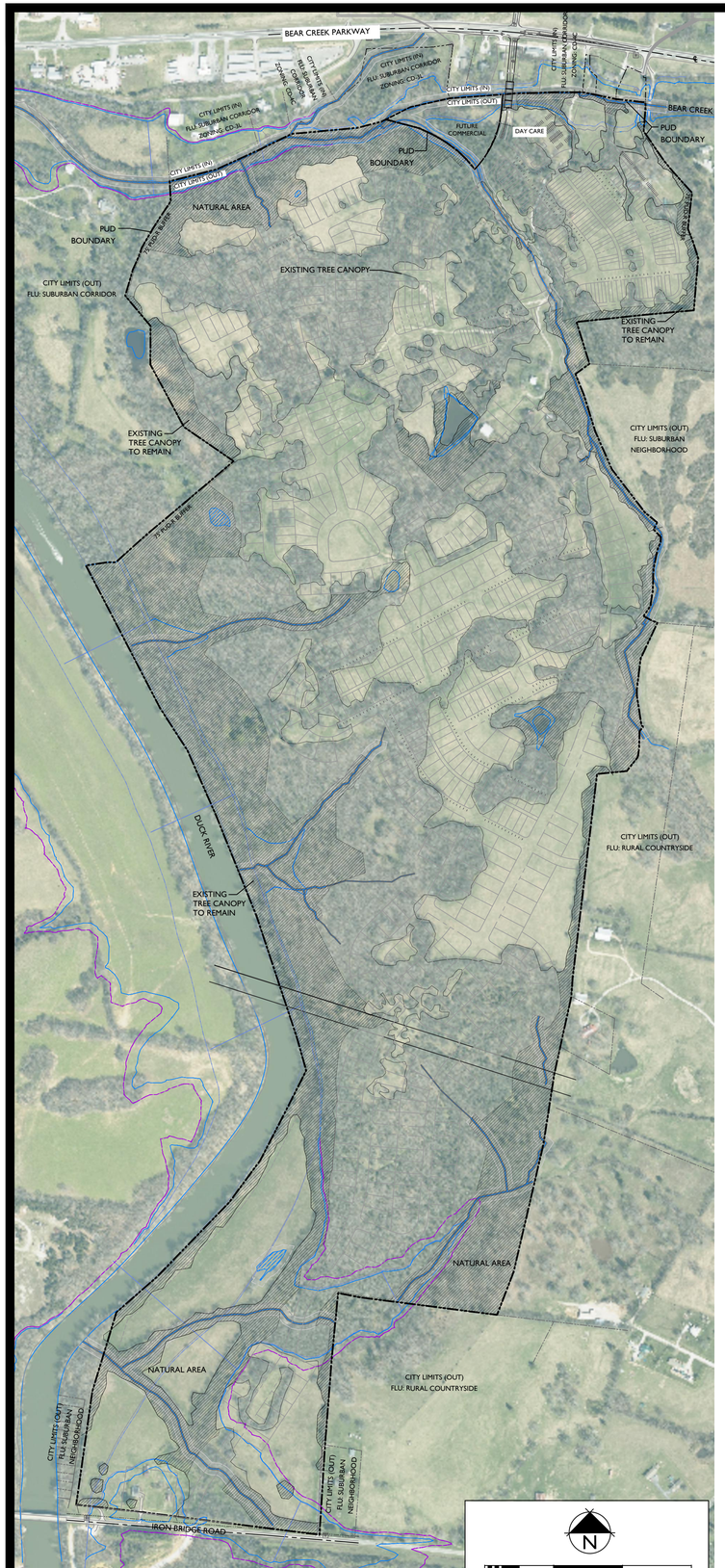



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| 3 |

STREET SECTIONS

SHEET
C2.8




## SITE DATA:

EXISTING TREE CANOPY COVERAGE: 262.4 AC; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%; 94.5 AC MIN
ESTIMATED PRESERVATION: 101.5 AC; 39%

ANTICIPATED PRESERVATION AREAS TO BE DETERMINED WITH FINAL GRADING/STORMWATER.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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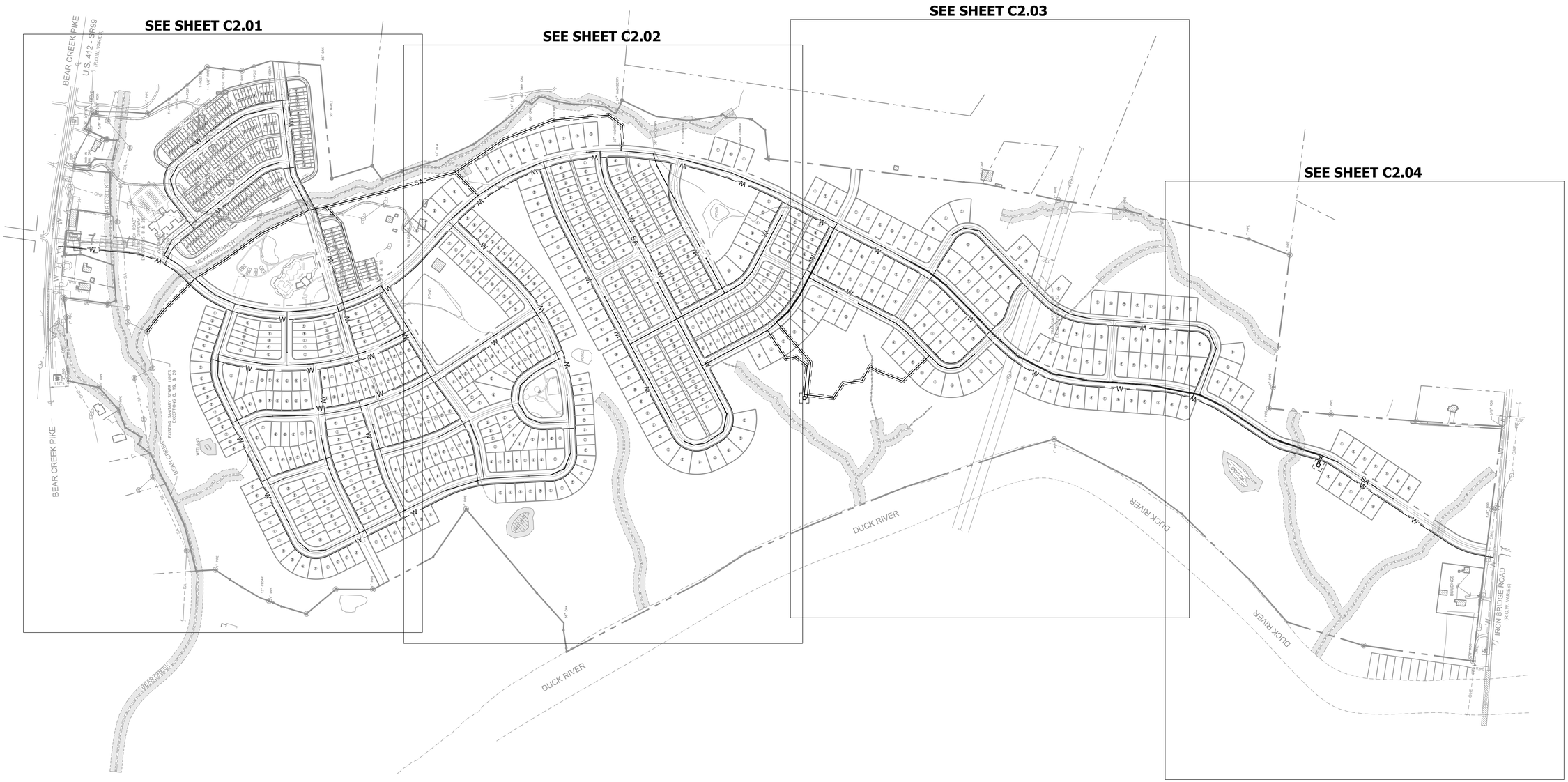
GREGORY C. GAMBLE
REGISTERED
LANDSCAPE ARCHITECT
1.25.24

Date: October 16, 2023

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OVERALL PUD-R PMDP

SHEET
C2.9




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615.248.9999
csdgtn.com

SEAL




# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

Review Comments

ISSUE DATE: 01/23/24

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |
| 3 | Tech Review Comments | 01/23/24 |

DRAWN BY: TWG
CHECKED BY: TWG

## OVERALL UTILITY PLAN

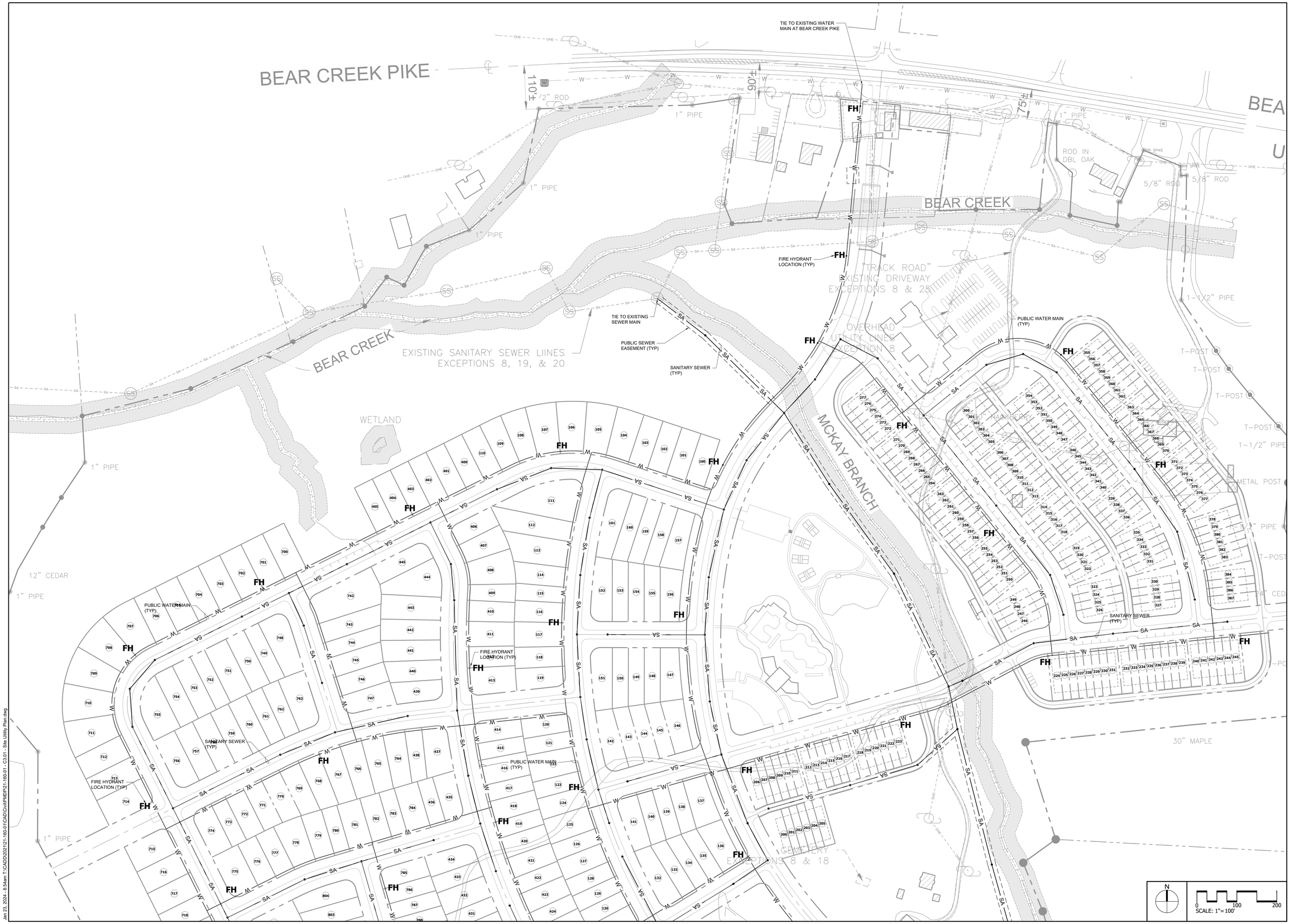
# C3.00

PROJECT NO.: 21-160-01

N

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SCALE: 1" = 300'

Jan 23, 2024 - 8:54am T:\CAD\D\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.00 - Overall Utility Plan.dwg




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DRAWN BY: TWG
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SITE UTILITY PLAN

C3.01
PROJECT NO.: 21-160-01

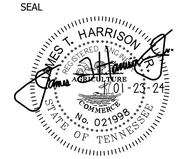


Jan 23, 2024 - 8:54am T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.01 - Site Utility Plan.dwg




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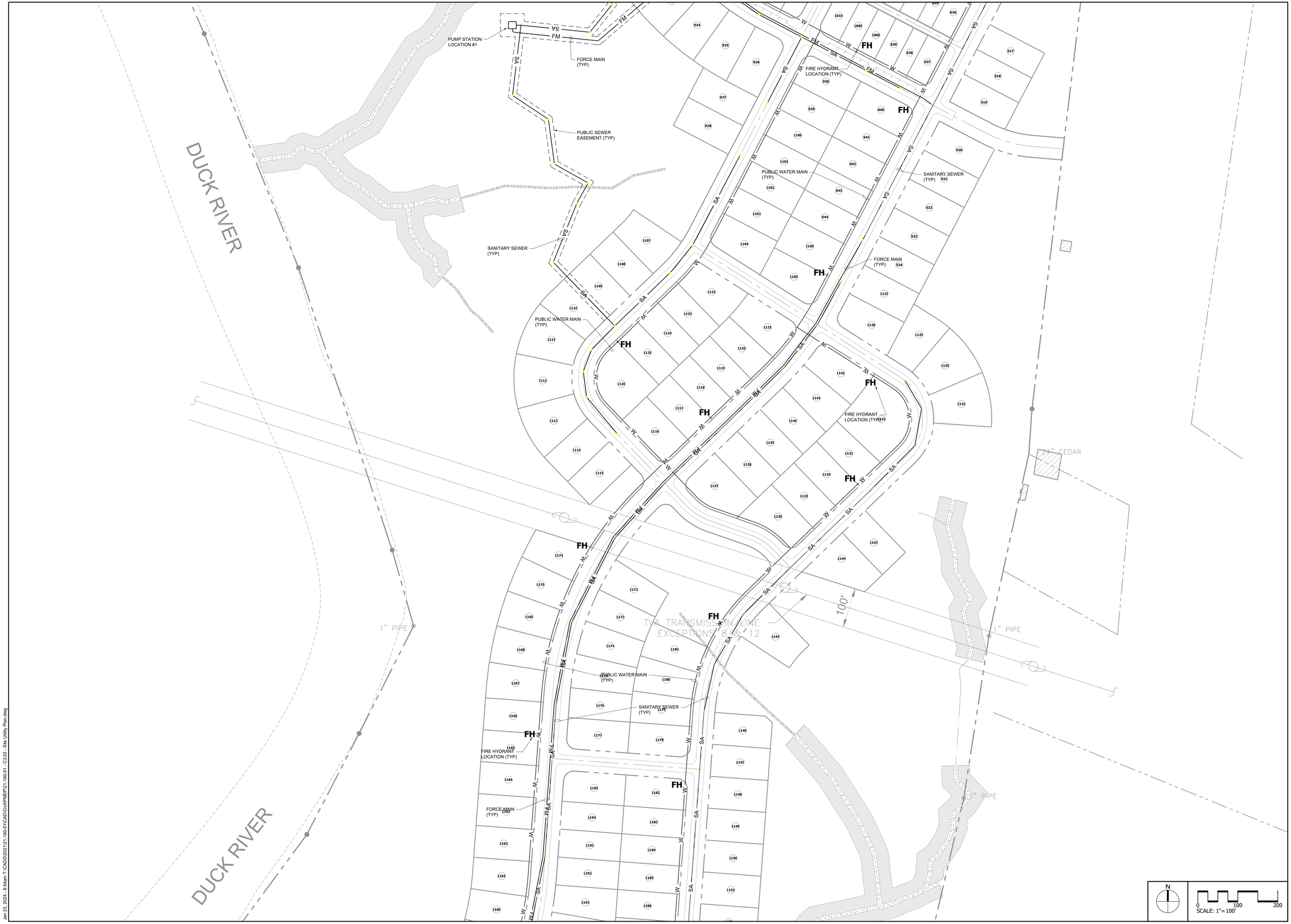
DRAWN BY: TWG
CHECKED BY: TWG

SITE UTILITY PLAN

C3.02

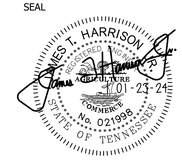
PROJECT NO.: 21-160-01

Jan 23, 2024 - 8:54am T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.02 - Site Utility Plan.dwg




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SITE UTILITY PLAN

C3.03

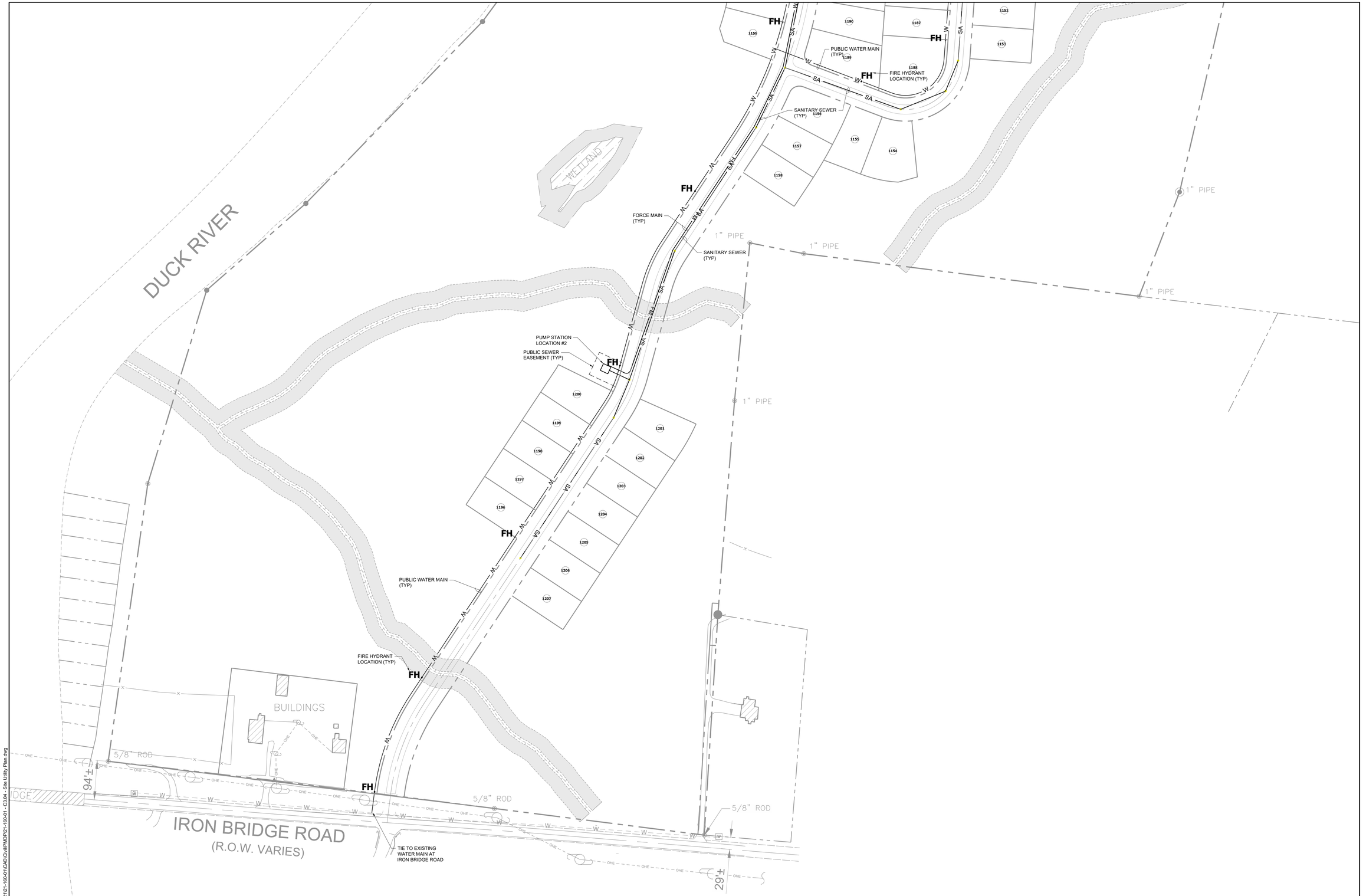
PROJECT NO.: 21-160-01

N

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SCALE: 1"= 100'



Jan 23, 2024 - 8:54am T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.03 - Site Utility Plan.dwg




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csdgtn.com

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JAMES T. HARRISON
REGISTERED
PROFESSIONAL
ENGINEER
AGRICULTURAL
COMMERCE
No. 021998
STATE OF TENNESSEE
10-23-24

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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CHECKED BY: TWG

## SITE UTILITY PLAN

# C3.04

PROJECT NO.: 21-160-01

N

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SCALE: 1"= 100'

Jan 23, 2024 - 8:54am T:\CAD\D\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.04 - Site Utility Plan.dwg




N

0 300 600
SCALE: 1" = 300'

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Landscape Architecture

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csdgtn.com

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JAMES T. HARRISON
REGISTERED
LANDSCAPE ARCHITECT
01-23-24
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS

PMDP

Bear Creek Pike
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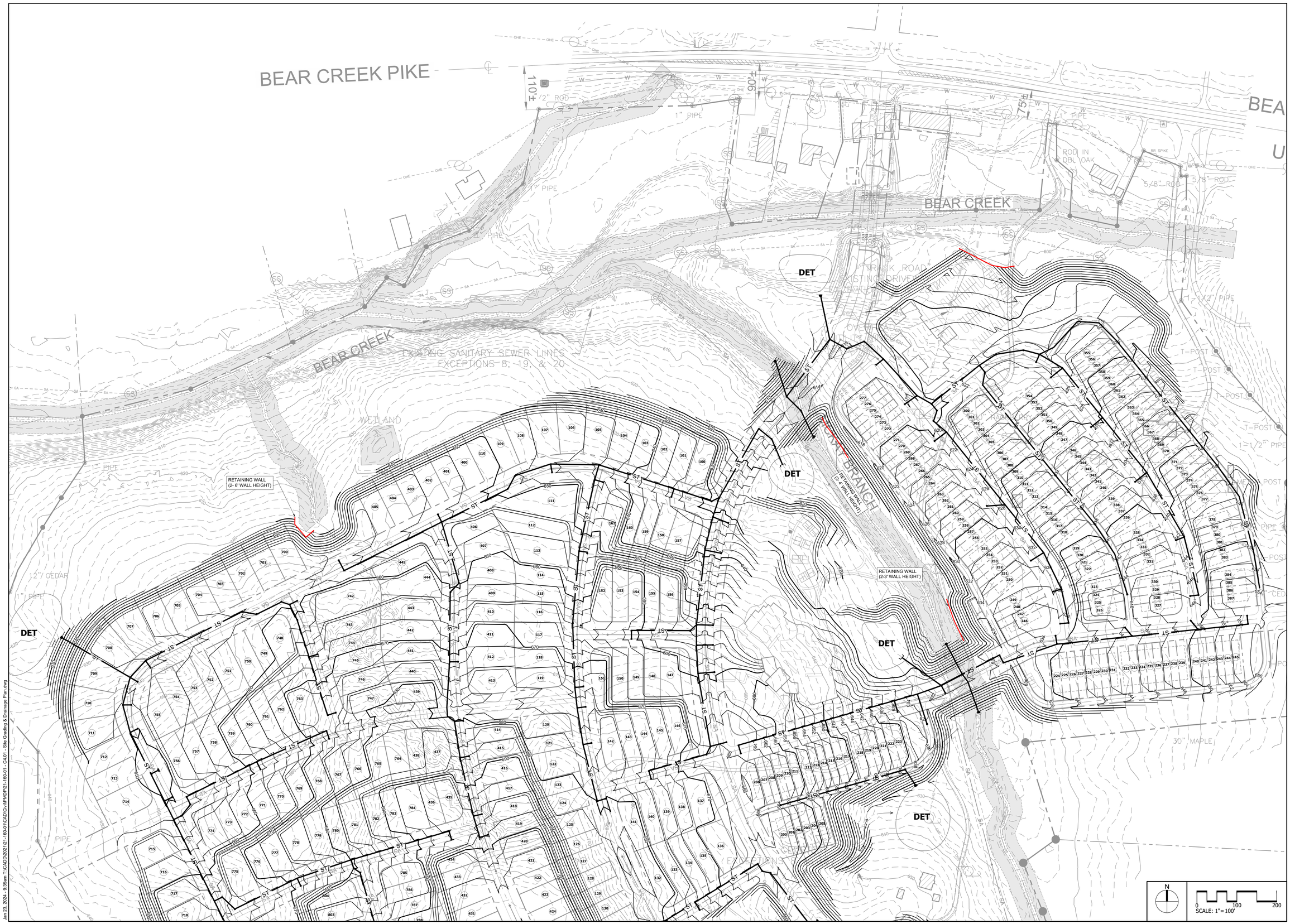
## OVERALL GRADING & DRAINAGE PLAN

# C4.00

PROJECT NO.: 21-160-01



Jan 23, 2024 - 9:38am T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.00 - Overall Grading & Drainage Plan.dwg

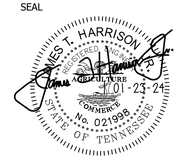



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DRAWN BY: TWG
CHECKED BY: TWG

## SITE GRADING & DRAINAGE PLAN

# C4.01

PROJECT NO.: 21-160-01

SCALE: 1"= 100'




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Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL

JAMES T. HARRISON IV
REGISTERED
PROFESSIONAL ENGINEER
No. 021998
STATE OF TENNESSEE
10-23-24

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
Review Comments

ISSUE DATE: 01/23/24

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |
| 3 | Tech Review Comments | 01/23/24 |

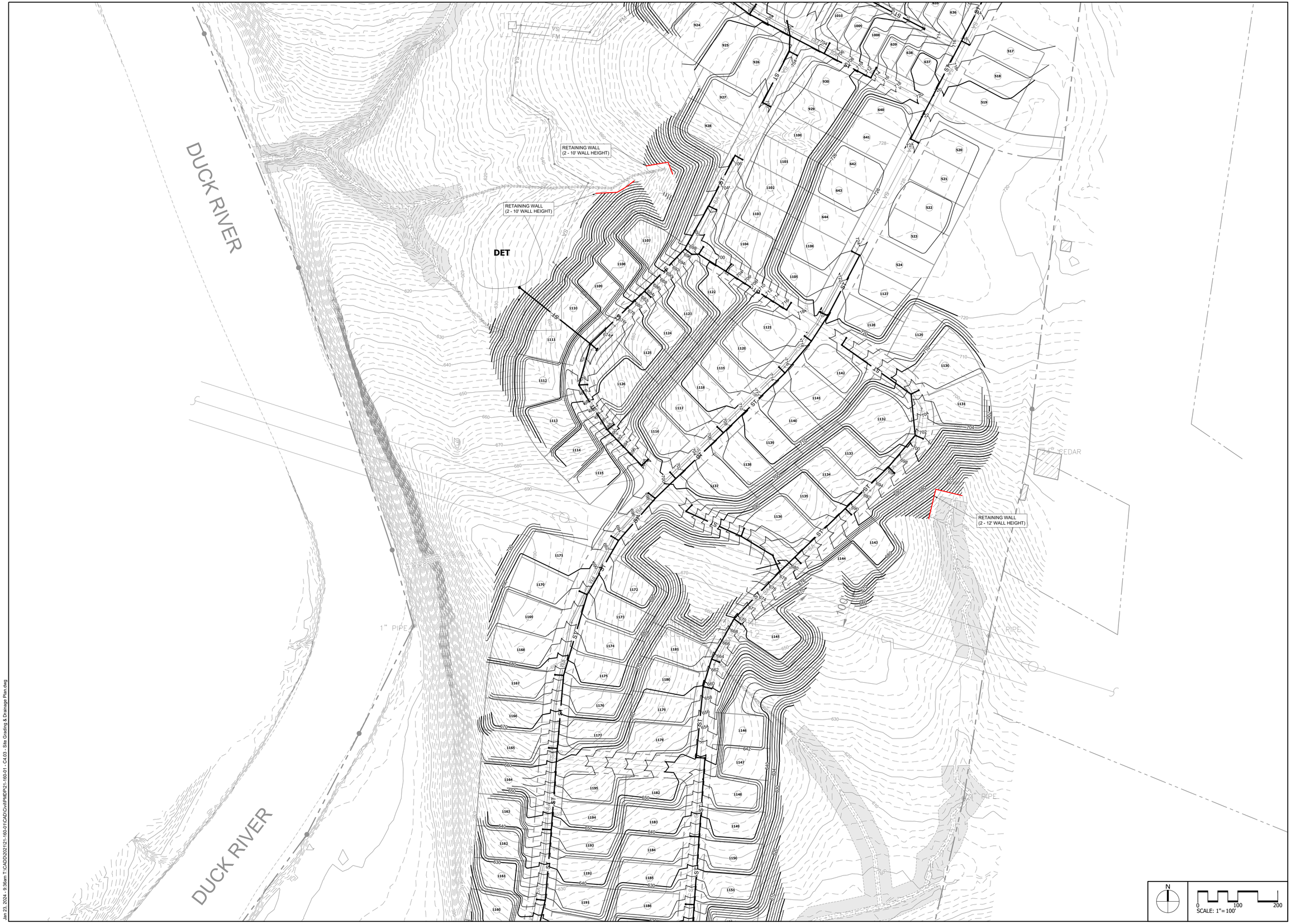
DRAWN BY: TWG
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SITE GRADING & DRAINAGE PLAN

C4.02

PROJECT NO.: 21-160-01

Jan 23, 2024 - 9:36am T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.02 - Site Grading & Drainage Plan.dwg




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JAMES T. HARRISON IV
REGISTERED
LICENSED
PROFESSIONAL ENGINEER
No. 021998
STATE OF TENNESSEE
01-23-24

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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SITE GRADING & DRAINAGE PLAN

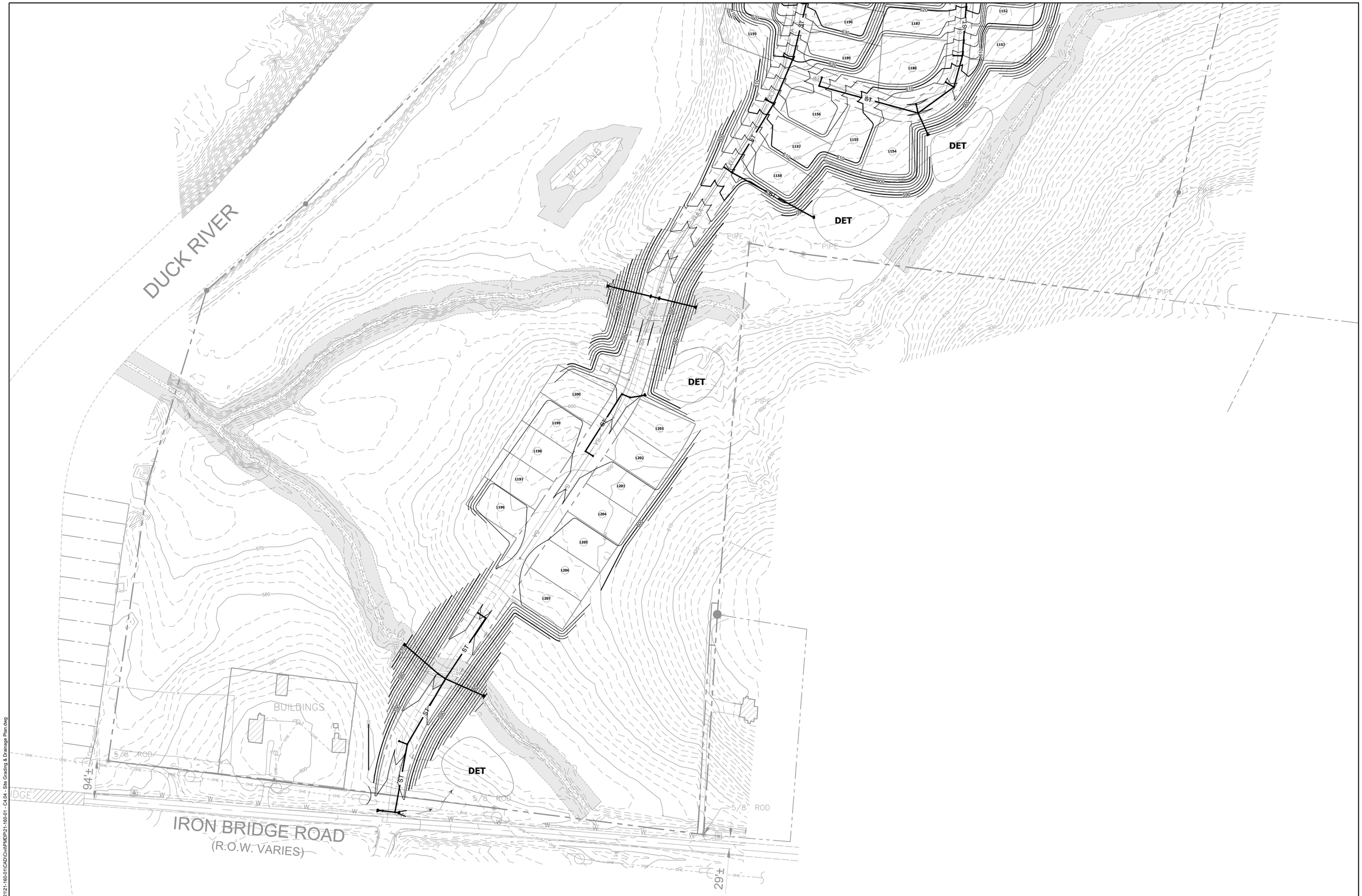
C4.03

PROJECT NO.: 21-160-01

N

0 100 200
SCALE: 1"= 100'

Jan 23, 2024 - 9:36am T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.03 - Site Grading & Drainage Plan.dwg




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# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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SITE GRADING & DRAINAGE PLAN

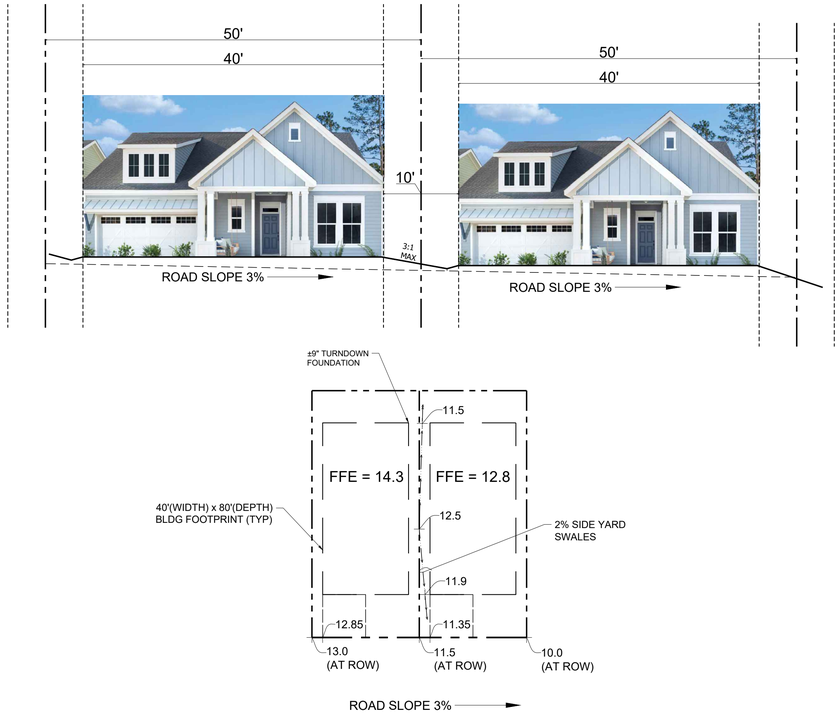
C4.04

PROJECT NO.: 21-160-01

N

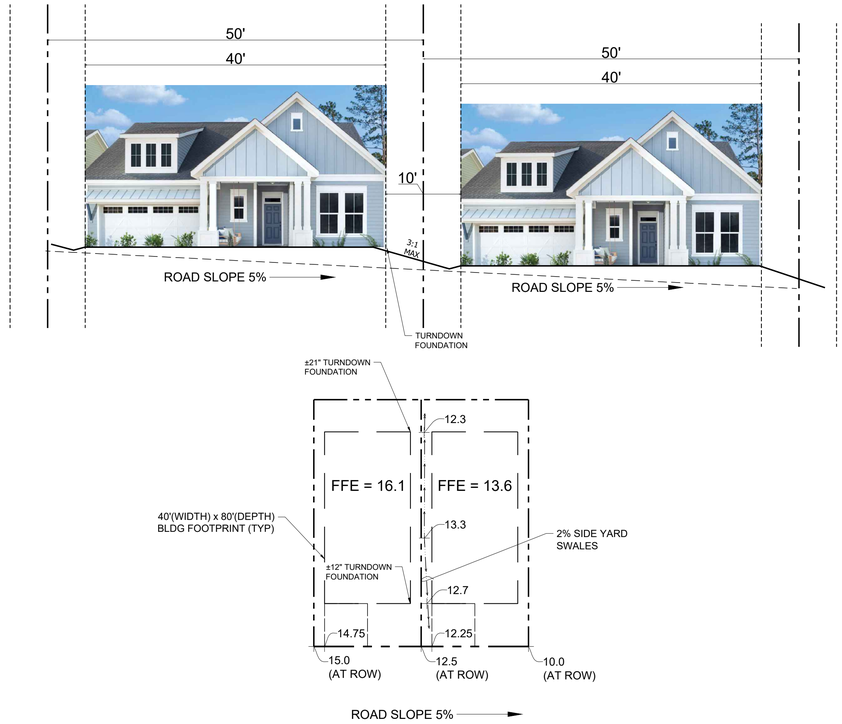
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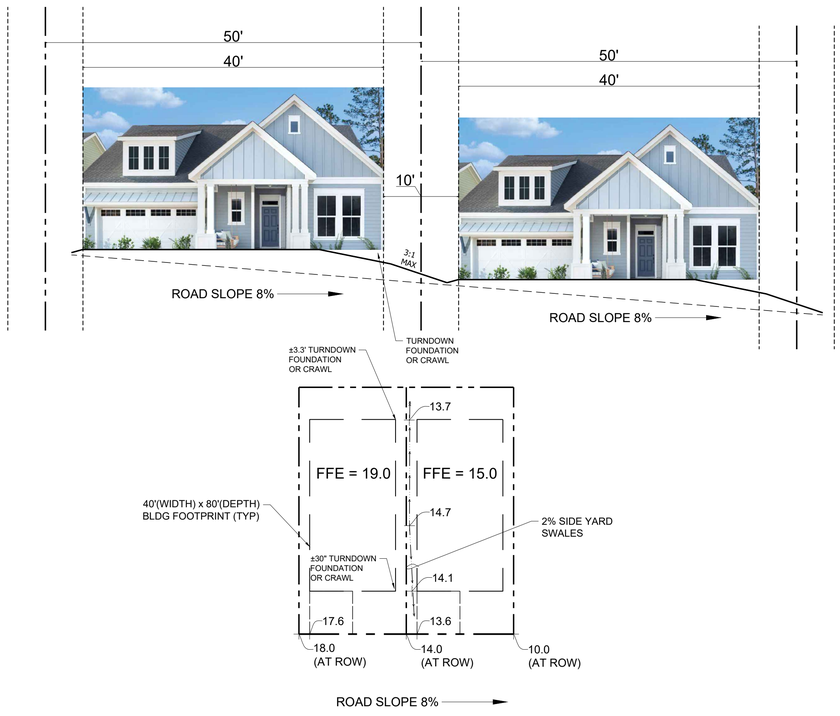

## LOT GRADING DIAGRAM - 3% ROAD SLOPE

NTS



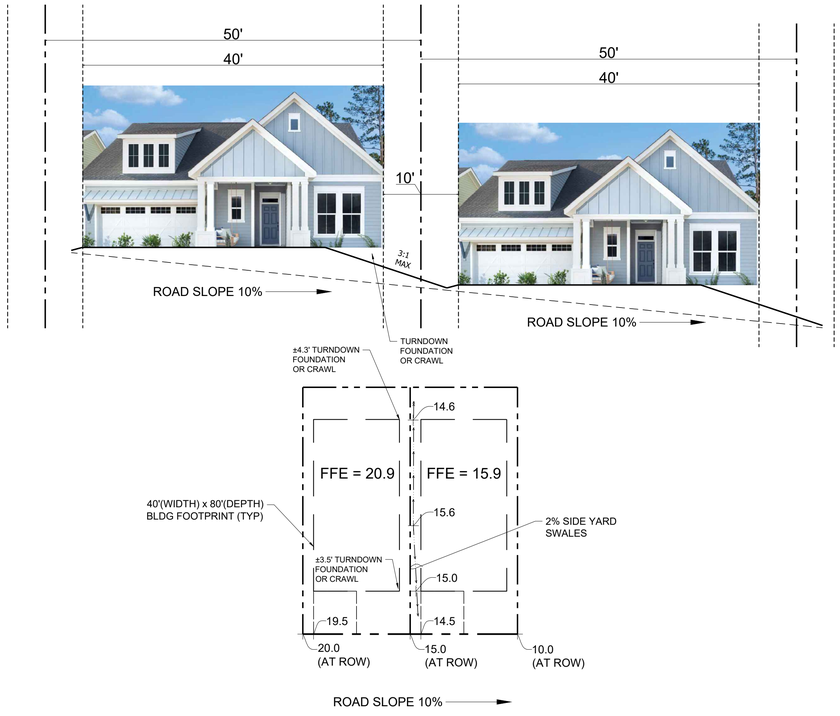

## LOT GRADING DIAGRAM - 5% ROAD SLOPE

NTS




## LOT GRADING DIAGRAM - 8% ROAD SLOPE

NTS

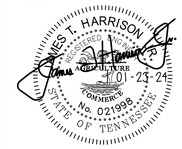



## LOT GRADING DIAGRAM - 10% ROAD SLOPE

NTS

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Bear Creek Pike
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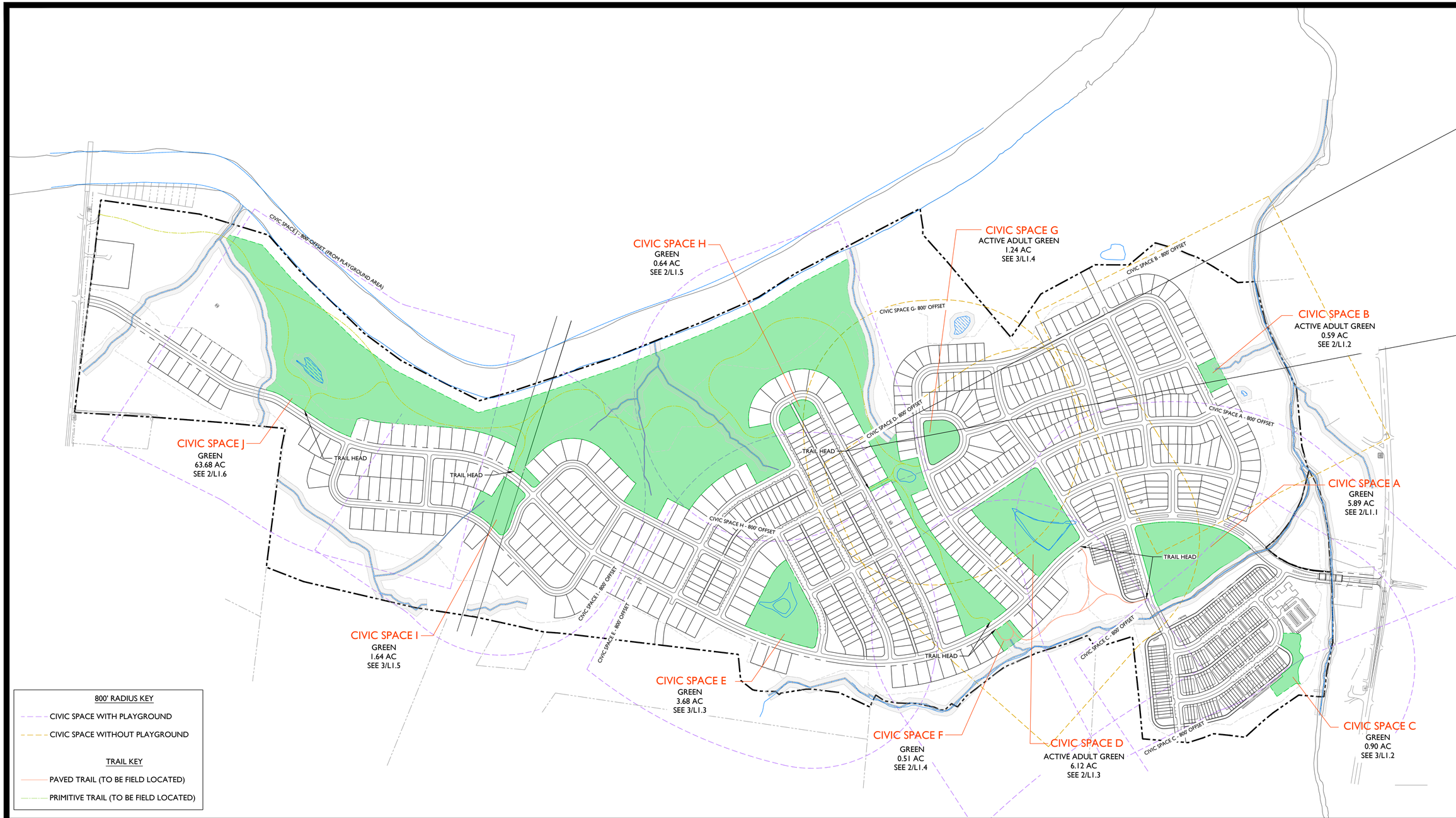
LOT DRAINAGE DIAGRAMS

C4.05

PROJECT NO.: 21-160-01



Jan 23, 2024 - 8:53am T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.05 - Lot Drainage Diagrams.dwg




800' RADIUS KEY

- CIVIC SPACE WITH PLAYGROUND
- CIVIC SPACE WITHOUT PLAYGROUND

TRAIL KEY

- PAVED TRAIL (TO BE FIELD LOCATED)
- PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CIVIC SPACE PLAN

N

0 300 600 900

GRAPHIC SCALE 1"=300'-0"

TOTAL OPEN SPACE PROVIDED: 214.93 AC; 52.4% OF GROSS SITE AREA

OPEN SPACE BREAKDOWN

CIVIC SPACE: 84.89 AC

ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC

ALL OTHER OPEN SPACE: 55.04 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC

CIVIC SPACE PROVIDED: 20.7%; 84.89 AC (SEE SHEET L1.0)

CIVIC SPACE BREAKDOWN

| KEY | SIZE | PLAYGROUND |
|---|---|---|
| A | 5.89 AC | YES |
| B | 0.59 AC | NO |
| C | 0.90 AC | YES |
| D | 6.12 AC | NO |
| E | 3.68 AC | YES |
| F | 0.51 AC | YES |
| G | 1.24 AC | YES |
| H | 0.64 AC | YES |
| I | 1.64 AC | YES |
| J | 63.68 AC | YES |

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GLORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT 1.23.24

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
| 2 January 23, 2024 |
| 3 |

OVERALL CIVIC SPACE PLAN

SHEET L1.0




1 LI.1 KEY MAP N.T.S

NEIGHBORHOOD CLUBHOUSE





PICKLE BALL COURTS



DOG PARK

WALKING PATHS





SWING BENCH

POOL





PICKLE BALL COURTS




2 LI.1 CIVIC SPACE - A
CONCEPTUAL PLAN

0' 50' 100'

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE
REGISTERED LANDSCAPE ARCHITECT
1.25.24

Date: October 16, 2023
Revision Date
1 December 18, 2023
2 January 23, 2024
3

OVERALL CIVIC SPACE PLAN
SHEET
LI.1




1 / LI.2 KEY MAP N.T.S




2 / LI.2 CIVIC SPACE - B

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



BENCHES



FORMAL PLANTING



FORMAL LAWN



WALKING PATH




3 / LI.2 CIVIC SPACE - C

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'

PLAYGROUND





FORMAL PLANTING

PLAYGROUND



GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee



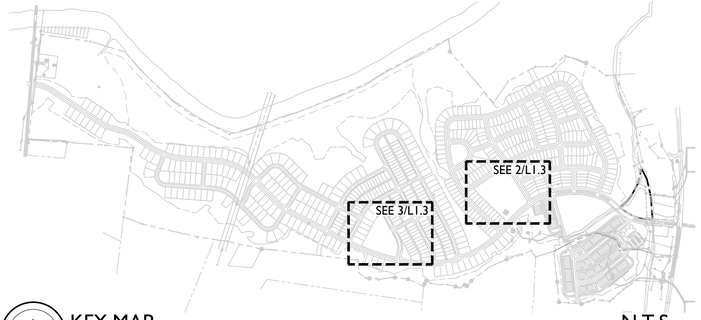

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OVERALL CIVIC SPACE PLAN

SHEET LI.2



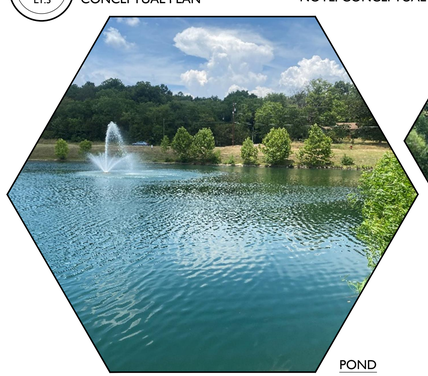

1 / L1.3 KEY MAP N.T.S



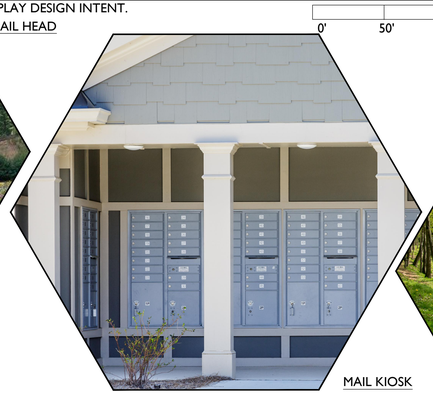

2 / L1.3 CIVIC SPACE - D
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 50' 100'


POND


TRAIL HEAD

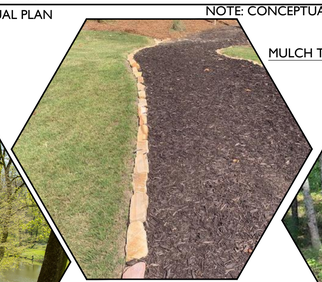

MAIL KIOSK

3 / L1.3 CIVIC SPACE - E
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'


NATURAL POND


MULCH TRAIL


NATURAL TRAIL



TRAIL SIGN

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT 1.25.24

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| 3 |

OVERALL CIVIC SPACE PLAN

SHEET L1.3




2 LI.4 CIVIC SPACE - F

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



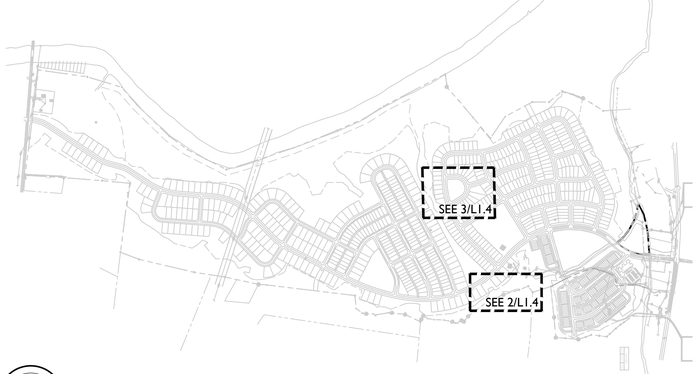
SWINGS



FORMAL PARK



PLAYGROUND




1 LI.4 KEY MAP N.T.S




3 LI.4 CIVIC SPACE - G

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



FORMAL PARK



COMMUNITY GARDEN



DOG PARK

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT 1.25.24

Date: October 16, 2023

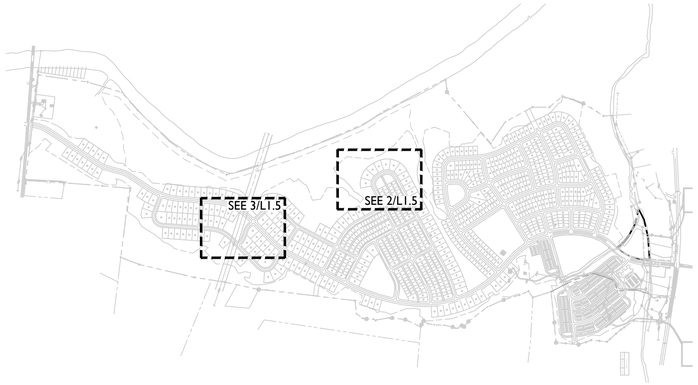
Revision Date

1 December 18, 2023

2 January 23, 2024

OVERALL CIVIC SPACE PLAN

SHEET LI.4




1 LI.5 KEY MAP N.T.S




2 LI.5 CIVIC SPACE - H

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



SWINGS



PLAYGROUND



PLAYGROUND




3 LI.5 CIVIC SPACE - I

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



SWINGS



MAIL KIOSK



FORMAL PLANTING

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT 1.23.24

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OVERALL CIVIC SPACE PLAN

SHEET LI.5




2 / L1.6 CIVIC SPACE - J

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 100' 200'

NOTE: PRIMITIVE WALKING TRAILS TO BE FIELD LOCATED.



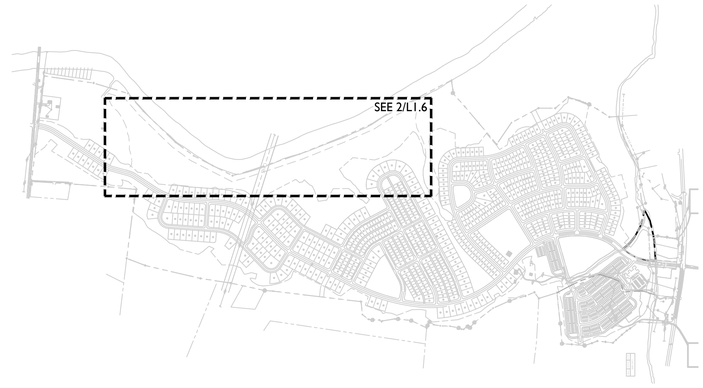
OPEN FIELD



TRAIL HEAD



MULTI-PURPOSE FIELD




1 / L1.6 KEY MAP N.T.S

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT 1282

Date: October 16, 2023

| Revision | Date |
|---|---|
| 1 | December 18, 2023 |
| 2 | January 23, 2024 |
| 3 | |

OVERALL CIVIC SPACE PLAN

SHEET L1.6

KOLTERLAND

14025 Riveredge Drive
Suite 175
Tampa, FL 33637

T 813-615-1244
F 813-615-1461
www.kolter.com

February 9th, 2024

Mr. Kevin McCarthy & Mr. Austin Brass
Planning Department
City of Columbia, TN
N. Garden Street
Columbia, TN

RE: Memorandum of Understanding (MOU) for the- Construction of the Columbia Bluffs Amenity

Dear Mr. McCarthy and Mr. Brass,

Kolter Land (Developer) would like to submit this MOU to the Planning Department regarding the timing of the construction of the Amenity for the Columbia Bluffs project.

Prior to final acceptance of *Phase 3 and all subsections* of vertical build out, and prior to the Submission of the Final Plat to the Planning Commission for *Phase 4*, the **Amenity Center**, located east of the Active Adult portion of the development will have commenced and be completed.

Please let me know if you should have any questions.

Respectfully,

Joshua Gibbs
Kolter Land Partners, LLC
Vice President
14025 Riveredge Drive, Suite 175
Tampa, FL 33637
(615) 582-3253

MANHOLE 17
STA:9+65
TC:686.9

MANHOLE 18
STA:10+98
TC:681.2

MANHOLE 19
STA:11+70
TC:680.7

MANHOLE 20
STA:13+61
TC:680.5

MANHOLE 21
STA:16+55
TC:679.8

MANHOLE 23
STA:17+99
TC:687.0

MANHOLE 22
STA:20+67
TC:686.0

MANHOLE 24
STA:23+56
TC:678.6

MANHOLE 25
STA:24+12
TC:675.1

MANHOLE 26
STA:25+13
TC:683.1

MANHOLE 27
STA:26+86
TC:676.9

MANHOLE 28
STA:30+15
TC:682.0

MANHOLE 29
STA:31+29
TC:681.0

MANHOLE 30
STA:33+07
TC:681.8

MANHOLE 34
STA:34+60
TC:671.5

MANHOLE 32
STA:36+45
TC:641.6

GRAVITY SEWER TO SOUTHERN PUMP STATION

NORTHERN PUMP STATION TO BE REMOVED. FLOW REDIRECTED TO SOUTHERN STATION

GRAVITY SEWER TO SOUTHERN PUMP STATION

SOUTHERN PUMP STATION
(OFF PAGE)
±238 LOTS DIRECTED TO STATION
(±149 LOTS REDIRECTED FROM NORTHERN STATION)

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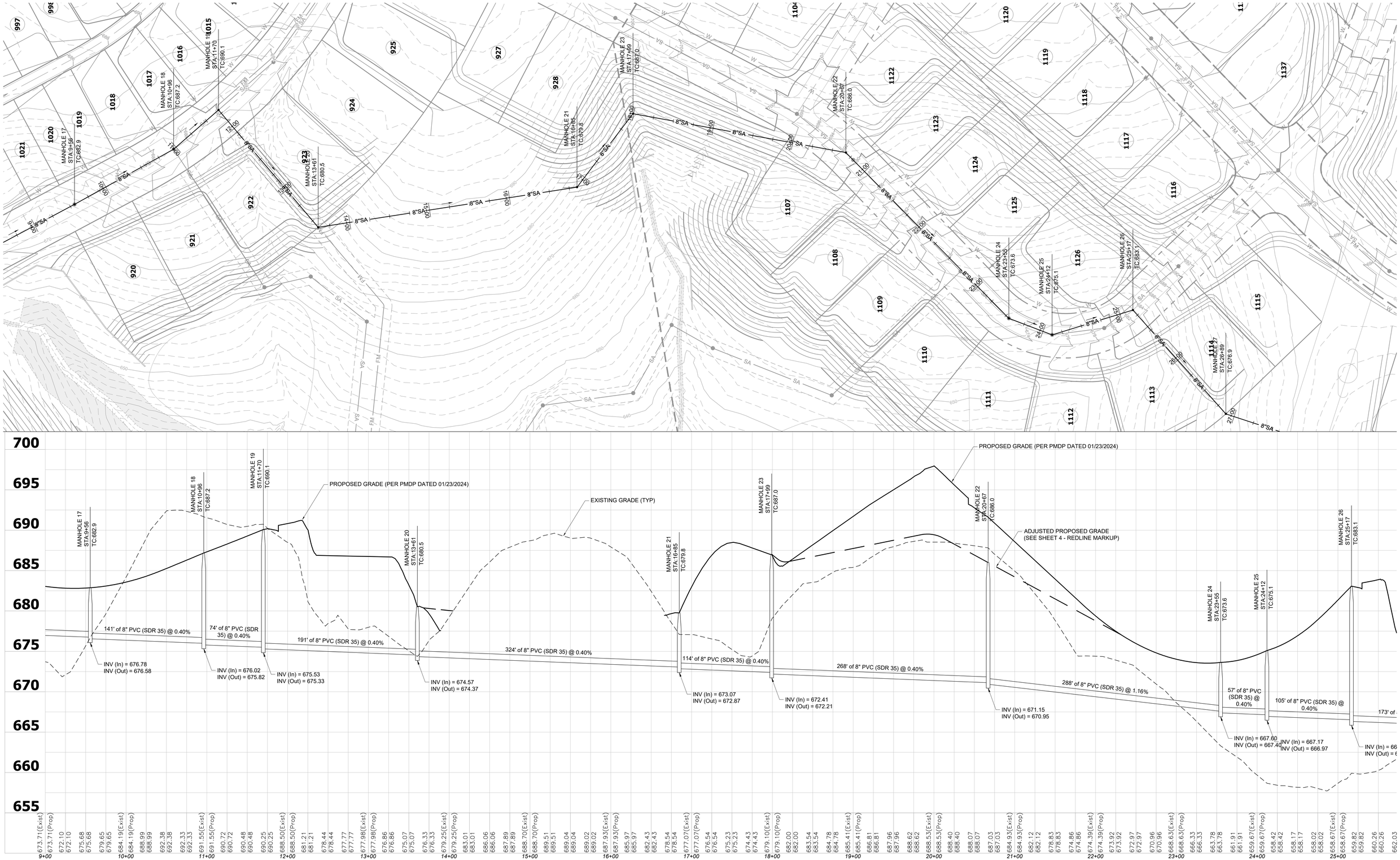
# COLUMBIA BLUFFS - PMDP EXHIBIT

## SEWER PLAN - LAYOUT ADJUSTMENT (SHEET 1 OF 4)

PN:21-160-01 | D:02.06.2024

N

0 100 200
SCALE: 1"=100'




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# COLUMBIA BLUFFS - PMDP EXHIBIT

## SEWER PROFILE (SHEET 2 OF 4)

PN:21-160-01 | D:02.06.2024

N

SCALE: 1"=50'




# COLUMBIA BLUFFS - PMDP EXHIBIT

## SEWER PROFILE (SHEET 3 OF 4)

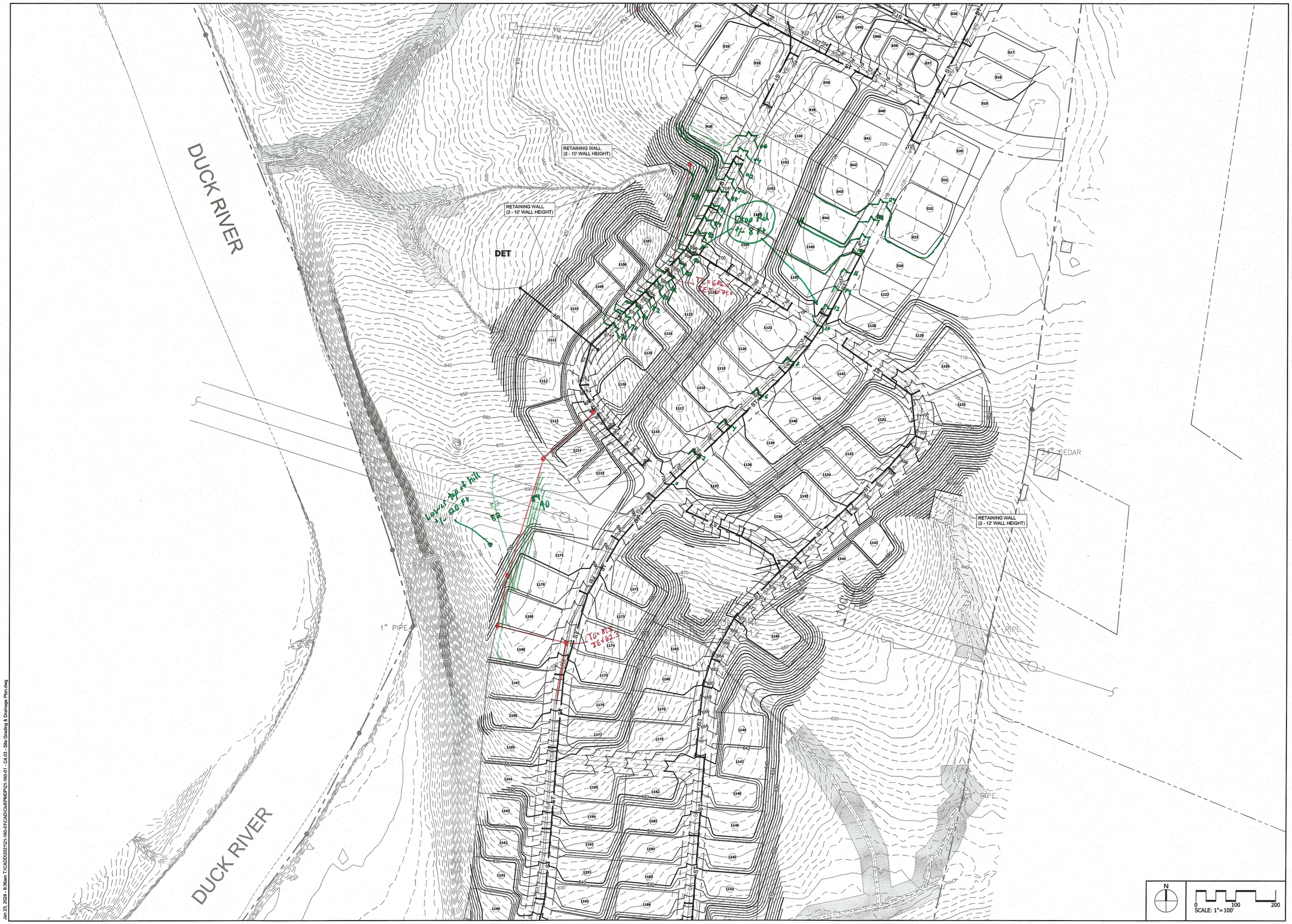
PN:21-160-01 | D:02.06.2024

CSDG Planning | Engineering Landscape Architecture

N

SCALE: 1"=50'

# REDLINE MARKUP (GRADING ADJUSTMENTS FOR SEWER REVISION)
## SHEET 4 OF 4





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Landscape Architecture
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Nashville, TN 37211
615.248.9999
csdgtn.com


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PMDP
Bear Creek Pike
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DRAWN BY: TWG
CHECKED BY: TWG

SITE GRADING & DRAINAGE PLAN

C4.03

PROJECT NO.: 21-160-01

N

SCALE: 1"= 100'

Jan 23, 2024 - 9:38am T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.03 - Site Grading & Drainage Plan.dwg

## Kevin McCarthy

**From:** Ryan Filipkowski
**Sent:** Saturday, February 3, 2024 10:55 AM
**To:** keli@gdc-tn.com; greg.gamble@gdc-tn.com; jgibbs@kolter.com
**Cc:** Donnie Boshers; Austin Brass; Paul Keltner; Glenn Harper; Melissa Sanders; Kevin McCarthy
**Subject:** Columbia Bluffs Preliminary PUD

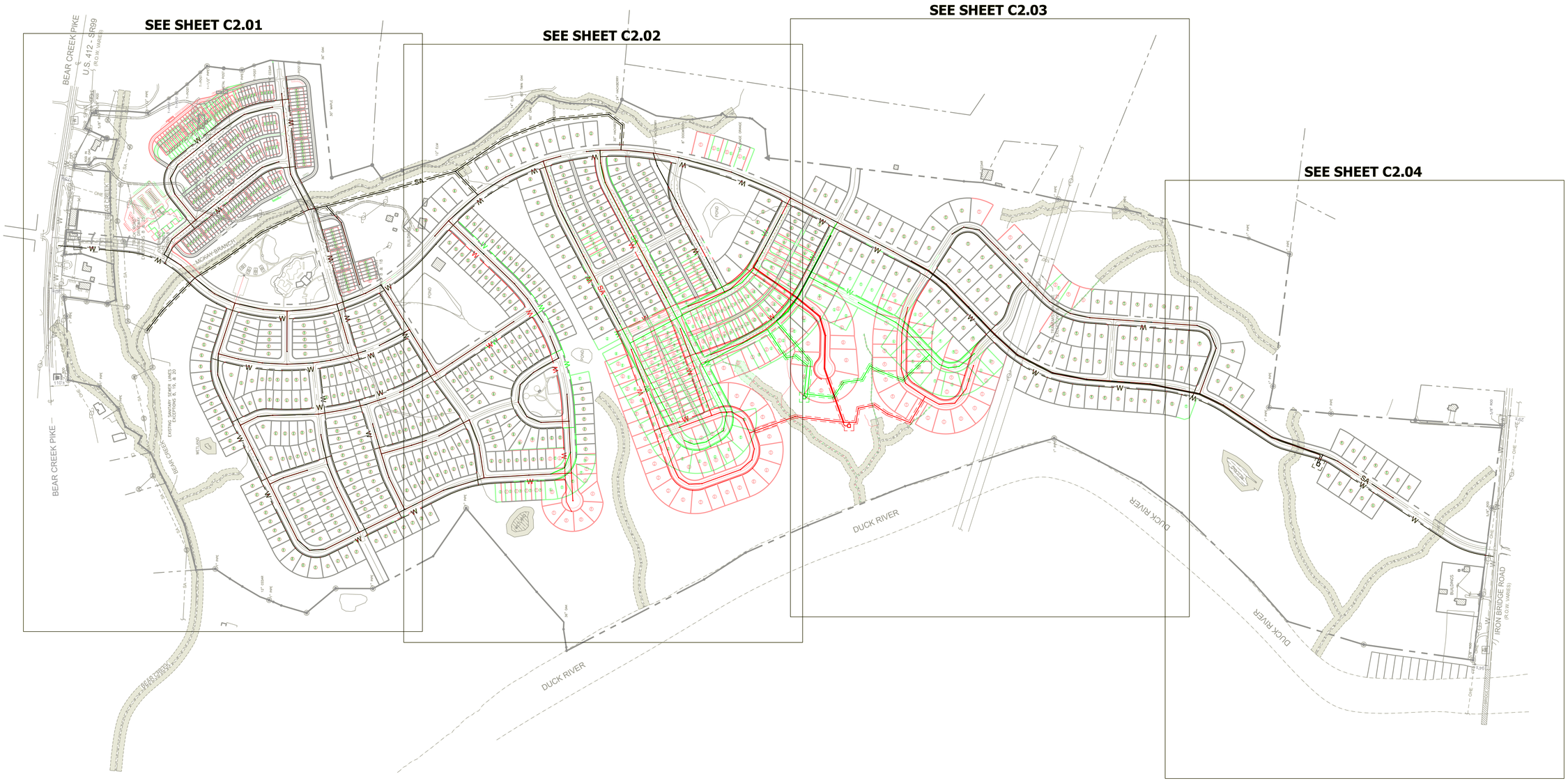
Mr. Gamble,

We have been looking more closely at the proposed Preliminary PUD Master Plan for Columbia Bluffs in order to anticipate questions we may be asked by Planning Commission. We wanted to bring a couple of items to your attention now in case the topic comes up during the meeting on February 14th.

The Wastewater Department prefers to eliminate the southern sanitary pump station from the PUD. Pump stations meeting city standards should serve closer to 150 units or more in order to achieve minimal cost efficiency. The number of units served by the pump station (81) is insufficient to obtain a flow rate that warrants a separate pump station. Upsizing the station may present other inefficiencies and problems. The elimination of this station and redirection to the northern pump station sewershed should not force sewer deeper than ~15 ft. Also, for the suction lift pump stations that Columbia prefers, the rule-of-thumb greatest depth from pumps to wetwell suction piping is about ~20 ft.

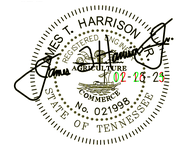
We understand that this information may impact your plan of development and you may want to discuss potential alternatives with staff before addressing Planning Commission. We have also communicated these concerns to Planning staff. Please communicate through Kevin and Austin if you would like to schedule a time to go over these comments.

Ryan Filipkowski, P.E.
Civil Engineer
Columbia Wastewater




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2505 Kline Ave, Ste 200
Nashville, TN 37211
615.244.9004
csdgtn.com

SEAL




# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INITIAL SUBMITTAL
Review Submittal

ISSUE DATE: 12/18/2023

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 12/18/2023 |
| 2 | Tech Review Comments | 12/18/2023 |
| 3 | Tech Review Comments | 01/23/24 |

DRAWN BY: TWG
CHECKED BY: TWG

## OVERALL UTILITY PLAN

# C3.00

PROJECT NO.: 21-160-01

N

0 300 600
SCALE: 1"= 300'

Dec 20, 2023 - 7:52pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.00 - Overall Utility Plan.dwg

BEAR CREEK PIKE

TIE TO EXISTING WATER MAIN AT BEAR CREEK PIKE

110'+/-

206'+/-

75'+/-

1/2" ROD

1" PIPE

1" PIPE

1" PIPE

1" PIPE

ROD IN DBL OAK

5/8" ROD

5/8" ROD

1-1/2" PIPE

BEAR CREEK

BEAR CREEK

FIRE HYDRANT LOCATION (TYP)

TRACK ROAD

EXISTING DRIVEWAY EXCEPTIONS 8 & 25

OVERHEAD UTILITY LINES EXCEPTION 8

TIE TO EXISTING SEWER MAIN

PUBLIC SEWER EASEMENT (TYP)

SANITARY SEWER (TYP)

EXISTING SANITARY SEWER LIINES EXCEPTIONS 8, 19, & 20

PUBLIC WATER MAIN (TYP)

MCKAY BRANCH

T-POST

T-POST

T-POST

1-1/2" PIPE

METAL POST

1-1/2" PIPE

T-POST

24" CEDAR

WETLAND

1" PIPE

12" CEDAR

1" PIPE

PUBLIC WATER MAIN (TYP)

FIRE HYDRANT LOCATION (TYP)

SANITARY SEWER (TYP)

FIRE HYDRANT LOCATION (TYP)

PUBLIC WATER MAIN (TYP)

SANITARY SEWER (TYP)

1" PIPE

CEMETERY

EXCEPTIONS 8 & 18

30" MAPLE

N

0 100 200

SCALE: 1"= 100'

Dec 20, 2023 - 7:52pm T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.01 - Site Utility Plan.dwg

CSDG
Planning | Engineering
Landscape Architecture
2908 Kirby Ave., Ste 200
Nashville, TN 37212
615.244.9004
csdgtn.com

SEAL

JAMES T. HARRISON
REGISTERED
PROFESSIONAL
ENGINEER
12-15-23
COMMERCE
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL
Review Submittal

ISSUE DATE: 12/18/2023

REVISION HISTORY:

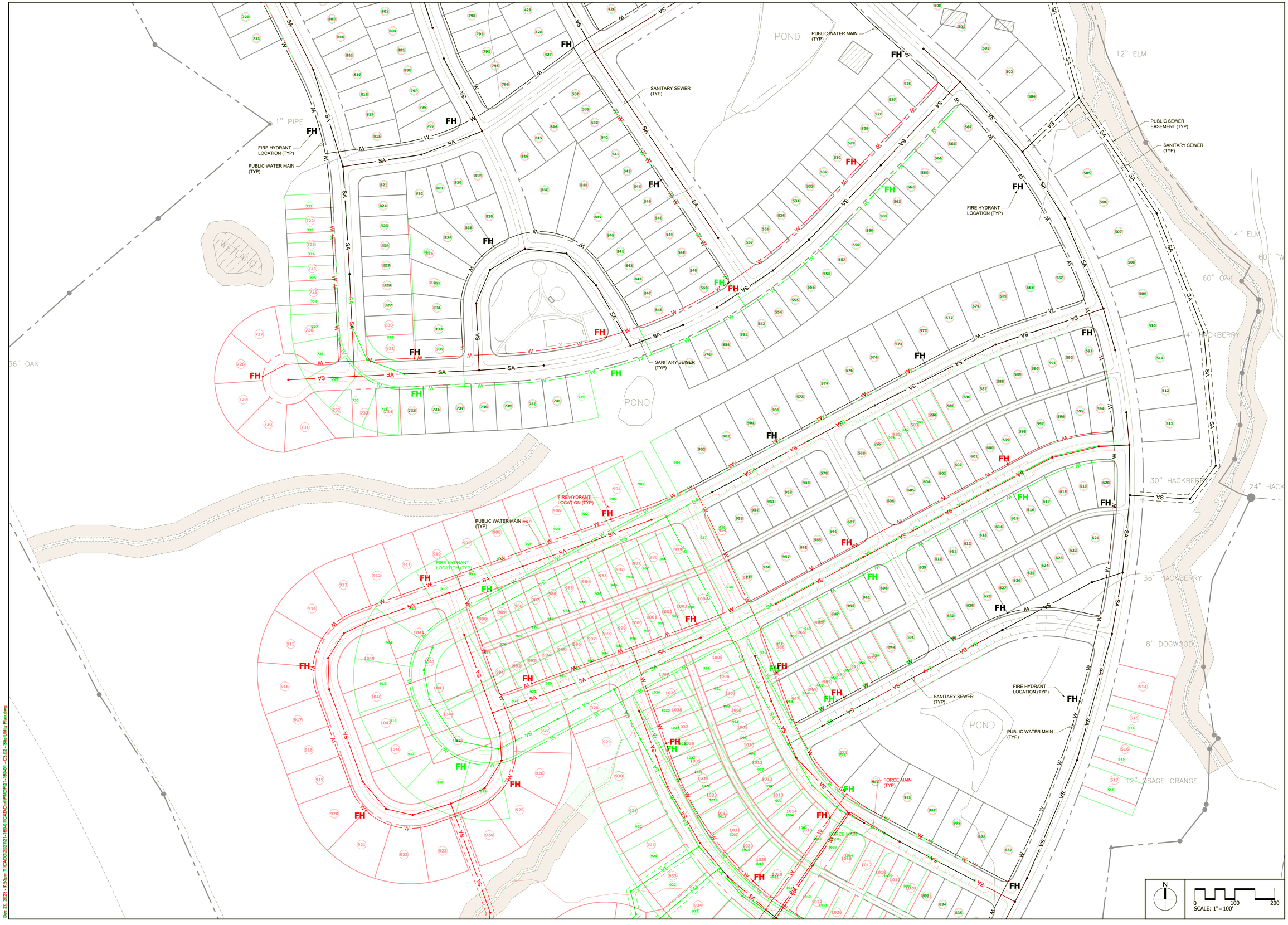
| Rev. | Description | Date |
|---|---|---|
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| 3 | Tech Review Comments | 01/23/24 |

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CHECKED BY: TWG

## SITE UTILITY PLAN

# C3.01

PROJECT NO.: 21-160-01




CSDG
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# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
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ISSUE DATE: 12/28/2023

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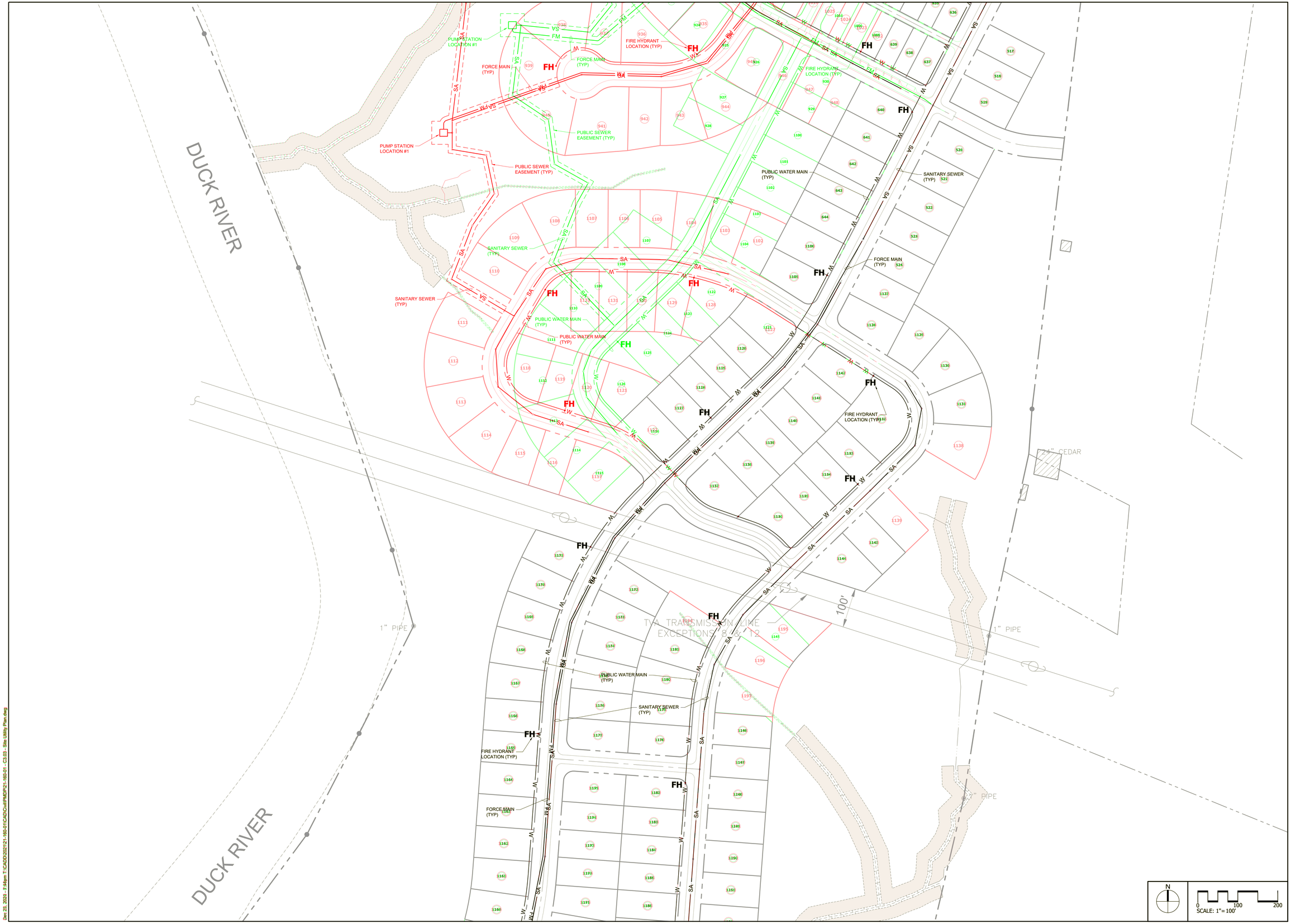
SITE UTILITY PLAN

C3.02

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:54pm T:\CADD\2021\21-160-01\CADD\Civil\PMDP\21-160-01 - C3.02 - Site Utility Plan.dwg




Dec 20, 2023 - 7:44pm T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.03 - Site Utility Plan.dwg

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2305 Kline Ave, Ste 200
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01-25-24

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INITIAL SUBMITTAL
REVIEW SUBMITTAL

ISSUE DATE: 12/28/2023

REVISION HISTORY:

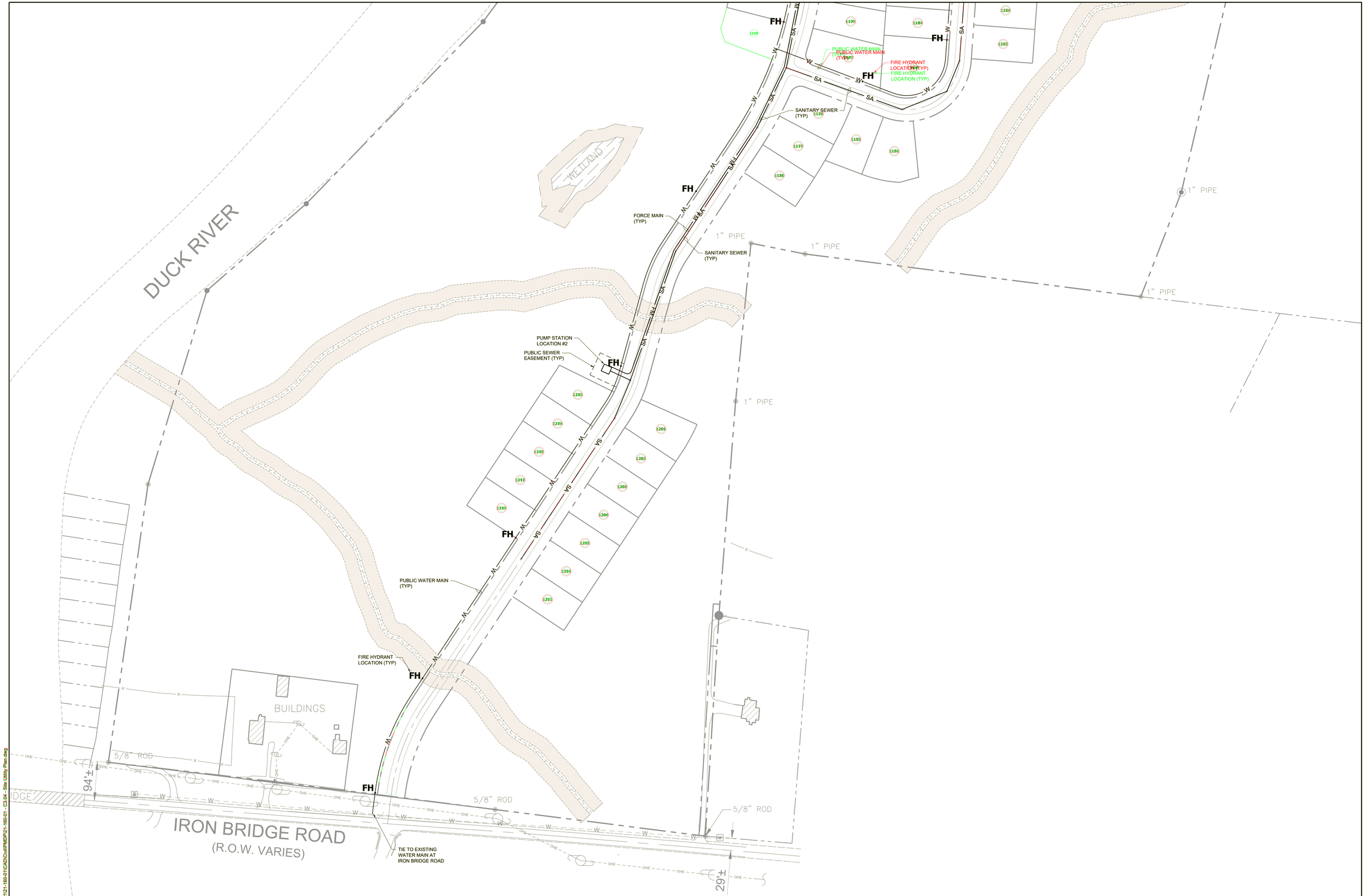
| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
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| 3 | Tech Review Comments | 01/23/24 |

DRAWN BY: TWG
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SITE UTILITY PLAN

C3.03

PROJECT NO.: 21-160-01




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SEAL

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STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
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| 3 | Tech Review Comments | 01/23/24 |

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CHECKED BY: TWG

## SITE UTILITY PLAN

N
0 100 200
SCALE: 1"= 100'

# C3.04

PROJECT NO.: 21-160-01

Dec 20, 2023 - 3:46pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.04 - Site Utility Plan.dwg




N

0 300 600
SCALE: 1"= 300'

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STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INITIAL SUBMITTAL
Initial Submittal

ISSUE DATE: 12/18/2023

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| 3 | Tech Review Comments | 01/23/24 |

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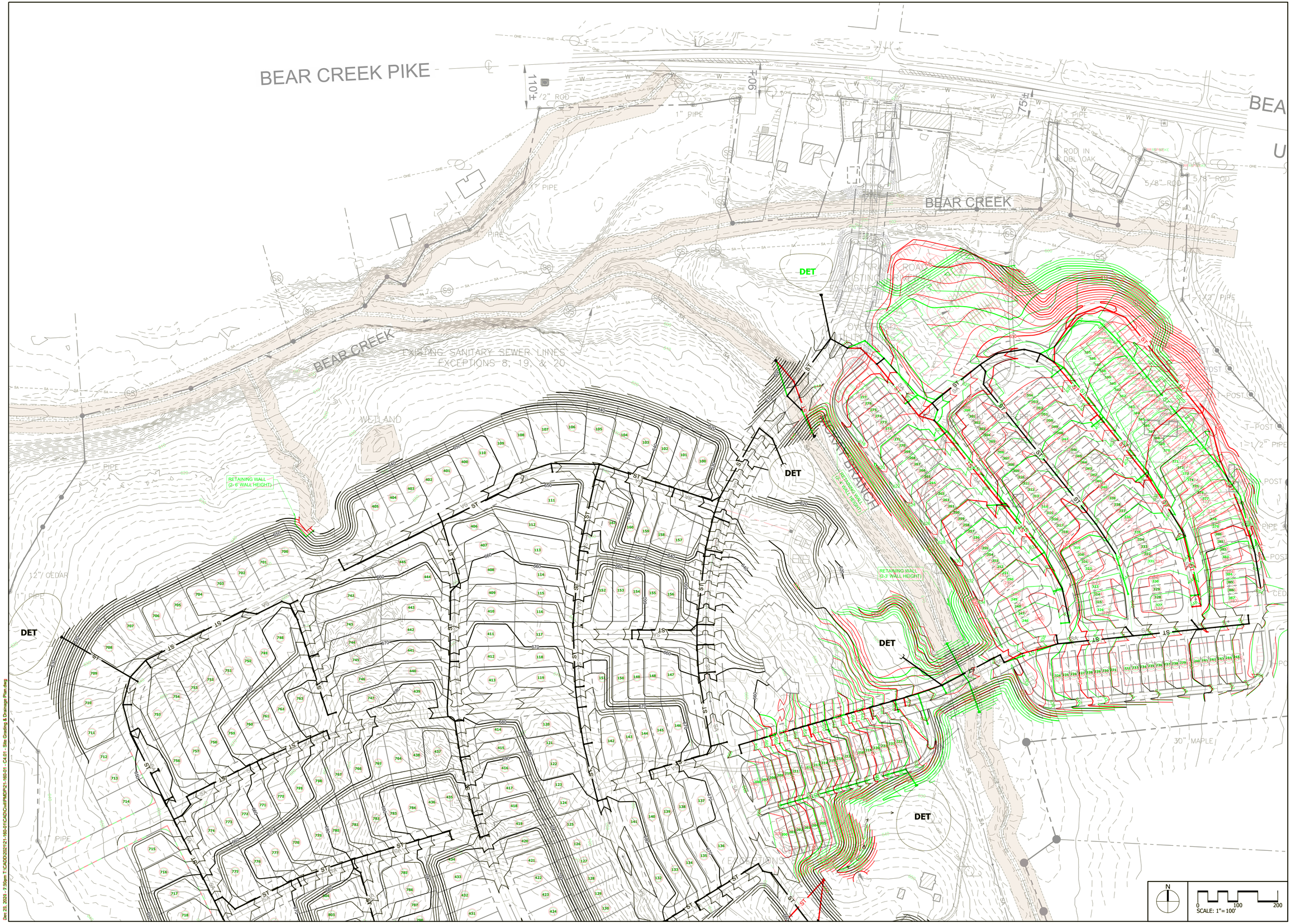
## OVERALL GRADING & DRAINAGE PLAN

# C4.00

PROJECT NO.: 21-160-01



Dec 23, 2023 - 7:49pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.00 - Overall Grading & Drainage Plan.dwg




Dec 20, 2023 - 7:36pm T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.01 - Site Grading & Drainage Plan.dwg

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12-18-23
DEPARTMENT OF COMMERCE
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS

PMDP

Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

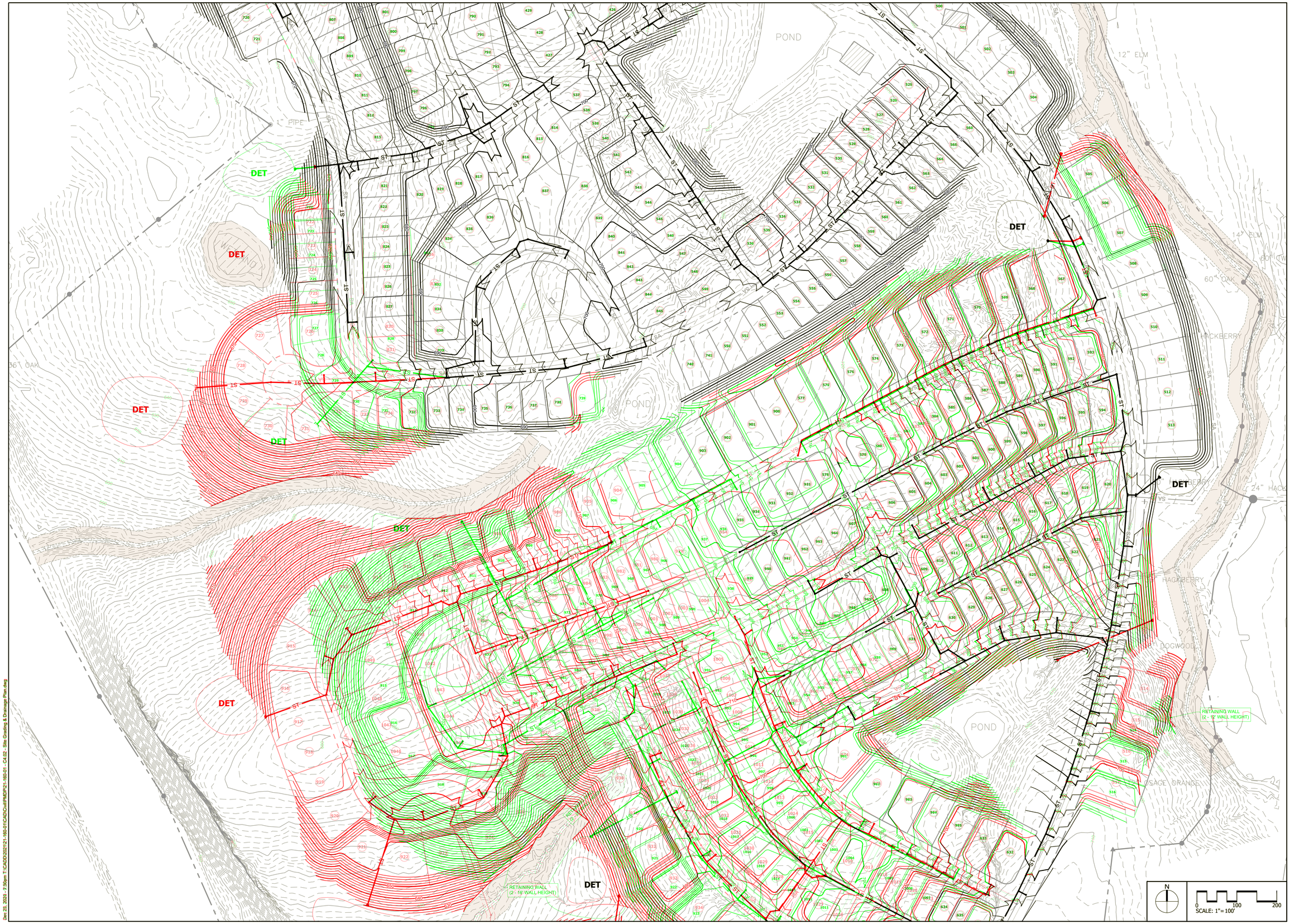
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| 3 | Tech Review Comments | 01/23/24 |

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## SITE GRADING & DRAINAGE PLAN

# C4.01

PROJECT NO.: 21-160-01




Dec 20, 2023 - 7:36pm T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.02 - Site Grading & Drainage Plan.dwg

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STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INITIAL SUBMITTAL
Initial Submittal

ISSUE DATE: 12/18/2023

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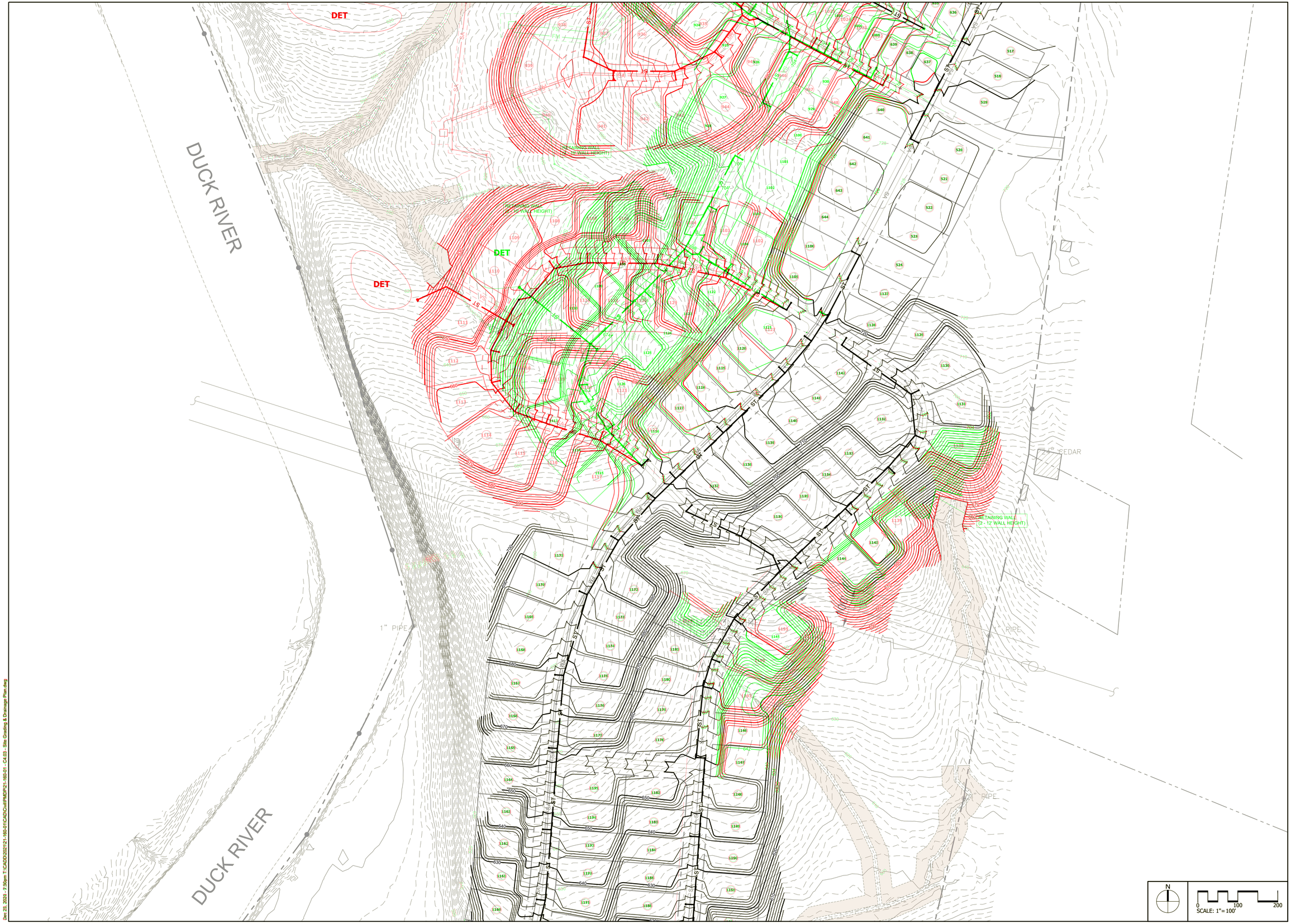
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## SITE GRADING & DRAINAGE PLAN

# C4.02

PROJECT NO.: 21-160-01




Dec 20, 2023 - 7:30pm T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.03 - Site Grading & Drainage Plan.dwg

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01-16-24

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INTERNAL SUBMITTAL
Review Submittal

ISSUE DATE: 12/18/2023

REVISION HISTORY:

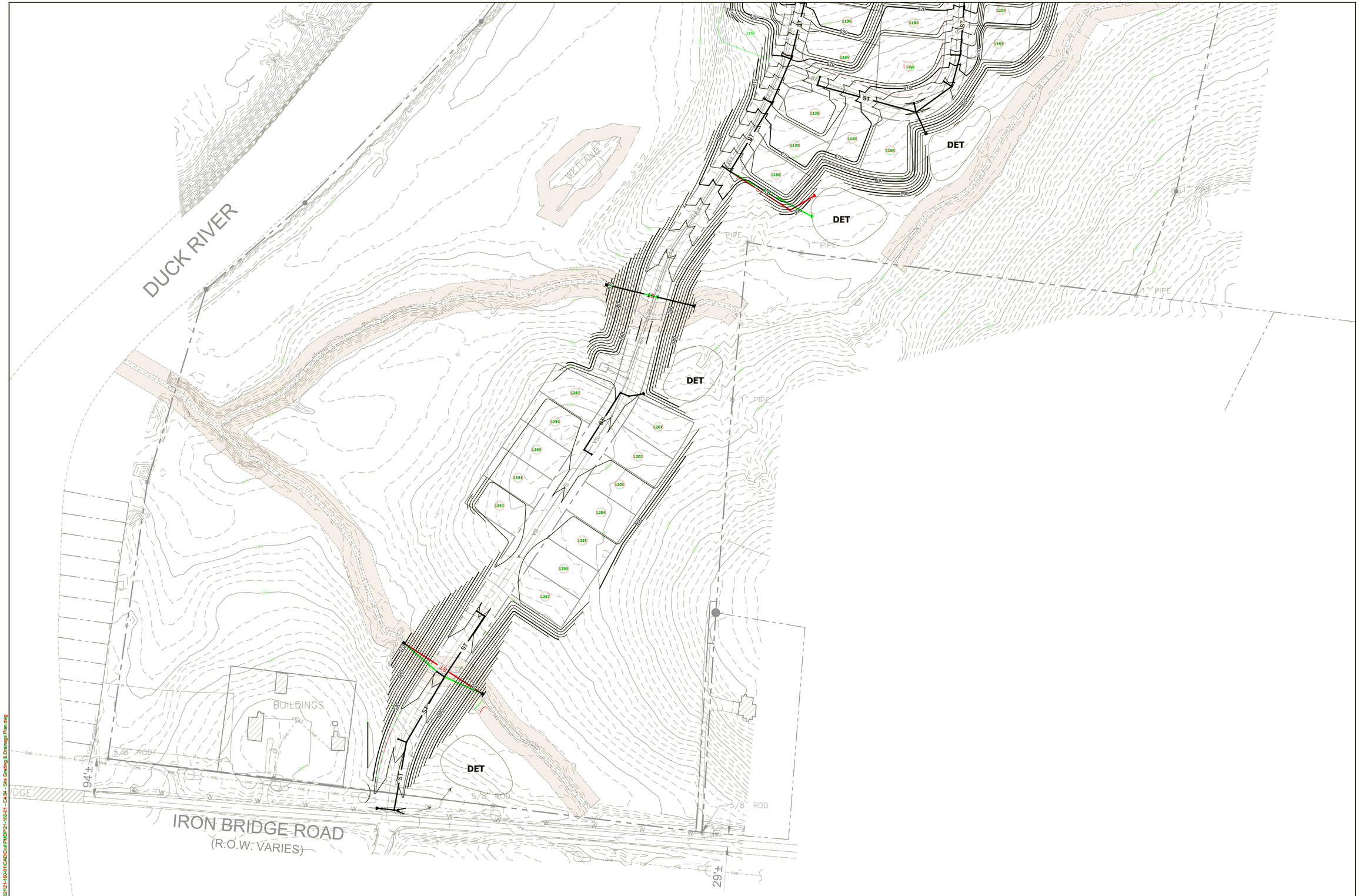
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## SITE GRADING & DRAINAGE PLAN

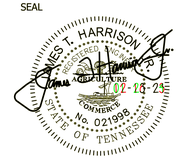
# C4.03

PROJECT NO.: 21-160-01




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# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
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## SITE GRADING & DRAINAGE PLAN

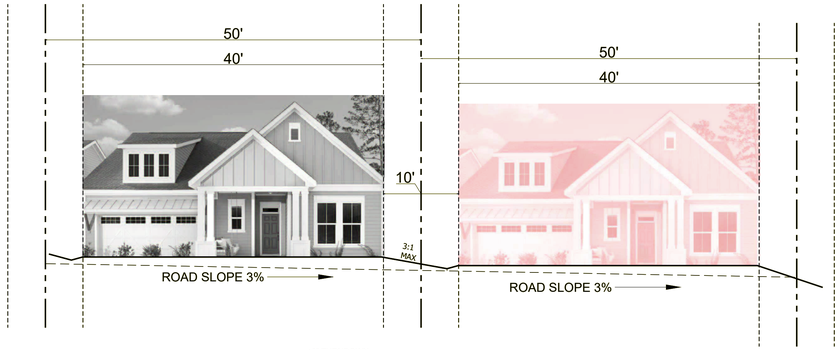
# C4.04

PROJECT NO.: 21-160-01

N

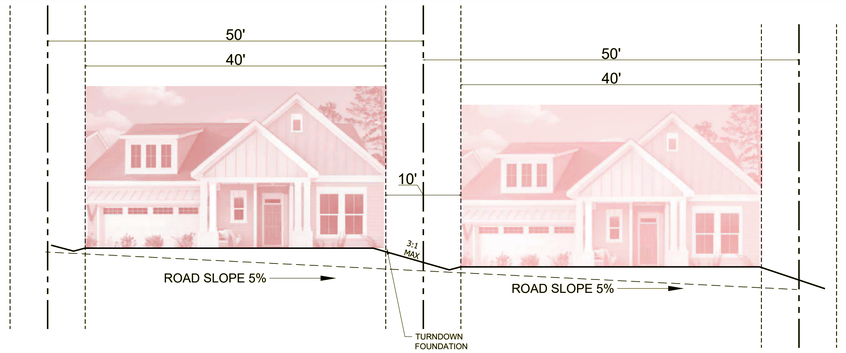
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SCALE: 1"= 100'

Date: 2/1, 2024 - 7:53pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.04 - Site Grading & Drainage Plan.dwg



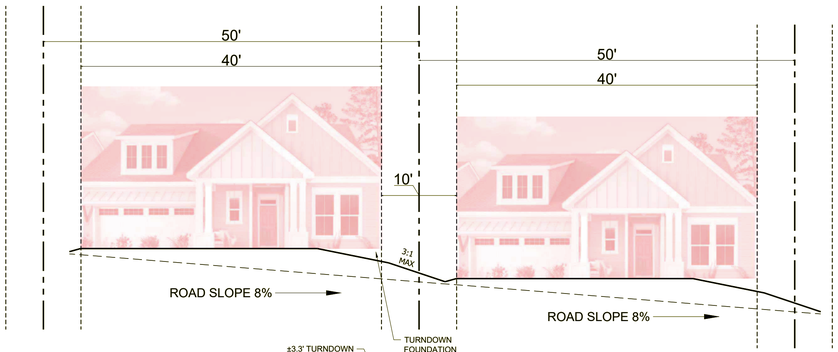

## LOT GRADING DIAGRAM - 3% ROAD SLOPE

NTS



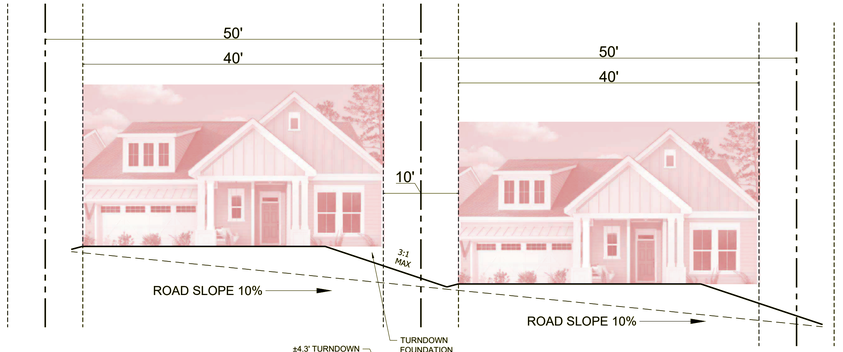

## LOT GRADING DIAGRAM - 5% ROAD SLOPE

NTS




## LOT GRADING DIAGRAM - 8% ROAD SLOPE

NTS




## LOT GRADING DIAGRAM - 10% ROAD SLOPE

NTS

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SEAL




# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INITIAL SUBMITTAL
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LOT DRAINAGE DIAGRAMS

C4.05

PROJECT NO.: 21-160-01

Dec 20, 2023 - 7:57pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.05 - Lot Drainage Diagrams.dwg

SEE SHEET C3.01

SEE SHEET C3.02

SEE SHEET C3.03

SEE SHEET C3.04

BEAR CREEK PIKE

U.S. 412 - SR99

DUCK RIVER

DUCK RIVER

DUCK RIVER

SCALE: 1" = 300'

# PLAN OF SERVICES

FOR ANNEXATION

*400 BEAR CREEK PIKE* PROPERTY

+/-400 ACRES,

*BEING*

TAX MAP 90 PARCEL 12.01

## A. Water

"The project is within Columbia Power and Water's service area. The availability of capacity to serve will be based on a determination by the Fire Marshal of fire flow requirements and the information submitted on the Water Service Availability Request application. Any off-site improvements detailed in the availability letter are the responsibility of the developer/owner. All public water system improvements are subject to the preparation and approval of detailed construction plans prepared in accordance with CPWS and Tennessee Department of Environment and Conservation requirements."

## B. Sewer

All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided. Note: Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.

## C. Police

The jurisdiction of the Columbia Police Department will be extended to the areas annexed immediately upon the effective date of annexation.

## D. Fire and Rescue

1. The City of Columbia Fire & Rescue provides an array of services to the citizens and visitors of the City of Columbia. These services include but may not be limited to non-emergency services such as fire prevention and codes enforcement, pre-incident planning, public education programs, smoke alarm check/replacement, emergency management preparedness, and emergency services such as fire suppression, heavy rescue, emergency medical first response, and hazardous materials response. The City of Columbia Fire Department currently holds an Insurance Service Organization (ISO) class 1 rating.

   Columbia Fire & Rescue strives to provide all services in a timely, courteous, and professional manner. Due to the nature of emergency services, we strive to arrive at the incident scene as quickly as possible but without posing additional dangers to the residents/visitors we meet while responding to your location.

**Infrastructure:**

The infrastructure put in place is like the foundation of your development. If the infrastructure is designed and constructed with the present needs and future plans in mind, your development will be prepared for the future.

**Water:**

Columbia Fire & Rescue requires that there be sufficient water provided through the municipal water system to meet the needed fire flow requirements for your facility. These flows are calculated by the Fire Marshal. These flows are based on many factors dealing with your buildings' construction type, fire load in the building, square footages, and etc. If you install fire sprinkler systems in your facilities, Columbia Fire & Rescue can drastically reduce fire flow requirements.

**Roadway and Bridges**: Columbia Fire & Rescue serves the residents and visitors of our jurisdiction by utilizing highly trained firefighters and modern fire apparatus. A minimum response to a structure fire in your development will be four fire apparatus. One of the fire apparatus that will respond to your development will be a ladder truck with a gross vehicle weight rating of approximately 80,000 pounds. Roadways and bridges must be designed and constructed not only with light vehicle traffic in mind but with the emergency service vehicles that will be servicing your development.

**Damage Free Property Access:** Columbia Fire & Rescue requires all gates automatic or manual that will be or may be locked to be equipped with Knox Rapid Entry system. You can research this product at www.knoxbox.com or

your gate vendor will be familiar with the product. Our department would also be happy to work with you to find what Knox Rapid Entry product is best suited for your application.

**Damage Free Home/Facility Access**: Currently, Columbia Fire & Rescue does not require residential occupancies to be equipped with the Knox Rapid Entry system. However, this product is a very wise investment for your future development. The Knox Rapid Entry System products allow homes to be secured but also allow the Columbia Fire & Rescue Department access to your property and/or homes without any delay or property damage. The system has an armored key lock safe recess mounted to the exterior of the homes with the key to the residence inside. Firefighters access the residence key during an emergency to gain entry into the home without causing any property damage. Again, our department would be happy to provide you with information and education on this program and its many positive attributes.

**Emergency Response to Your Location:** The proposed annex will be located on the property at 400 Bear Creek Pike in Columbia, Tennessee. This location is approximately 1.4 miles from Columbia Fire Station #3 located at 705 Tom Sharp Road, 3.3 miles from Fire Station #1 located at 1000 South Garden in downtown Columbia, and 7.4 miles from Fire Station #5 located at 2633 Nashville Hwy. These distances are used to calculate an estimated response time to your development for the different levels of emergency response that may be needed at your facilities.

**Medical Emergency Response:** Columbia Fire & Rescue normally responds a minimum of one fire apparatus from Station #3 to service your location for a medical emergency. From the time you dial 911 until the fire department will arrive at your location will be within 3.5 minutes. Should your property experience a mass casualty incident where additional fire apparatus/firefighters would need to respond, then Fire Station #1 could send an additional unit and arrive on-scene 4.5 minutes of your 911 call.

**Fire Incident Response:** Columbia Fire & Rescue recommends a multi-faceted fire suppression approach. First, future homes should be constructed to meet or exceed all applicable fire and life safety codes. Secondly, even if not required by building, fire, or life safety codes, we encourage the installation and use of fire sprinkles in future homes. Columbia Fire & Rescue's normal fire incident response to a single family residential development is three fire apparatus with a minimum 15 firefighters and 1 Chief Officer. Response times will be similar to the times estimated in the emergency medical response section. Your first fire apparatus should be on-scene within approximately 3.5 minutes, the second fire apparatus should be on-scene within 4.5 minutes, and the third/fourth apparatus should be on-scene within 4.5 minutes. Due to OSHA standards that require at least four firefighters to arrive on-scene prior to initiating an interior fire attack

and Columbia Fire & Rescue's minimum staffing policy, it could take the 4.5 minutes to get the minimum number of firefighters to the scene to begin an interior fire attack.

In summary, the members of the Columbia Fire & Rescue consider it an honor to serve the residents and visitors in our community each and every day. When an emergency occurs, time is our worst enemy. Columbia firefighters train to reduce every second while not posing any additional undue risk to firefighters and/or the public when responding to or working at an emergency incident. The times estimated in the referenced examples are a combination of averages and estimations. Our department has very little data to support incident responses to your location. The time estimations are based on the fire companies being at their regular station, time it takes for Maury 911 to process a 911 call, the time it takes for Columbia firefighters to board the apparatus and leave the station, and the travel time from the station to your location is an estimate based on road miles, probable traffic conditions, and road conditions. You can see by the examples referenced above that it will take time for Columbia Fire & Rescue to receive your call for help and then respond to your location. The roadways have considerable driveway/cross street connections, hills, curves, and reduced speed zones that contribute to a long response time for fire apparatus to arrive.

## E. Development Services

1. The planning and zoning jurisdiction of the City will extend to the annexed areas immediately upon the effective date of the annexation.

2. The property shall be zoned PUD-R (Planned Unit Development – Residential District) upon the effective date of the annexation.

3. The code administration jurisdiction of the City will extend to the annexed areas immediately upon the effective date of the annexation.

4. Upon the effective date of annexation, all development will be required to abide by the Columbia Zoning Ordinance.

## F. Streets

1. Upon acceptance by City Council and all warranties have expired; all streets and drainage systems will be maintained by Public Works. Service will include street sweeping, catch basin cleaning, street repair and snow removal drainage maintenance, and sidewalk repair.

2. Upon acceptance by City Council, all approved street signs will be maintained by Public Works.

## G. Parks and Recreation

Residents of the annexed areas may use all existing recreational facilities, parks, etc., on the effective date of annexation. The same standards and policies now used in the present City will be followed in expanding the recreational program and facilities in the enlarged City.

## H. Refuse Collection

Single family homes will receive City of Columbia trashcan service. For 189 townhomes, we recommend five or six 8-yard dumpsters with 3x/week collection if utilizing City of Columbia sanitation services. Private sanitation services, including dumpsters, compactors, individual receptacles or valet service, may be utilized. Individual trash receptacles will not be provided by the City of Columbia to townhome residents.

Single Family homes will receive the following City of Columbia sanitation services: Residential customers will be issued one 96-gallon garbage receptacle with the option to purchase up to two additional garbage receptacles. The Sanitation Department will provide weekly curbside garbage collection. Bi-weekly curbside recycling will be offered on a subscription basis. Brush collection will be provided on a bi-weekly basis. Residents are allotted three free bulk item pickups per year.

Townhomes will receive the following services: The Sanitation Department will provide dumpster collection. For the 189 units, we recommend five (5) or six (6) 8-yard dumpsters serviced 3 times a week. Brush collection will be provided on a bi-weekly basis. Residents are allotted three free bulk item pickups per year. Private sanitation services, including dumpsters, compactors, individual receptacles or valet service, a are an option for townhomes. Individual receptacles will not be provided by the City of Columbia to multi-family apartment or townhomes.

## I. Power

Columbia Power System has an existing power line near the proposed development. We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction.

## J. Schools

This property falls under the jurisdiction of Maury County Public School System.

The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.

CPWS

February 5, 2024
Mr. Joshua Gibbs
Kolter Land
14025 Riveredge Drive, Suite 175
Tampa, FL 33637
***Sent via email: jgibbs@kolter.com***
**RE: Water Availability Letter**
**Big Bear Bluffs Single Family**
**400 Bear Creek Pike**
**Tax Map 90, Parcel 12.01**
***Columbia, Maury County, TN***

Dear Mr. Gibbs:

Columbia Power and Water Systems ("the Utility"/CPWS) is a municipal corporation authorized to provide water services in accordance with State law. CPWS has adopted rules, regulations, and standard operation procedures, prescribing the conditions under which CPWS will furnish water service. In addition, certain State laws delegate authority to the Tennessee Department of Environment and Conservation, various Planning Commissions and other authorities in Cities and Counties. These Cities and Counties have also adopted rules and regulations. Subject to the payment of all charges and fees imposed by CPWS and the approval of any and all required governmental agencies, water service will be made available on a first-come, first-served basis, subject to availability of all CPWS furnished equipment and materials appropriate for the development and provided the applicant complies with all rules and regulations of CPWS and conditions set out herein.

As submitted by the applicant, the proposed development includes up to 860 single-family residential units in townhome and detached configurations, an approximately 4,600 square-foot amenity building with pool, a daycare, and irrigation for common areas. CPWS has evaluated the projected water demands for the proposed development and is able to meet a fire-flow capacity of 1,000 gpm at 20 psi for all proposed lots (as submitted by the applicant in concept plan dated 9/29/2023) while maintaining the existing level of service and pressures in this portion of the distribution system. CPWS can provide water for the proposed development according to the following requirements:

- Water availability for the proposed 860 units is contingent upon the schedule of development as provided by the applicant. Any acceleration of the schedule (start, finish, or increased unit count per phase) will require re-evaluation of water availability. Acceptance of an accelerated schedule is not guaranteed. The schedule as provided by the applicant is as follows:

| Project Phase | Approximate Units | Sitework Started | Vertical Construction Completion | Notes |
|---|---|---|---|---|
| Phase 1 | 129 | Q1 2026 | Q2 2028 | |
| Phase 2 | 142 | Q2 2028 | Q4 2029 | Includes amenity building |
| Phase 3 | 109 | Q3 2029 | Q1 2031 | Includes daycare |
| Phase 4 | 135 | Q4 2030 | Q2 2032 | |
| Phase 5 | 112 | Q1 2032 | Q2 2033 | |
| Phase 6 | 122 | Q2 2033 | Q1 2034 | |
| Phase 7 | 94 | Q1 2030 | Q2 2033 | |

- This Water Availability Letter represents water availability for the entire development, but a new water service application and fee is required for subsequent phases. Water service is not guaranteed until the relevant impact fees are paid for each meter to be installed.
- A new 12-inch water main will be required to be installed by the Applicant from Bear Creek Pike, south through the spine road of the proposed development to Iron Bridge Road. From there a 16-inch main will be installed west to Tom J Hitch Parkway. From the intersection of Tom J Hitch Parkway and Iron Bridge Road, a new 16-inch water main will be installed north to the existing 12-inch CPWS water main located just south of the Duck River bridge on Tom J Hitch, as well as south to the existing 12-main near 1451 Tom J Hitch Parkway. The attached figure provides a visual representation of these requirements.
- A permanent, exclusive 20-foot water main easement will be provided by the developer for the new 16-inch and 12-inch water mains. Within the development, the easement may overlap the right-of-way of the spine road.
- Lane additions or other required improvements at Bear Creek Pike or other roadways may necessitate additional construction to relocate any impacted existing water mains.
- All off-site improvements must be constructed, tested per CPWS standards and deeded over to CPWS prior to connection of any domestic water meter used for full-time residence.
- The remainder of the water mains in the development shall be a minimum of 8-inch diameter with looped connections throughout the development. Final design to accommodate fire protection loads may necessitate an increase in some water main sizes in the development.

All of the above requirements are to be constructed and paid for by the Applicant and deeded over to CPWS once complete up to and including the meter. No construction of water infrastructure shall be initiated until final construction plans have been approved by TDEC and a water service agreement with CPWS is fully executed.

Once you have received this Water Availability Letter, next steps in the process to obtain water service from CPWS are as follows:

- Present the attached fireflow analysis figure for coordination and approval of development from the Columbia Fire Marshall.
- Prior to expiration of this water letter, remit to CPWS the new water service fees for Phase 1 of the development as follows:

| | |
|---|---|
| New Water Service Fee: $1,500 + $370 per SFU (129 SFUs) | $49,230.00 |

- Provide site base CAD files in DWG format, including roads, lot lines, existing and proposed contours, and other existing and proposed utilities, for use in development of water construction drawings. *This should include survey for the corridor of any required offsite improvements.*
- CPWS will then develop water construction drawings and submit them to TDEC for approval. Upon approval by TDEC and payment of Phase 1 meter and impact fees by the applicant, applicant may then schedule a pre-construction meeting with CPWS. Pre-construction meeting will not be scheduled until fees are paid in full or surety is provided in lieu of full payment. Final meter and impact fees are subject to change based on final design and meter size determination. Meter fees are subject to change based on market costs at time of purchase. Meters will not be set until meter and impact fees are paid. Meter and impact fees for Phase 1 are as follows:

| | |
|---|---|
| Meter Fee: $540 per 3/4" meter (129 meters) | $69,660.00 |
| Impact Fee: $4,500 per 3/4" meter (129 meters) | $580,500.00 |
| **Total Meter and Impact Fees Due =** | **$650,160.00** |

- After the pre-construction meeting, CPWS will then issue a formal notice to proceed. No construction of CPWS infrastructure may take place prior to the pre-construction meeting.
- Applicant is then required to construct all public water infrastructure per CPWS standard specifications and provide CPWS personnel unregulated access to the site to inspect the construction of the water infrastructure.

If you have any questions, please feel free to contact me at 423-774-0349 or eric.king@inflodesign.com. This letter is valid for one-hundred twenty (120) calendar days from the date of this letter.

Sincerely,



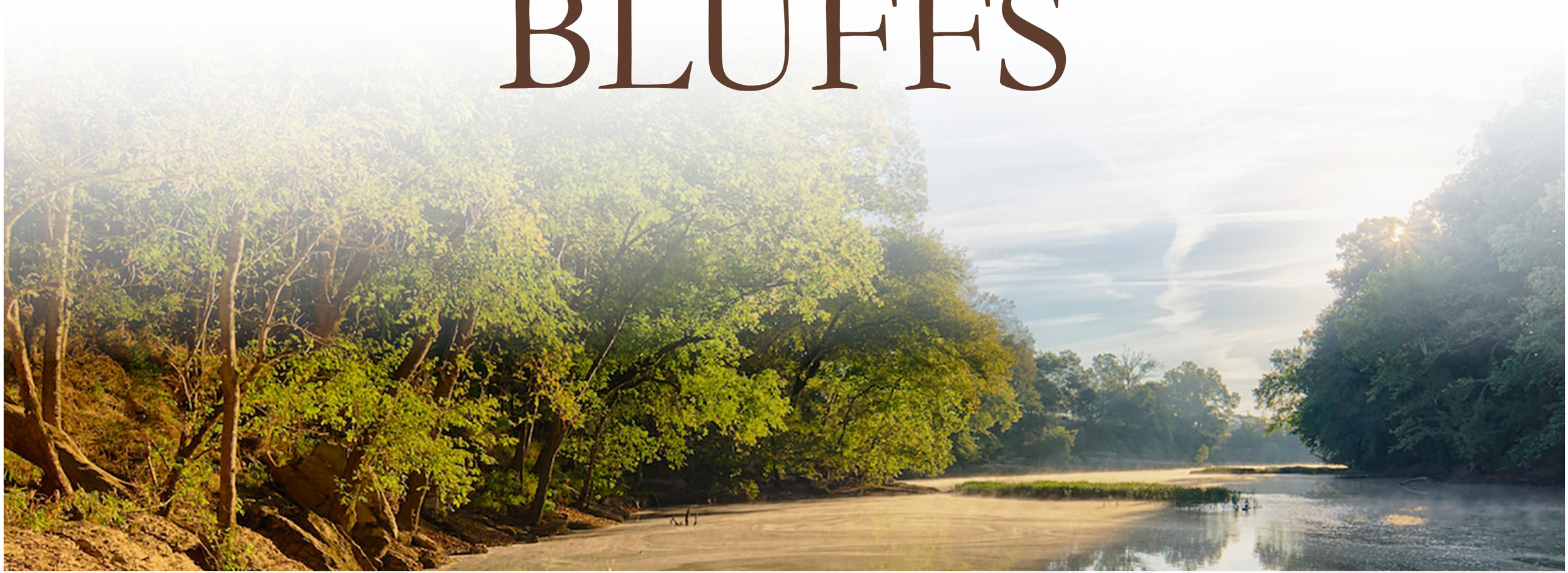
Eric King, P.E.
Inflo Design Group, LLC
on behalf of Columbia Power and Water Systems

cc: Jonathan Hardin, CPWS
File 22-092

# COLUMBIA

*City of Columbia, Tennessee*

# BLUFFS



## Architectural Review Team Submittal

### w/Corrected Comments

January 23, 2024




# COLUMBIA BLUFFS ARCHITECTURE

**DEVELOPER**
JIM HARVEY
KOLTER LAND
14025 RIVEREDGE DRIVE, SUITE 175
TAMPA, FL 33637

**ENGINEER**
JIM HARRISON
CIVIL SITE DESIGN GROUP
2305 KLINE AVENUE, SUITE 300
NASHVILLE, TN 37211

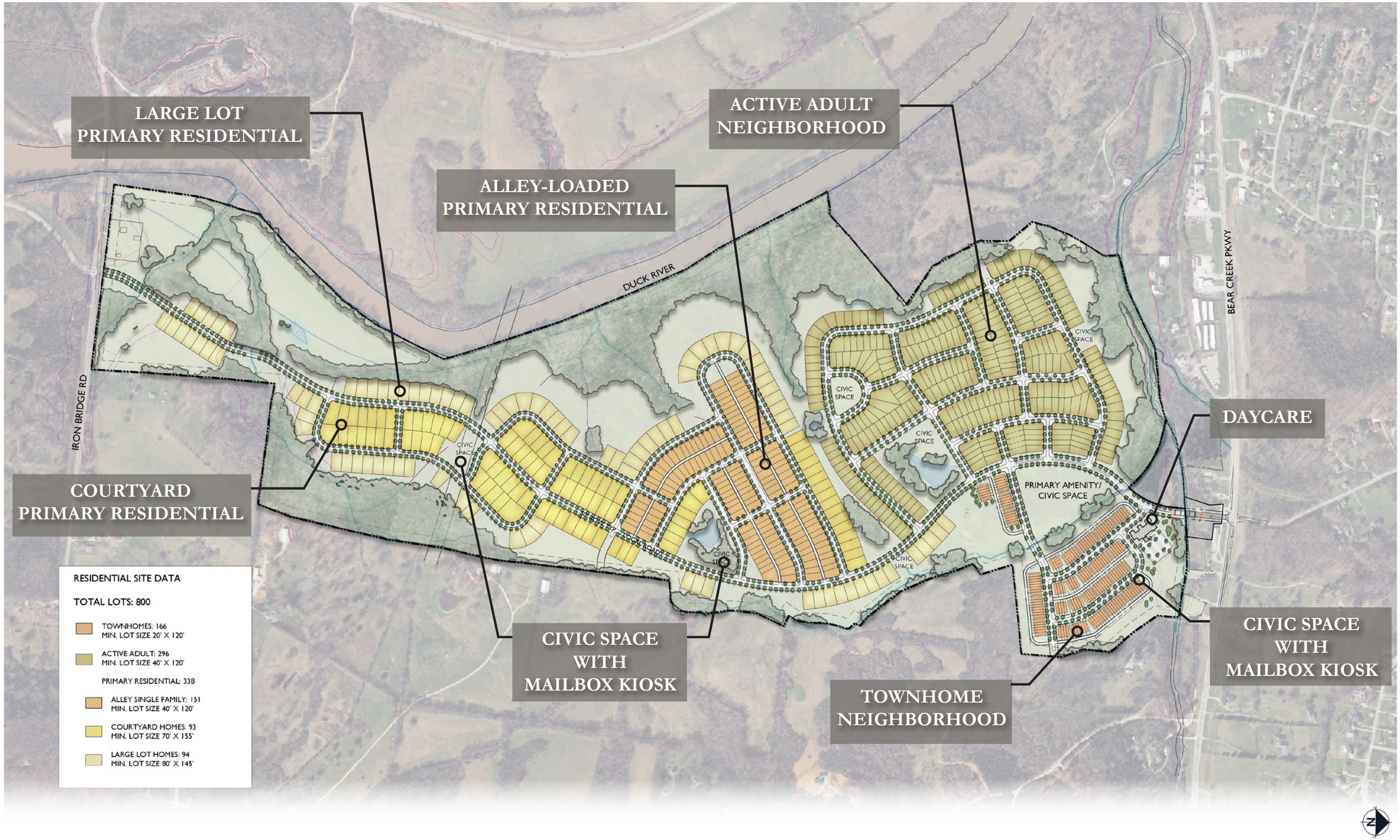
**LANDSCAPE ARCHITECT**
GREG GAMBLE
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37069

**TABLE OF CONTENTS:**

2. DEVELOPMENT TEAM
3. DEVELOPMENT PLAN
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8. COURTYARD HOMES
10. LARGE LOT HOMES
12. ALLEY-LOADED PRIMARY RESIDENTIAL
14. TOWNHOMES
16. DAYCARE
17. MAIN AMENITY ARCHITECTURE
18. CIVIC SPACE ARCHITECTURE

**SUBMITTED: 10/16/2023**
**REVISED: 12/18/2023**
**APPROVED BY ARCHITECTURAL REVIEW TEAM AT 01/09/2024 MEETING**
**ARCHITECTURAL REVIEW TEAM COMMENTS: 01/09/2024**
**REVISED PER APPROVAL COMMENTS: 01/23/2024**

# DEVELOPMENT TEAM




# MASTER DEVELOPMENT PLAN

| | Single Family & Townhomes | Active Adult Single Family |
|---|---|---|
| **Building Height and Massing** | • Primarily a mix of 1-story and 2-story, with a maximum of 3-story<br>• Attached garages encouraged | |
| **Building Separation** | • Single Family: 10' minimum<br>• Townhomes: 15' minimum | • Single Family: 10' minimum |
| **Street Facades** | • Maximize frontage and orientation onto residential streets<br>• Porches should orient to residential streets<br>• Entries visible from residential streets | • Maximize frontage and orientation onto residential streets<br>• Porches should orient to residential streets<br>• Entries visible from residential streets |
| **Building Entries** | • Porches minimum 6' deep and 6' wide | |
| **Roof Forms** | • Roofs may vary in style, but should be designed to create unity to the full community<br>• All roof forms to be reviewed and approved by the master developer | • Roofs may vary in style, but should be designed to create unity to the full community<br>• All roof forms to be reviewed and approved by the master developer |
| **Roof Detail** | • All roofs should create eaves for shadow and rain protection<br>• Where used, gutters should be expressed as positive elements adding desirable detail | • All roofs should create eaves for shadow and rain protection<br>• Where used, gutters should be expressed as positive elements adding desirable detail |
| **Parking** | • Garage-parked<br>• Each garage parking space shall be a minimum of 10' x 20'<br>• Garage doors with windows required | • Garage-parked<br>• Each garage parking space shall be a minimum of 10' x 20'<br>• Garage doors should have windows |

## ARCHITECTURAL GUIDELINE NOTE:

The architectural guidelines and conceptual elevations are intended to convey the architectural quality and design intent. Final elevations and color schemes will be brought back to be approved by the ADRT at final PUD-R Development Plan.

## COMPLIANCE NOTE:

The architectural guidelines as shown in this pattern book represent compliance with the standards set by the Zoning Ordinance except in areas requesting a modification of standards which are requeted to be approved through the PUD-R Preliminary Development Plan process.

**Architectural Building Materials**

In keeping with the upscale project image, the materials used for structures at Columbia Bluffs should be appropriate for the individual building design concepts and shall be consistent with the project theme. Materials shall be selected and used with consideration to building scale, color scheme, mass, and the surrounding environment.

**Roofing Materials**

Permitted:
- Dimensional Asphalt Shingles
- Laminated Shingles
- Copper Finishes
- Standing Seam Metal Roofs

Not Permitted:
- Rolled Asphalt
- Asbestos Cement Shingles
- Brightly Colored Metal Roofing

**Exterior Siding Materials**

Permitted:
- Brick
- Stone
- Natural Wood Accents
- Stucco
- Hardie Plank/Panels
- Cementitious Fiber Siding/Cladding

Not Permitted:
- All Plastics (including vinyl)
- Plywood
- Exposed Concrete Block

**Awnings**

Permitted:
High Quality Heavy Canvas
Illuminated Awnings
Metal Awnings

**Colors**

Permitted:
- Muted
- Natural
- Earth Tones

Conditional Permitted:
- Bright
- Primary Colors (per review and approval of the Master Developer)

Building Requirements:
- Maximum Height (Stories) 3 stories

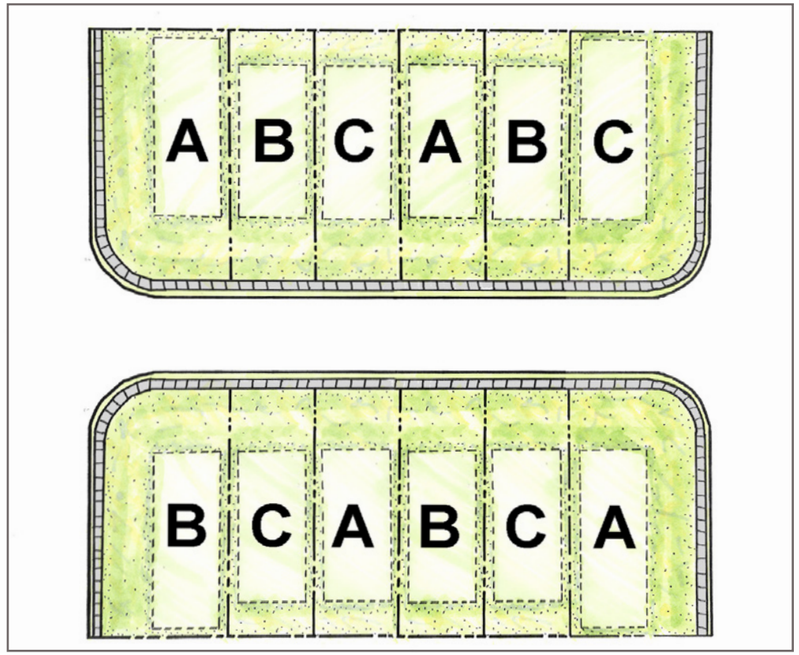








IMAGE OF HOMES REPRESENT AN EXAMPLE OF FACADE VARIETY ALONG SAME STREET. FINAL SELECTION OF MATERIALS AND STYLES TO BE APPROVED AT FMDP.




In order to avoid monotony of architectural design, no approval shall be issued for the construction of a dwelling if it is substantially like any proposed neighboring building for which on approval has already been issued or is being concurrently considered.

- A building shall be considered neighboring if it fronts on the same street as the building under construction or an intersecting street; no building elevation may be repeated across from, adjacent to, or diagonal to a similar building elevation. There shall be a minimum of a 2-lot gap between each similar building elevation (see diagram to above in which A, B, and C represent different elevation styles).
- Vary garage door locations to the front facade of the house when possible. Avoid continuous runs of garages in the same unbroken plain.
- Vary roof orientation, ridge lines, and eave heights between each lot when possible.
- Building facade colors and design elements should vary between each lot with a variation of massing and architectural details on each block.
- Landscaping should vary in composition from building to building when possible.

Final determination of the appropriate elevation pattern and variety is subject to review by the Architectural Design Review Team.

# FACADE VARIETY







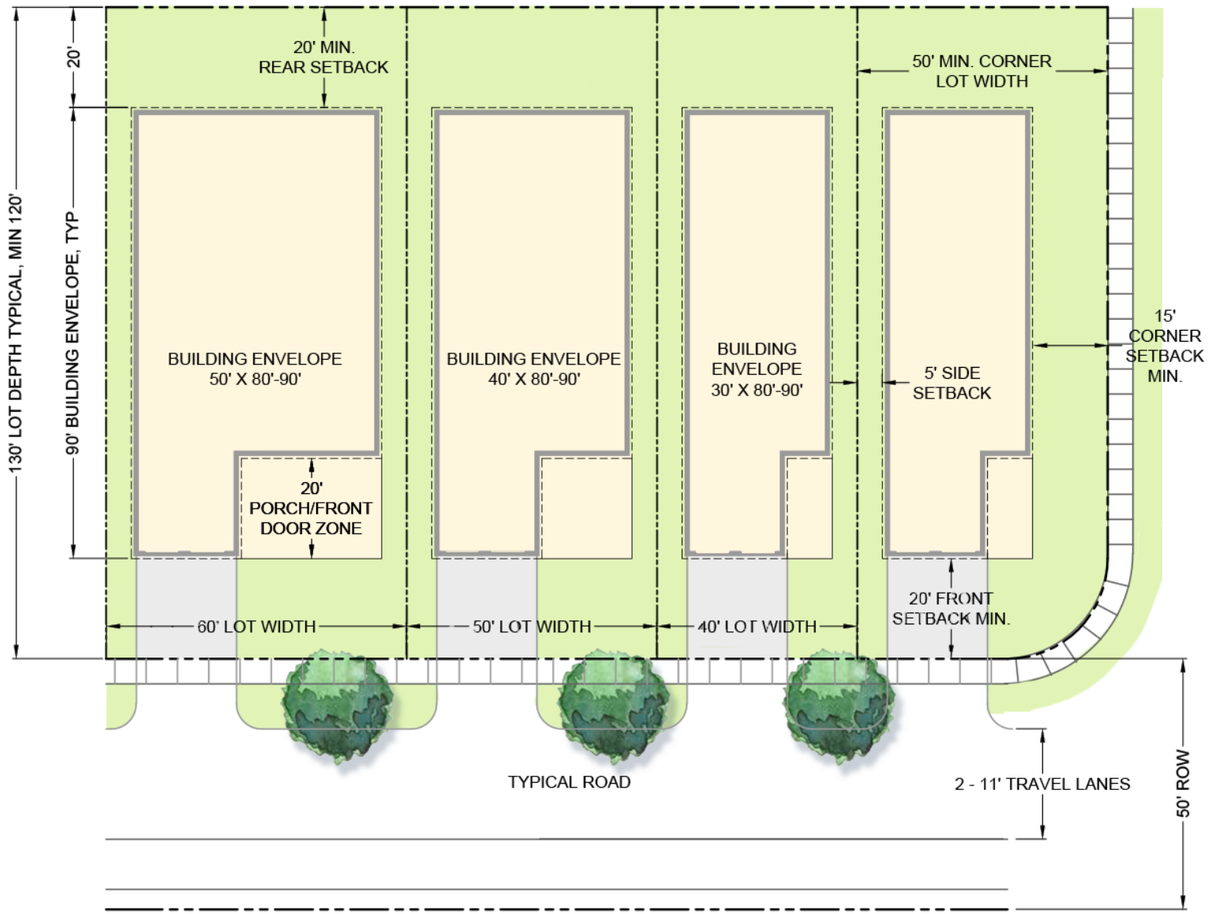


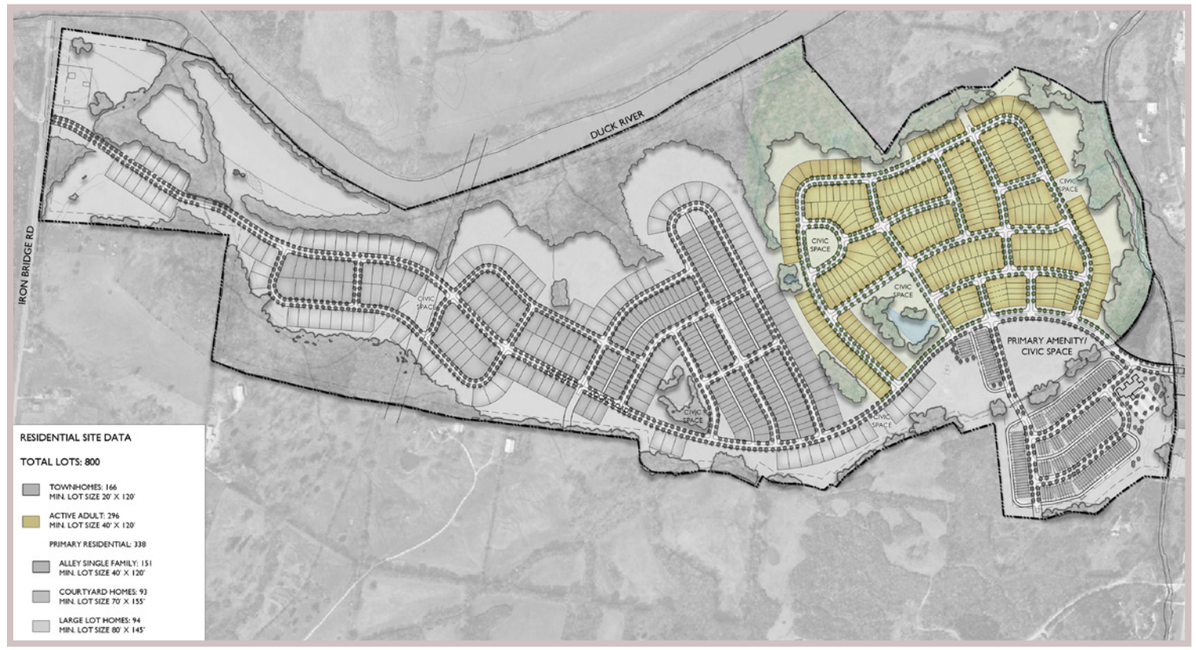
ACTIVE ADULT SINGLE FAMILY:

1. CODE DEVIATION: SIDE YARD SETBACK OF 5 FEET
2. CODE DEVIATION: FINISHED FLOOR LEVEL MAY MATCH THE FINISHED GRADE ELEVATION
3. CODE DEVIATION: GARAGE DOORS ARE LOCATED IN THE SECOND LAYER.
4. CODE DEVIATION: GARAGE DOORS ARE A MINIMUM OF 16 FEET IN WIDTH, AND A MAXIMUM OF 67% OF THE TOTAL GARAGE PLUS THE FAÇADE WIDTH.
5. CODE DEVIATION: FAÇADE WINDOW SILL HEIGHT, 24 INCHES MINIMUM ABOVE AVERAGE GRADE AT FAÇADE
6. CODE DEVIATION: 18 FOOT MAXIMUM WIDTH DRIVEWAY IN THE 1ST LAYER
7. ALL HOMES TO HAVE BRICK OR STONE SKIRTING AROUND THE FOUNDATION. PRIMARY MATERIALS MUST CONTINUE THROUGH THE 2ND LAYER.
8. BRICK HOMES MUST HAVE ROWLOCK TO ESTABLISH A BASE / FOUNDATION FOR THE HOME.
9. PORCH COLUMNS TO HAVE BRICK OR STONE FOUNDATIONS. TOP OF MASONRY COLUMN TO ALIGN WITH BRICK OR STONE ROWLOCK AT THE FOUNDATION OF THE HOME.
10. EACH GARAGE DOOR MUST HAVE ORNAMENTAL LIGHTING FIXTURE ABOVE IT.

# ACTIVE ADULT SINGLE FAMILY

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL







**LOT RANGE: 40'-60'**
**296 HOMES**

BUILDING SETBACKS:
- FRONT: 20'
- REAR: 20'
- SIDE: 5'
- CORNER: 15'

ALL LOTS TO HAVE FRONT LOADED GARAGES
- MINIMUM 20' OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.

SITE SETBACKS ARE DUE TO ALL INCLUSIVE MAINTENANCE APPLICATION GOVERNED BY THE PROPOSED HOA, TO BE DEED RESTRICTED.

# ACTIVE ADULT SINGLE FAMILY











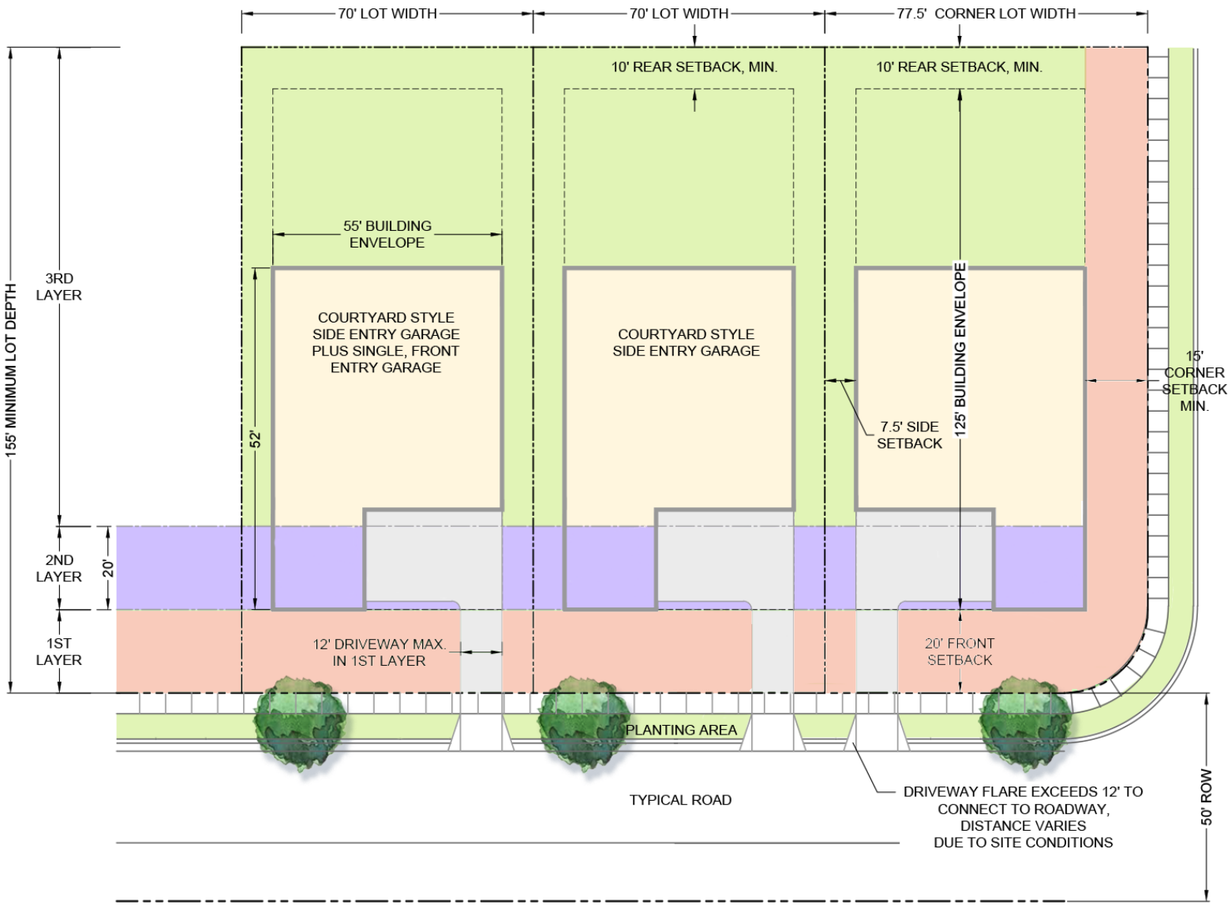


## COURTYARD HOMES:

1. CODE DEVIATION: SIDE YARD SETBACK OF 7.5 FEET
2. CODE DEVIATION: FAÇADE WINDOW SILL HEIGHT. 36 INCHES MINIMUM ABOVE AVERAGE GRADE AT FAÇADE.
3. CODE DEVIATION: GARAGE LOCATED IN 2ND LAYER
4. CODE DEVIATION: GARAGE DOOR MUST BE PERPENDICULAR TO THE RIGHT OF WAY, MUST HAVE WINDOWS, AND MAY BE UP TO 16 FEET IN WIDTH.
5. CODE DEVIATION: 12 FOOT MAXIMUM WIDTH DRIVEWAY IN THE 1ST LAYER
6. ALL GARAGE DOORS TO HAVE WINDOWS
7. ALL HOMES TO HAVE BRICK OR STONE FOUNDATION. PRIMARY MATERIALS MUST CONTINUE THROUGH THE 2ND LAYER.
8. BRICK HOMES MUST HAVE ROWLOCK TO ESTABLISH A BASE / FOUNDATION FOR THE HOME.
9. PORCH COLUMNS TO HAVE BRICK OR STONE FOUNDATIONS. TOP OF MASONRY COLUMN TO ALIGN WITH BRICK OR STONE ROWLOCK AT THE FOUNDATION OF THE HOME. CLADDING MAY BE EXCLUDED IF COLUMNS APPEAR AS 6” X 6” CEDAR COLUMNS FROM ROOF LINE TO PORCH.
10. EACH GARAGE DOOR MUST HAVE ORNAMENTAL LIGHTING FIXTURE ABOVE IT.

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL

# COURTYARD HOMES







## LOT: 70' MINIMUM
## 93 HOMES

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 20' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

ALL LOTS TO HAVE SIDE LOADED GARAGES WITH THE OPTION OF A SINGLE, FRONT-LOADED GARAGE IN THE 3RD LAYER.

- MINIMUM 20' LENGTH OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.

# COURTYARD HOMES











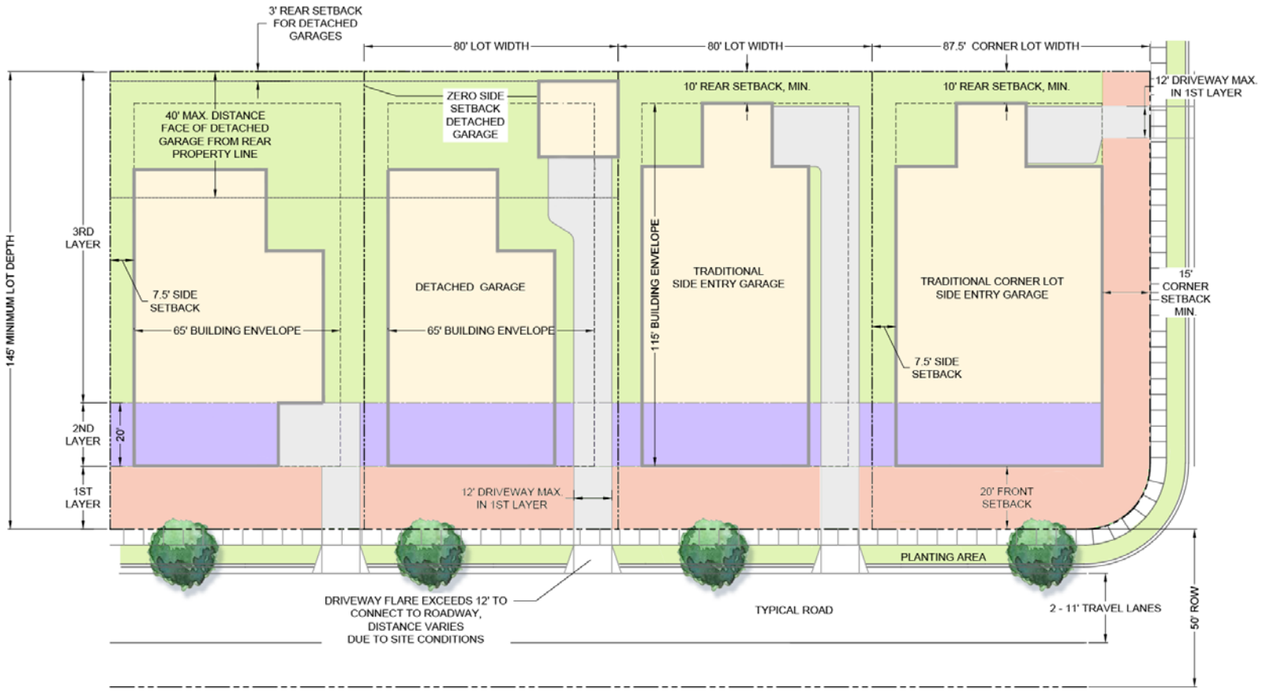


## LARGE LOT HOMES:

1. CODE DEVIATION: SIDE YARD SETBACK OF 7.5 FEET
2. CODE DEVIATION: GARAGE DOOR MUST BE PERPENDICULAR TO THE RIGHT OF WAY, MUST HAVE WINDOWS, AND MAY BE UP TO 16 FEET IN WIDTH.
3. CODE DEVIATION: 12 FOOT MAXIMUM WIDTH DRIVEWAY IN THE 1ST LAYER
4. BRICK HOMES MUST HAVE ROWLOCK TO ESTABLISH A BASE / FOUNDATION FOR THE HOME.

# LARGE LOT HOMES

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL







## LOTS: 80' MINIMUM
## 94 HOMES

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 20' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

LOTS WILL HAVE A MIX OF GARAGE LOCATIONS, ATTACHED AND DETACHED
- MINIMUM 20' OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.

# LARGE LOT HOMES











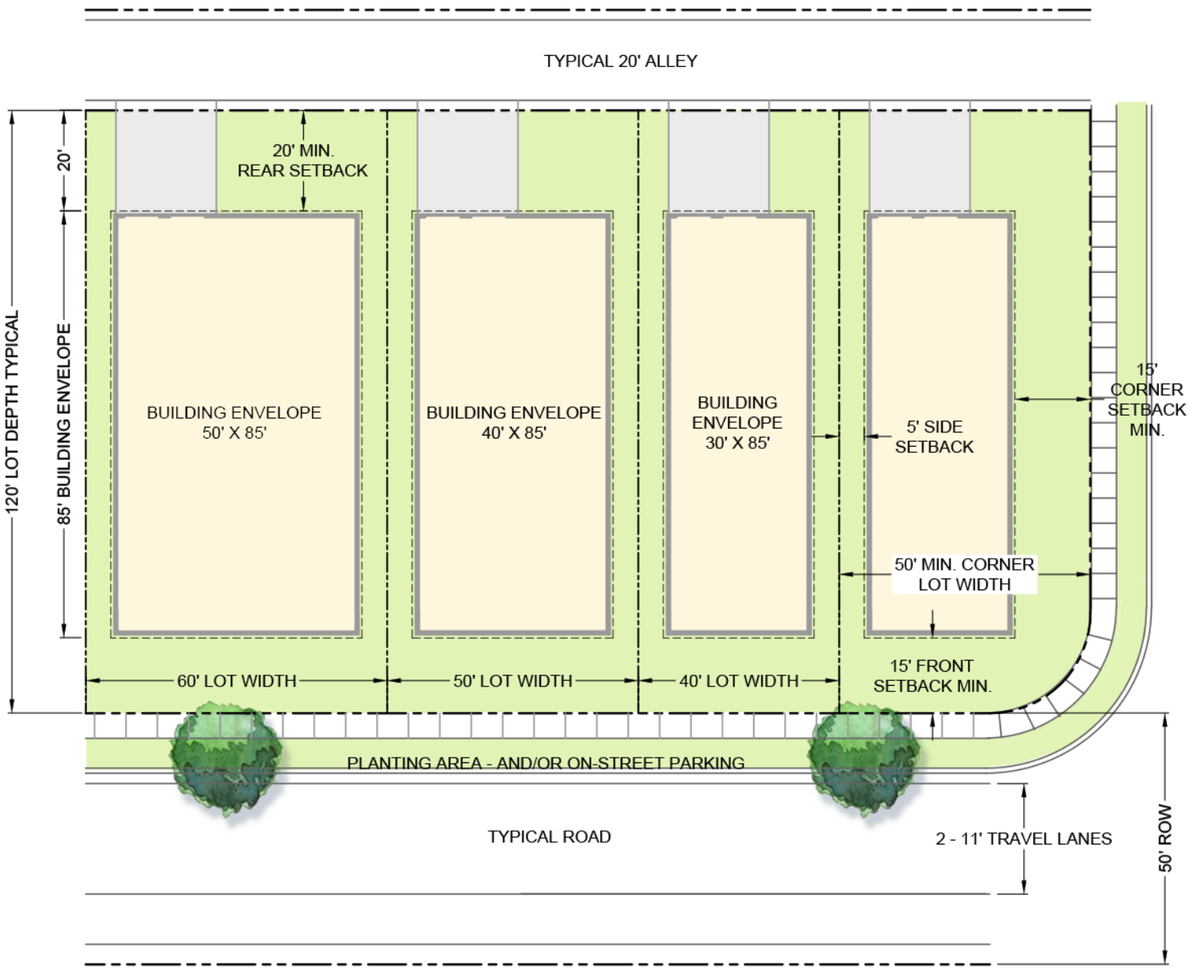


SINGLE-FAMILY ALLEY LOADED:

1. CODE DEVIATION: SIDE YARD SETBACK OF 5 FEET.
2. BRICK HOMES MUST HAVE ROWLOCK TO ESTABLISH A BASE/FOUNDATION FOR THE HOME.

# SINGLE-FAMILY ALLEY LOADED

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL







**LOT RANGE:** 40’-60’
**151 HOMES**

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 15’ |
| REAR: | 20’ |
| SIDE: | 5’ |
| CORNER: | 15’ |

ALL LOTS TO HAVE REAR LOADED GARAGES
- MINIMUM 20’ LENGTH OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10’ X 20’.

# SINGLE-FAMILY ALLEY LOADED





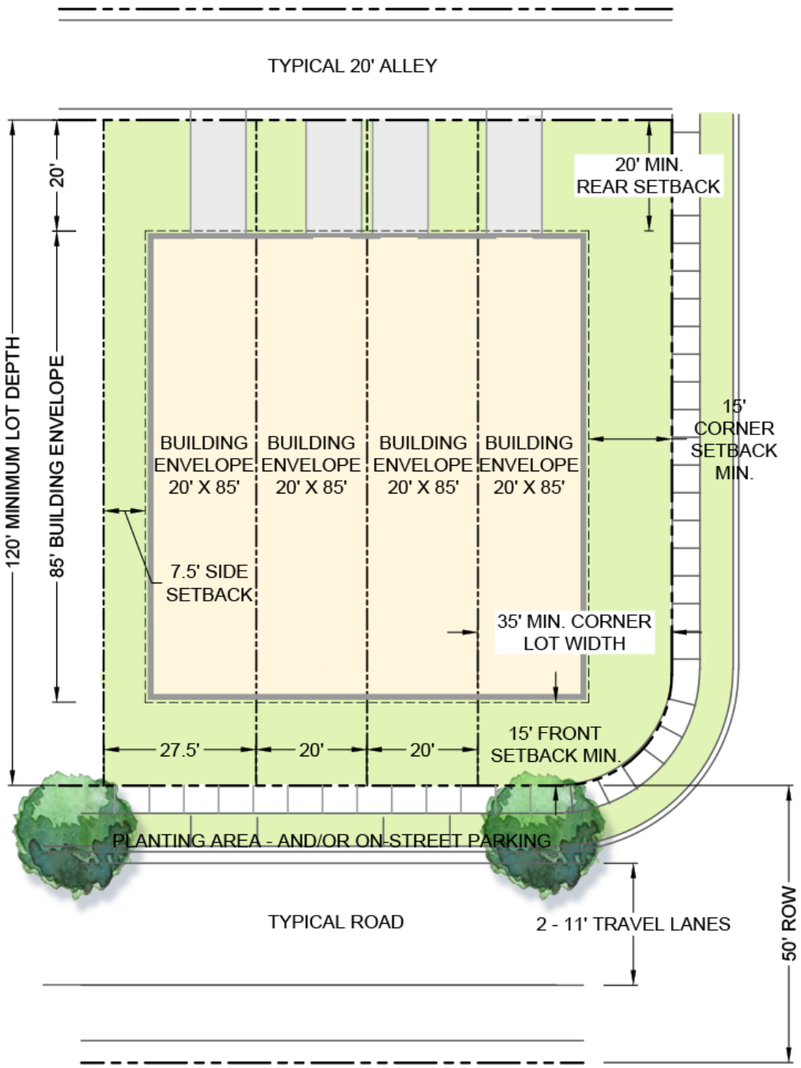


TOWNHOMES:

1. CODE DEVIATION: SIDE YARD SETBACK OF 7.5 FEET.
2. ALL SHUTTERS SHOWN ARE FUNCTIONAL WITH SHUTTER DOGS
3. BRICK HOMES MUST HAVE ROWLOCK TO ESTABLISH A BASE / FOUNDATION FOR THE HOME.
4. PORCH COLUMNS TO HAVE BRICK OR STONE FOUNDATIONS. TOP OF MASONRY COLUMN TO ALIGN WITH BRICK OR STONE ROWLOCK AT THE FOUNDATION OF THE HOME. CLADDING MAY BE EXCLUDED IF COLUMNS APPEAR AS 6" X 6" CEDAR COLUMNS FROM ROOF LINE TO PORCH.

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL

# TOWNHOMES







## LOTS: 20' MINIMUM
## 166 HOMES

BUILDING SETBACKS:

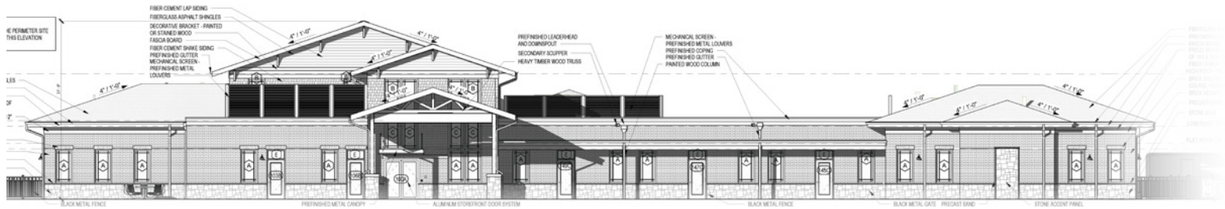
| | |
|---|---|
| FRONT: | 15' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

ALL LOTS TO HAVE REAR LOADED GARAGES
- MINIMUM 20' LENGTH OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.TOWNHOME BUILDINGS

WILL CONSIST OF 4, 6, 7, AND 8 UNIT BUILDINGS.

# TOWNHOMES

# DAYCARE ELEVATIONS




WEST ELEVATION




EAST ELEVATION




SOUTH ELEVATION




NORTH ELEVATION

ELEVATIONS ARE CONCEPTUAL.
FINAL APPROVALS TO BE DETERMINED WITH FMDP.




## DAYCARE

CHILD DAYCARE TO BE APPROXIMATELY 12,000-14,000 SQFT., AND WILL SERVE AS A BENEFIT NOT ONLY TO THE LOCAL NEIGHBORHOOD BUT TO THE COMMUNITY AS WELL.

## DAYCARE:

1. SHOPFRONT IS CALCULATED AT THE MAIN ENTRY ELEVATION ONLY. __% PROVIDED. ALL OTHER ELEVATION HAVE A MINUMUM OF 20% GLAZING.

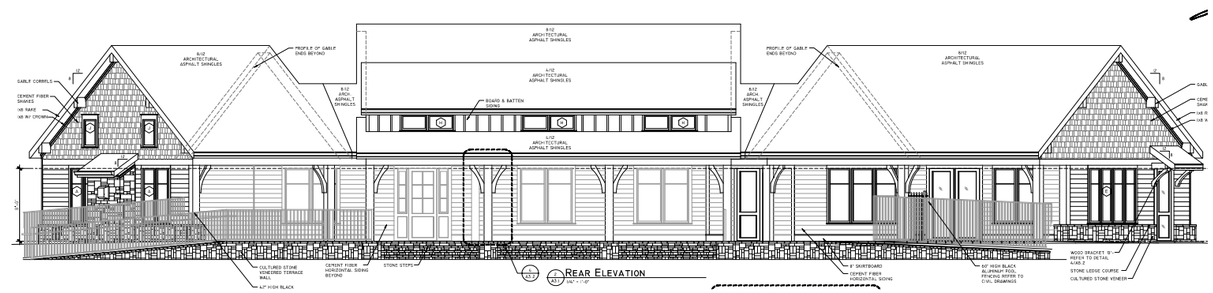
# AMENITY PHOTOGRAPHS

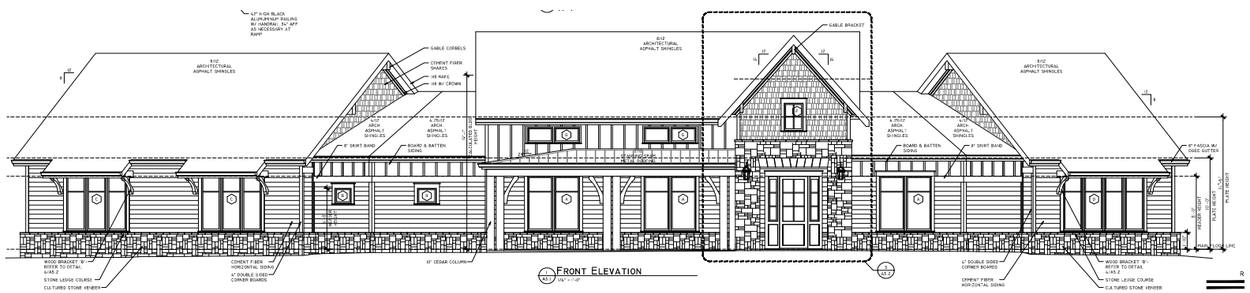




POOL AND CLUBHOUSE FROM SIMILAR KOLTER PROJECT

# AMENITY ELEVATIONS




IMAGES AND ELEVATIONS ARE CONCEPTUAL.
FINAL APPROVALS TO BE DETERMINED WITH FMDP.

AMENITY:

1. ALL COLUMNS WILL HAVE STONE BASE. HEIGHT OF COLUMNS TO MATCH THE ROW LOCK ON THE FACADE ELEVATION.





5 CIVIC SPACES ARE PLANNED FOR THIS SITE.

THREE OF THESE SITES WILL HAVE COVERED MAILBOX KIOSKS. COVERED SEATING WILL BE PROVIDED IN MOST PARKS.

IMAGES ARE TO PROVIDE EXAMPLES OF TYPES OF COVERED SEATING AND MAILBOX KIOSKS, BUT COULD BE SUBJECT TO REVISIONS AT FMDP APPROVALS.

**PUD-R Table 4.3.1-K District Standards: Planned Unit Development - Residential District**

| Bulk Standard | Required | | Proposed |
|---|---|---|---|
| **Density** | 12 density units per acre maximum | | 1.96 density units per acre |
| **Block Perimeter** | 2000 feet maximum | | |
| **Principal Building** | 6 maximum per lot / building site for attached townhouse buildings, 1 maximum per lot / building site | | |
| **Accessory Buildings** | 1 maximum per building site | | |
| **Lot / Building Site Width** | 18 ft. min; 180 ft. max; For Townhouses with each unit on its own Lot or Building Site: 18 - 36 ft. for single Townhouse unit attached to other Townhouse units X 8 max. attached Townhouse units For multiple Townhouses on a single Lot or Building Site: 18 -20 ft. per Townhouse unit X 8 max. attached Townhouse units 38 ft min. for House, 25 ft min. for each Duplex unit or 50 ft min. for both units of Duplex, and 100 ft. max. for Small Multifamily Building | | |
| **Frontage Buildout** | 60% Minimum | | |
| **Impervious Surface Coverage** | 70% Maximum; except 90% maximum for each group of attached townhouse units | | |
| **Lot / Building Site Enfrontment** | Must enfront a vehicular Thoroughfare or Internal Drive, except ≤ 20% of the Lots / Building Sites within a Development Parcel may Enfront a Pedestrian Path, Passage, pedestrian walkway or water body if such Lots / Building Sites have legal and physical vehicular access to a vehicular Thoroughfare via Driveway or Easement. | | |
| **Lot / Building Site Access** | All Lots must have legal and physical vehicular access to a vehicular Thoroughfare via Driveway, Internal Drive or Easement. | | |
| **Setbacks** | | | |
| **Front Setback, Principal** | 15 - 35 feet | | |
| **Front Setback, Secondary** | 15 - 35 feet | | |
| **Side Setback** | 0 feet minimum on attached side of attached buildig types, otherwise 10 feet minimum; 24 feet maximum per side | | Active Adult Homes: 5 feet<br>Courtyard Homes: 7.5 feet<br>Large Lot Homes: 7.5 feet<br>Single Family Alley Loaded Homes: 5 feet<br>Town Homes: 7.5 feet |
| **Rear Setback** | 10 feet minimum | | |
| **Building Standards** | | | |
| **Building Height** | 1-2 Stories for houses and duplex building types; 2-3 stories for townhouse. | | |
| **Ceiling Height** | May not exceed 14 feet from finished floor to finished ceiling | | |
| **Vertical Composition** | Each Principal building must have an identifiable base, middle, and cap. | | |
| **Finished Floor Level** | Minimum 18 inches above finished grade at façade. | | Active Adult Homes: 0 inches above finished grade at façade for ADA accessibility; All other homes a mimimum of 18 inches above finished grade at façade. |
| **Main Entrance** | Main entrance must be in façade of principal frontage | | |
| **Façade Position** | Parallel to straight frontage line or to tangent of curved frontage line | | |
| **Façade Proportions** | Must be vertically proportioned | | |
| **Facade Articulation** | Not Applicable | | |
| **Façade Openings** | Facade windows and/or doors must be spaced ≤ 20 ft. apart. In Stories above first, Facade openings must be ≤ 50% of total Facade area. | | |
| **Façade Glazing** | 20% – 60% of total Facade area for non-Shopfront; 70% of total Facade area, min. for Shopfront. | | |
| **Window Shape** | Square or vertical in proportion, except for transoms | | |
| **Window Alignment** | Upper floor windows and other features must be aligned with those of first floor. | | |
| **Window Types** | Except in Shopfront or Gallery Frontage, and except for transoms and sidelights, Windows in Facade and 1st & 2nd Layers must be single-hung, double-hung, casement or awning types. In Stories above first, Facade openings must be ≤ 50% of total Facade area. | | |
| **Window Glazing Material** | Clear glass for all Elevations. | | |

| | | | |
|---|---|---|---|
| **Window Trim in 1st layer** | Min. 4 in. trim with sill and top plate if siding surrounding window; soldier course above lintel and rollock course below sill if brick or stone surrounds window | | |
| **Shutters** | If any, must be functional and proportioned to cover half of window width from each side or entire window width, with shutter dogs | | |
| **Façade Window Sill Height** | If Residential: 5 ft. min. above avg. grade at Facade | | Active Adult Homes: 24 inches minimum above average grade at façade;<br>Courtyard Homes: 36 inches minimum above average grade at façade. All other homes 5 ft. minimum above average grade at façade. |
| **Porch Frontages** | Min. 6 ft. clear depth, excluding rails, pillars, columns or other features | | |
| **Shopfront Frontages** | 12 in.-24 in. knee wall required at Frontage | | For Clubhouse and Pre-School: finished floor elevation may match finished grade for ADA accessibility; no knee wall required. |
| **Façade Variety** | No Facade may exist more than once on a Block Face or within view of the same Facade | | |
| **Roof Pitch** | 6:12 - 14:12, except for shed roofs which may be 3:12 - 14:12 and except roof pitch may match the primary roof pitch of an existing Building that is less than 6:12 | | |
| **Roof Design** | Eaves shall extend no less than nine inches beyond the supporting walls. Gable end rakes shall overhang at least six inches. Eaves and rakes on Accessory Buildings and dormers shall overhang at least six inches. Soffits shall be placed perpendicular to the Building wall, not sloping in plane with the roof (except for gable end rakes). | | |
| **Building Materials** | | | |
| **Primary Building materials** | Brick, Natural Stone, Wood, Cementitious Siding; Authentic Stucco over masonry | | |
| **Changes in Building Materials** | Primary materials must continue along side Elevations through 2nd Layer. Primary materials shall continue for entire length of all Facades facing a Frontage. Any material changes must coincide with form, structural, or massing changes and shall not occur at outside corner of such change. | | |
| **Building Colors** | Up to 3 colors, including the natural color of any allowed materials, but excluding trim colors | | |
| **Foundation Cladding** | brick or natural stone | | |
| **Porch Peir Cladding** | brick or natural stone, with any space under Porch concealed by painted or stained latticework between piers | | brick or natural stone, with any space under porch concealed by painted or stained latticework between peirs; cladding may be excluded if column appears as a 6" x 6" cedar column from roof line to porch. |
| **Chimney Cladding** | brick, natural stone, or material matching primary material of Facade | | |
| **Vehicular Parking Requirements** | | | |
| **Off-Street Parking Surface** | Asphalt, concrete or other hard surface | | |
| **Garage Location** | in 3rd Layer Only | | Active Adult Homes: 2nd Layer<br>Courtyard Homes: 2nd Layer<br>Large Lot (side loaded): 2nd Layer<br>Single Family Alley Loaded: 3rd Layer<br>Town Homes: 3rd Layer |
| | | | Active Adult Homes: 10 ft x 20 ft per vehicle parking space; Garage Door width 67% pf total of garage + façade width; Garage must be detailed, finished, & designed like rest of Building with carriage house doors with windows; Single garage door width of 16 feet maximum; each Garage door must have ornamental lighting fixture above it; |

| | | | |
|---|---|---|---|
| **Garage Design** | Min. interior dimensions 10 ft. x 20 ft. per vehicle Parking space. If Garage faces Street: max. Garage door width 33% of total of Garage + Facade width. Garage must be detailed, finished, & designed like rest of Building with carriage house doors; max. Garage door width 9 ft.; each Garage door must have ornamental lighting fixture above it; min. 2 ft. separation between Garage doors | | Courtyard Homes: 10 ft x 20 ft per vehicle parking space; Garage Doors are not permitted to face the public street and must be perpendicular to the right of way; Garage must be detailed, finished, & designed like rest of Building with carriage house doors with windows; Single garage door width of 16 feet maximum; each Garage door must have ornamental lighting fixture above it;<br><br>Large Lot Homes: 10 ft x 20 ft per vehicle parking space; Garage Doors are not permitted to face the public street unless they are located in the 3rd Layer; Garage doors in the must be perpendicular to the right of way; Garage must be detailed, finished, & designed like rest of Building with carriage house doors with windows; Single garage door width of 16 feet maximum; each Garage door must have ornamental lighting fixture above it; |
| **Driveway / Vehicular Entrace Location** | in any layer | | |
| **Driveway / Vehicular Entrance Maximum Width** | 10 ft max. in 1st Layer if Residential; 24 ft max. in 1st Layer if non-Residential, regardless if shared or not | | Active Adult Homes: 18 ft max. in 1st Layer<br><br>Courtyard Homes: 12 ft max in 1st Layer<br>Large Lot Homes: 12 ft max in 1st Layer<br>Single Family Alley Loaded: Not Applicable<br>Town Home: Not Applicable |
| **Non-Building Components** | Recreation or Play Equipment NP in 1st or 2nd Layer | | Recreation or Play Equipment Permitted in 1st and 2nd layer if provided in HOA maintained Civic Space or on the Day Care parcel. |

**Article 5: Development Parcel Plans and Standards. Table 5.2.2.G-1 Urban Neighborhood Street**

| Bulk Standard | Required | | Proposed |
|---|---|---|---|
| **Right of Way Width** | 70 ft | | See Sheet C2.7 |
| **Pavement Width** | 38 ft | | See Sheet C2.7 |

**Article 5.3.1.A - Percentage of Civic Space**

| Bulk Standard | Required | | Proposed |
|---|---|---|---|
| **Civic Space Requirement** | Any Development Parcel shall include at least 5% but not more than 20% of its gross acreage assigned as Civic Space(s). The Civic Space provided pursuant to this Section 5.3.1.A shall be in addition to all Yard, Setback, and Impervious Surface area required not permitted to be covered under this Ordinance and the Subdivision Regulations. | | Remove: "but not more than 20%": Any Development Parcel shall include at least 5% of its gross acreage assigned as Civic Space(s). The Civic Space provided pursuant to this Section 5.3.1.A shall be in addition to all Yard, Setback, and Impervious Surface area required not permitted to be covered under this Ordinance and the Subdivision Regulations. |

**Table 5.3.3-A Civic Space Types - Summary**

| Bulk Standard | Required | | Proposed |
|---|---|---|---|
| **Civic Space Types - Green** | An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre and the maximum is 8 acres. | | Remove: "and the maximum is 8 acres": An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre. |

**Table 5.3.3-B Civic Space Types - Specific Standards**

| Bulk Standard | Required | | Proposed |
|---|---|---|---|
| **Civic Space Types - Green** | An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre and the maximum is 8 acres. | | Remove: "and the maximum is 8 acres" from Intent and Specification Size: An open area, available for unstructured recreation. A Green may be spatially defined by landscaping rather than Building Frontages. Its landscape shall consist of lawn and Trees, naturalistically disposed. The minimum size is 0.5 acre. |

**Article 5.5.5 Civic Spaces Required**

| Bulk Standard | Required | | Proposed |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **B. Playground** | A Civic Space designed and equipped as a Playground conforming to Table 5.3.3-B (Civic Spaces – Playground) (1) within 800 feet of every Lot or Building Site in Residential Use in all Districts except CD-2, CD-3L, SD-INT, and SD-LI, and (2) within 1300 feet of every Lot or Building Site in Residential Use in Districts CD-2, CD-3L, and SD-LI; and | | Add: A Civic Space designed and equipped as a Playground conforming to Table 5.3.3-B (Civic Spaces – Playground) (1) within 800 feet of every Lot or Building Site, excluding Active Adult lots, in Residential Use in all Districts except CD-2, CD-3L, SD-INT, and SD-LI,and (2) within 1300 feet of every Lot or Building Site in Residential Use in Districts CD-2, CD-3L, and SD-LI; and |
| **C. Thoroughfare Enfrontment** | Each Civic Space shall have a minimum of 50% of its perimeter Enfronting a Thoroughfare, except for Playgrounds or Community Gardens. | | Remove the minimum perimeter requirement. |

## Property and Master Plan Description

Identifying paths for new development, suburban neighborhood development, through *Connect Columbia*

- **Fostered as part of a practice of managed growth that relies on balancing growth, economic development and community development**
  Columbia Bluffs seeks to be a master planned community with diversity of housing options and civic opportunities.

- **Preservation of historic, cultural and environmental assets**
  Columbia Bluffs seeks to build civic areas around the historic/cultural history of the property and utilize proactive measures to protect the natural environmental systems supporting the Duck River.

- **Connectivity**
  Columbia Bluffs seeks to provide a north-south roadway connection between Iron Bridge and Bear Creek Parkway as well as provide stub road opportunities for future development to the east.

- ***Connect Columbia* Top Priorities: allowing a PUD model that will allow flexibility with more assurance of the final outcome**
  Columbia Bluffs seeks to create a master planned neighborhood with commitments on density, architectural character, quality amenities, and protected open space.

- **Suburban Neighborhood goals: future development emphasizing connectivity and housing diversity, pedestrian friendly**
  Columbia Bluffs seeks to development a master plan with all of these goals.

- ***Connect Columbia* Near-Term Priorities: promote master planned housing opportunities for a "full-life cycle" to accommodate retirees and young professionals and to review zoning standards to permit smaller lot and home sizes to encourage such developments.**
  Columbia Bluffs seeks to create a master planned neighborhood with housing opportunities that range from Active Adult age-restricted living, larger lots/homes to support growing families and generational living opportunities, to smaller lots and town homes for young families.


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# PUD Justification

PUD Zoning is only to be used under certain very specific conditions.

- 2.4.4 – *PUD district may be assigned to an area within a parcel of land over 10 gross acres, only if due to unique site conditions or the necessary and intrinsic uses, size, or form a proposed development* ***cannot under any plan, design, or circumstances conform to one or more of the character districts*** *and standards therefor.*

**Environmental Uniqueness.** The uniqueness of the land and its proximity to the Duck River provides a unique opportunity to master plan the community with greater environmental protection.

The Duck River may be the most significant natural feature in Columbia. It's the protection and preservation of this resource for aquatic species diversity, wildlife, and a clean Columbia is paramount. Open spaces should be identified and preserved with these specific goals in mind. Based on the Zoning Ordinance Primary Use Table 4.3.9.A-1, open spaces are defined based on the use type. While some uses on this chart are similar, they do not seem to capture the breadth of environmental resource protections and would therefore fall under "other open space use not listed under any use category" which is limited to use within a PUD only. The use of the PUD-R for this property ensures the City's oversight and the design team's plans for development are thought about on the front end and not left to speculation. The property should be developed using Conservation Design Concepts where low impact development is proposed and where conservation is the top priority within sensitive land and around environmental features in order to protect them. These conservation areas include floodplains, steep slopes, natural drainage areas, and areas of established tree canopy along the Duck River.

The Zoning Ordinance does not require a Conservation Plan, nor a development strategy to protect a resource as significant as the Duck River. Section 6.2 Preservation of Natural Features states: Development shall preserve the natural features of the site, such as wetlands, unique wildlife habitats, Historic Structures, major trees and scenic views both from and into the site. This regulation is too vague and not specific enough for the subject property.

The applicant has chosen a PUD-R zoning district instead of CD-3 in order to utilize different neighborhood planning strategies than are allowed under a straight CD-3 zoning project. PUD-R allows for utilization of a cluster development strategy. While Columbia Bluffs is seeking an overall development density of less than what is allowed under CD-3, the PUD-R district allows for smaller lots, lesser lot coverage, and greater impervious surface coverage. The PUD-R also allows for the applicant to ask for modifications to the development standards, which if approved, will further the cluster development design implementation.

Additionally, the applicant is seeking to develop an active adult age restricted neighborhood within the master planned community. While there is no provision in CD-3 that would prohibit the development of an age-restricted neighborhood, many of the zoning criteria in CD-3 are not conducive to the typical design standards utilized in active


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adult age restricted developments. Active adult developments utilize smaller lots and lot coverage in order to reduce the exterior landscape maintenance, which is performed by the HOA. The builders associated with these developments have distinct building programs which cater to the specialized needs of their customers. These homes also tend to require accessible access, which could not be achieved without the ability to seek architectural modification including relief from finished floor level and window sill height at the façade.


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# Environmental Protection Strategy

1. **Strategy for Resource Protection utilizing a PUD Planning and Design Approach**

    a. Establish a Limits of Disturbance along the Duck River and its tributaries based upon slopes, natural drainage ways, floodplain areas, and mature tree canopy.
    b. Design new development around open space areas to highlight them as community amenities with pedestrian systems that will connect the entire conservation design open space throughout the community.
    c. Pedestrian circulation and trails are highly encouraged along the river, along stream corridors, and through scenic areas.
    d. The quantity of Open Space preservation should greatly exceed any established base zone district.
    e. New home lots should generally be smaller, clustered areas away from the protected banks of the Duck River.
    f. Document on-site natural resources through a State approved Hydrologist and concurrence reports with local, state, and federal agencies.
    g. Remove debris removal along creek banks to prevent impact to Bear Creek (shoes, clothing, random bottles, containers, fencing, wood)
    h. Use Best Management Practices for Stormwater Pollution Prevention Plans during construction.
    i. Use only one crossing point (< less than approx. 50’ - 60’ feet that spans the creek with no structures within Bear Creek (similar to several crossings visible from US (Highway 412).

2. **Strategy for Protection through Construction**

    Implementation of the Plan requires protective measures. PUD phasing and areas of disturbance should be documented and considered through the PUD process. Protection practices shall include:

    A. Storm water erosion control applications I.E.
        i. Stormwater Detention Areas,
        ii. natural riparian buffers
        iii. silt fencing
        iv. sediment ponds
        v. Check dams


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vi. Ongoing stormwater monitoring of Environmental Controls of water runoff areas and tributaries

B. Compliance with CGP, ARAP and NPDES permitting to address the protections that provide additional oversight to the project.

Throughout the duration of the project, these types of practices within the action areas will ensure environmental compliance with local, state and federal requirements.

**3. Strategy for Protection when construction is completed.**

Once development is completed permanent storm water detention areas and water out fall locations will be cleaned and stabilized in accordance with the local, state, and federal guidelines.

## PUD Standards and the Columbia Bluffs Plans

The Columbia Bluffs Master Plan will address and satisfy the standards for PUD Development as defined in 3.7.1 PUD-R District Standards: **PUD-Residential**: *Specifically, this District is intended for predominantly Residential areas on sites where there are sufficient existing infrastructure, services, and utilities available for a proposed Development. Development in this District:*

***a. Is walkable and provides a diverse mixture of housing choices and Building Types,***
***b. Is necessary to implement and is consistent with the Comprehensive Plan,***
***c. Cannot under any circumstances, plan, or design conform to one or more of the other Districts and standards therefor due to its necessary and intrinsic Uses or size or form,***
***d. Provides an innovative plan and design,***
***e. Is harmonious with and respects the land use, character, and natural or man-made features of both the subject property and Adjacent property,***
***f. Promotes quality and environmentally sensitive planning and design by taking advantage of special site characteristics, locations and land uses,***
***g. Provides Civic Space,***
***h. Is the best use of the site consistent with the goals of protecting and enhancing the natural environment. There are specific Development standards provided for this District, which may be supplemented by additional standards approved as part of the applicable Final Master PUD Development Plan.***

**PUD-R Justification**
Date: January 23, 2024
Project: Columbia Bluffs Preliminary PUD-R Master Development Plan

## Deviations from PUD-R Standards

A full listing of deviations has been provided in a separate document. Additional explanation for some of these requests is below. The developer seeks to reduce the development footprint and increase the open space held in preservation. The reduction in ROW width, setbacks, and variations in garage locations will provide for a unique, clustered neighborhood experience.

1. Utilization of street sections with smaller ROW impacts than the 70' ROW Urban Neighborhood Street. In coordination with Staff, the applicant is proposing a variety of street sections based on the development intensity and presence of on-street parking. These street sections range from 55' ROW to 80' ROW. This reduced ROW would yield 7 acres of additional open space.
2. Reduction in side setbacks from 10' to 7.5' on front loaded homes and townhomes provides approximately 6.2 acres of additional land placed into open space. (19,920 sf townhomes + 33,655 sf front load x 2 side yards x 2.5' reduction).
3. Reduction in side setbacks from 10' to 5' on detached alley loaded homes and active adult homes provides approximately 12.3 acres of additional land placed into open space. (445 homes x 120' depth x 2 side yards x 5' reduction = 422,400 SF)
4. Allow garage in 2nd layer on courtyard style homes (garage doors not facing frontage in second layer). The courtyard style home provides façade variety while also allowing side and not front facing garage access.
5. Allow active adult lots to have a finished floor level lower than 18 inches above finished grade at the façade. This provision will allow lot to achieve greater accessibility access.
6. Reduced window sill height at the façade from 5' minimum above average grade at façade to 3' minimum in the active adult and courtyard style homes. This will allow greater accessibility access in the active adult homes, but also allows for windows along the garage façade in courtyard homes.


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February 2, 2024

KL Nexus TN, LLC
14025 River Edge Drive
Suite 175
Tampa, Florida 33637

ATTENTION: Mr. Joshua Gibbs
jgibbs@kolter.com

Subject: Site Inspection Report
Columbia Bluffs Subdivision
400 Bear Creek Pike
Columbia, Tennessee

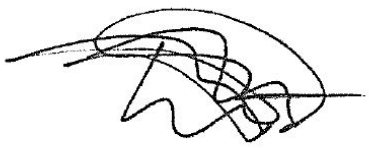
Dear Mr. Gibbs,

A representative of GEOServices, Mr. Wayne Harnack, P.E. was present at the above referenced proposed project to observe site conditions. At the time of our visit no visible construction has been performed. The proposed subdivision will consist of approximately 800 residences. A topographic map has been designed which indicates several wetland areas and the possibility of sink holes.

We explored the area where sink holes were anticipated, and we did not observe any features. We did observe surface bedrock and several solution channels for water drainage.

If there are any questions pertaining to this report, please do not hesitate to contact our office.

Sincerely,
**GEOServices, LLC**



Wayne F. Harnack. P.E.
Chief Operating Officer of Construction Services

GEOServices, LLC, Geotechnical and Materials Engineers

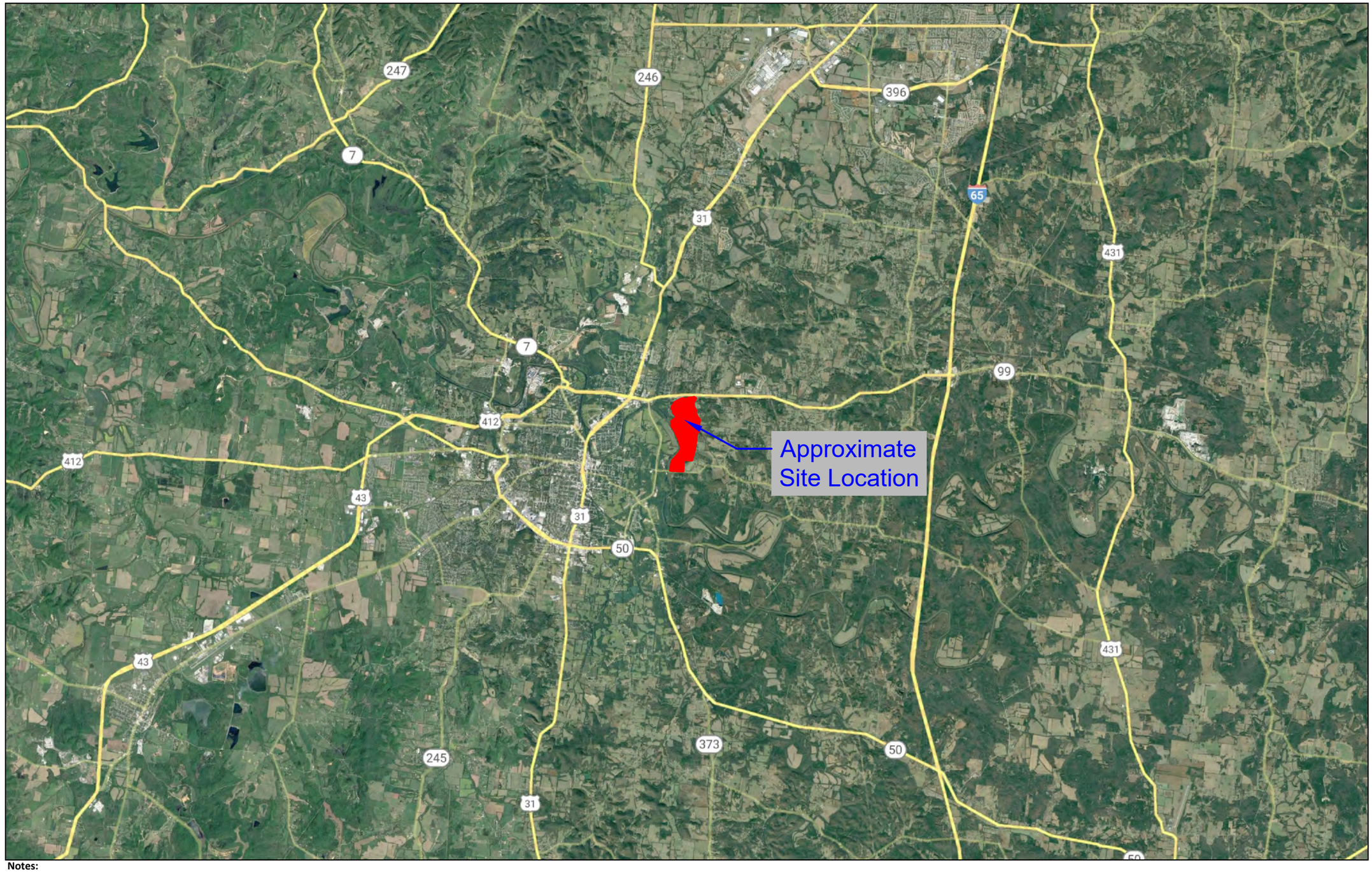


**APPENDICES**

GEOServices, LLC, Geotechnical and Materials Engineers



**APPENDIX A**




**Notes:**

1) Aerial Provided by: Google Earth Pro, (11/25/2019)

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

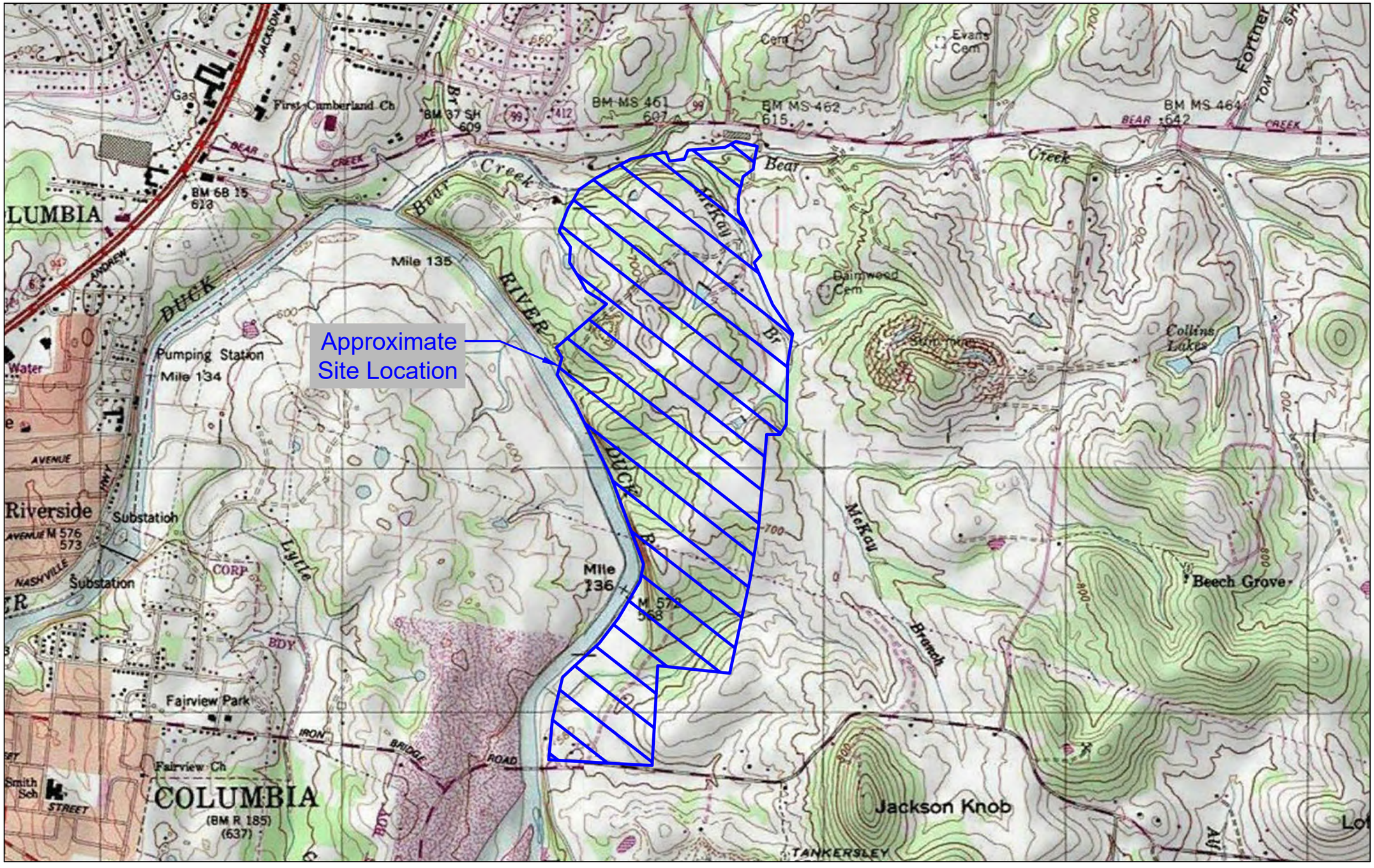
Site Vicinity Plan
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

GEOS Project No. 31-211695

FIGURE: 1

N




Source Provided by: MYTOPO

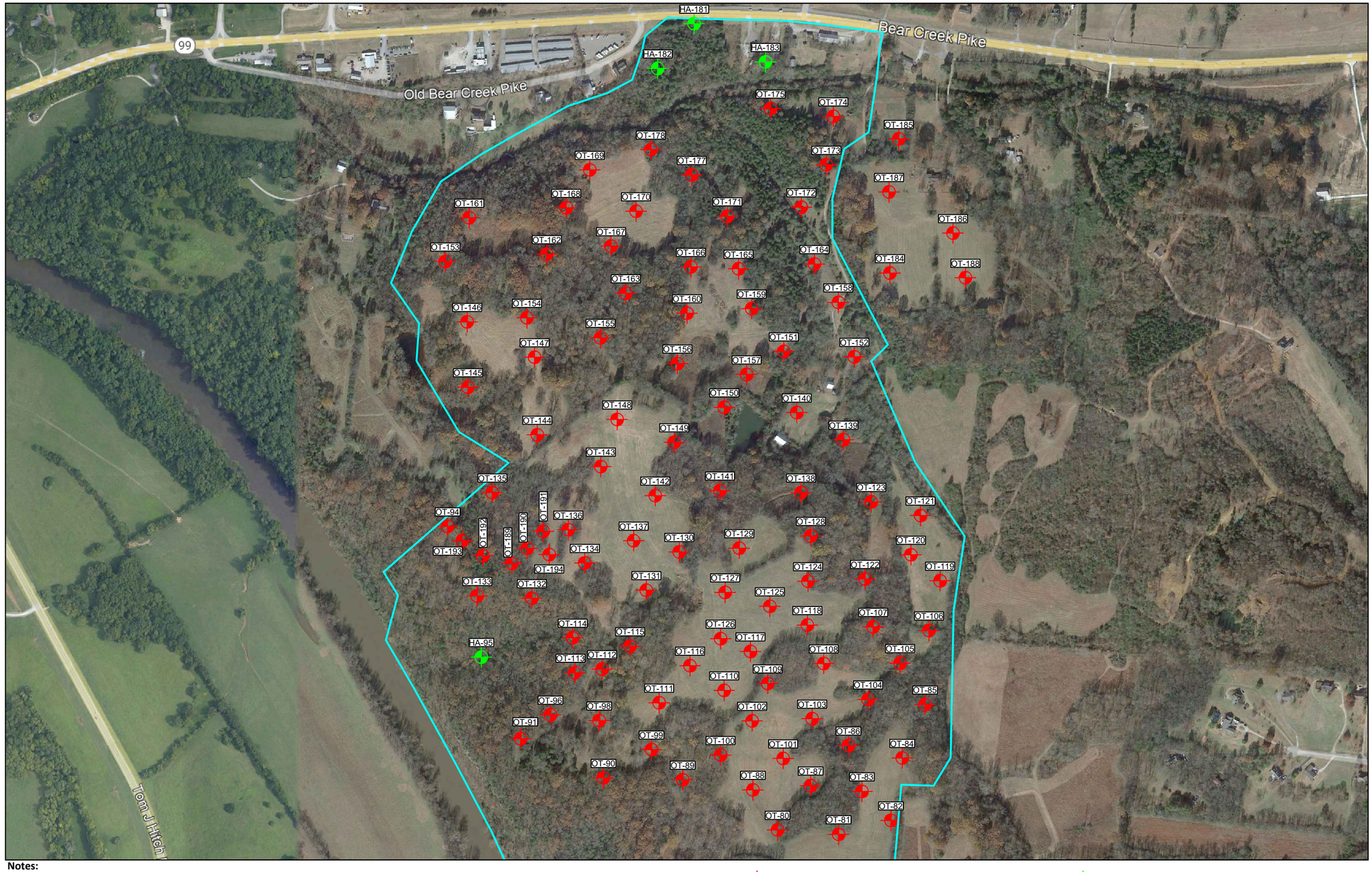
Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

USGS Topographic Map
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE:
12/20/2021

GEOS Project No.
31-211695

FIGURE:
2




**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)
3) Observation Trench Locations are shown in general arrangement only
4) Do Not use Observation Trench Locations for determinations of Distance or Quantities

Observation Trench Location & Identifier

Hand Auger Location & Identifier

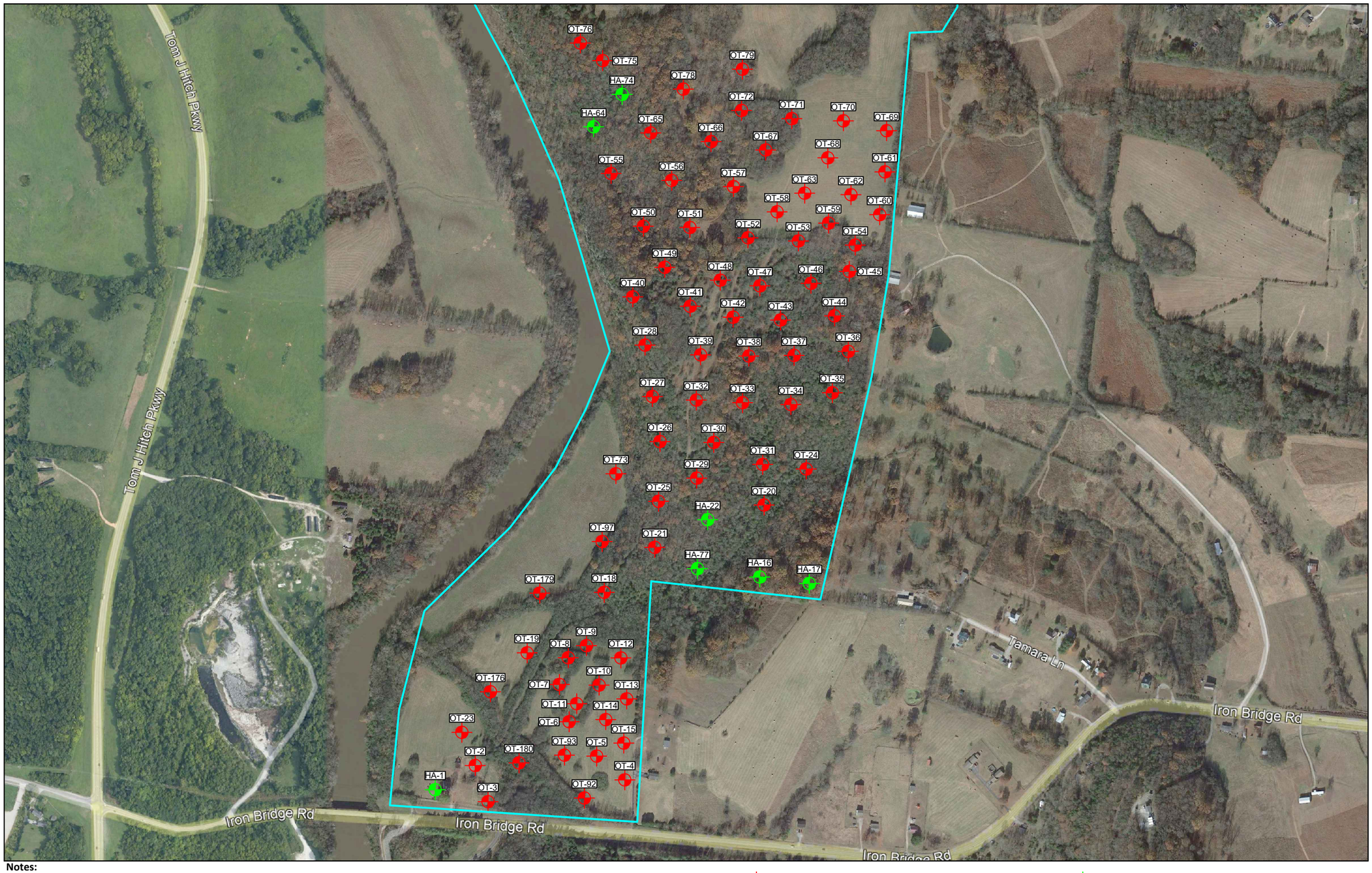
Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Observation Trench Location Plan
Proposed Bear Creek Property (North)
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

GEOS Project No. 31-211695

FIGURE: 3




**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)
3) Observation Trench Locations are shown in general arrangement only
4) Do Not use Observation Trench Locations for determinations of Distance or Quantities

Observation Trench Location & Identifier

Hand Auger Location & Identifier

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Observation Trench Location Plan
Proposed Bear Creek Property (South)
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

GEOS Project No. 31-211695

FIGURE: 4

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-1 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - reddish brown with black mottling; moist; (RESIDUUM) | | | | | |
| | Hand Shovel Termination at 1 foot | | | | | |
| 2.0 | Probe Rod through soil | | | | | |
| 3.0 | | | | | | |
| 4.0 | Hand Shovel/Probe Rod Termination at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-2 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-3-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 6-7-6 | | | | |
| 5.0 | Fat CLAY (CH) with sand at depth - light brown, brown with black mottling; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-3 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Lean CLAY (CL) with small rock fragments - brown, dark brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-5 | | | | |
| 3.0 | | | | | | |
| | | | | | | |
| 4.0 | | 7-8-9 | | | | |
| 5.0 | Fat CLAY (CH) with chert fragments - light brown, brown; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Refusal at 6.5 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 4 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-4 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, light brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-4-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-6-6 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 7-8-7 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-5 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-6 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | Fat CLAY (CH) with chert fragments at depth - light brown, brown, gray; stiff; moist; (RESIDUUM) | | | | | |
| 4.0 | | 9-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 9-10-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-7 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) - light brown, brown; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-8 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) - light brown, brown; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-9 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown with trace black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 6-7-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 9-10-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-10 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-11 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - dark brown, gray; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 2-3-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) - gray, brown with black mottling; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-12 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, chert fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Refusal at 6 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 1.5 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-13 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, trace siltstone at depth - brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 2-4-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-7-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Refusal at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-14 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, trace siltstone at depth - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 7-8-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-15 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-6-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-8-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-16 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with black mottling; moist; (RESIDUUM) | | | | | |
| | Hand Shovel Refusal at 1.2 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-17 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with abundant roots - light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | Hand Shovel Termination at 1.5 feet | | | | | |
| 3.0 | Probe Rod through soil | | | | | |
| 4.0 | Hand Shovel/Probe Rod Termination at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-18 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 0.8 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-19 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, dark brown; very soft to soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 1-2-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-4-4 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-20 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil and boulders (12 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-21 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil and Boulders (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 2.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-22 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Hand Shovel Refusal at 0.8 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-23 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with chert fragments, small rock fragments at depth, trace siltstone at depth - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-4-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-24 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.2 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-25 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, light brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Observation Trench Refusal at 2 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-26 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-27 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, light brown, gray with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 8-9-10 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-8-10 | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Termination at 6 feet | 12-12-15 | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-28 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-6-6 | | | | |
| 5.0 | Fat CLAY (CH) - brown with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 6.0 | | 8-9-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-29 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| 1.0 | Topsoil and weathered rock fragments (18 inches) | | | | | |
| 2.0 | Observation Trench Refusal at 1.5 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-30 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.2 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-31 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil, weathered rock fragments, boulders (12 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, light brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Observation Trench Refusal at 2 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-32 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 7-7-7 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-33 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, light brown, gray; moist; (RESIDUUM) | | | | | |
| 2.0 | | 10-11-11 | | | | |
| 3.0 | Fat CLAY (CH) with weathered rock fragments at depth - brown; stiff to very stiff; moist; (RESIDUUM) | | | | | |
| 4.0 | | 15+ | | | | |
| 5.0 | Observation Trench Refusal at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-34 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (11 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with trace weathered rock fragments - light brown, brown with black mottling at depth; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Termination at 6 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 1 foot below ground surface

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-35 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil and weathered rock fragments (12 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-36 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, light brown, gray with black mottling; firm to very stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 15+ | | | | |
| 7.0 | | | | | | |
| | Observation Trench Termination at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-37 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | | | | | | |
| | | | | | | |
| 2.0 | | | | | | |
| | | 7-8-9 | | | | |
| 3.0 | | | | | | |
| | | | | | | |
| 4.0 | | | | | | |
| | Fat CLAY (CH) - reddish brown, brown with black mottling; firm to stiff; moist; (RESIDUUM) | 9-10-10 | | | | |
| 5.0 | | | | | | |
| | | | | | | |
| 6.0 | | | | | | |
| | | 11-10-10 | | | | |
| 7.0 | | | | | | |
| | | | | | | |
| 8.0 | | | | | | |
| | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-38 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments at depth - brown, light brown, gray; stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 8-8-9 | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Refusal at 6 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-39 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) with siltstone at depth - brown with trace black mottling; firm; moist; (RESIDUUM) | 6-6-7 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 6-8-7 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-40 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, gray; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, gray with black mottling; firm; moist; (RESIDUUM) | 7-8-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | Observation Trench Termination at 8 feet | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-41 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-5 | | | | |
| 3.0 | Fat CLAY (CH) - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 4.0 | | 6-6-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-42 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-5-5 | | | | |
| 5.0 | Fat CLAY (CH) - brown with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 6.0 | | 7-8-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-43 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - reddish brown, brown with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-44 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 2-3-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-4-5 | | | | |
| 5.0 | Fat CLAY (CH) - brown, orangish brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-45 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Refusal at 6 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-46 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | Fat CLAY (CH) - brown, light brown with black mottling; soft to firm; moist; (RESIDUUM) | 6-7-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Refusal at 5.5 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-47 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, gray; firm; moist; (RESIDUUM) | | | | | |
| | | | | | | |
| 2.0 | | | | | | |
| | | 6-8-9 | | | | |
| 3.0 | | | | | | |
| | Fat CLAY (CH) - brown, gray with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 4.0 | | | | | | |
| | | 8-8-9 | | | | |
| 5.0 | | | | | | |
| | | | | | | |
| 6.0 | | | | | | |
| | | 8-9-10 | | | | |
| 7.0 | | | | | | |
| | | | | | | |
| 8.0 | | | | | | |
| | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-48 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown with black mottling; stiff; moist; (RESIDUUM) | 7-8-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-10-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-49 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 30, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (5 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, gray; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Fat CLAY (CH) - brown with black mottling; moist; (RESIDUUM) | | | | | |
| 8.0 | | | | | | |
| | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-50 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 2, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| 1.0 | Topsoil (18 inches) | | | | | |
| 2.0 | Fat CLAY (CH) with weathered rock fragments - light brown, gray; moist; (RESIDUUM) | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 4 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-51 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 2, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Fat CLAY (CH) with weathered rock fragments at depth - light brown, gray; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Refusal at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-52 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) - brown, orangish brown with black mottling; stiff; moist; (RESIDUUM) | 9-10-11 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-53 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) - brown, orangish brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-54 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | Fat CLAY (CH) - brown, light brown, reddish brown with black mottling; soft to firm; moist; (RESIDUUM) | 4-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-5-6 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 6-7-7 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-55 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 2, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Fat CLAY (CH) - reddish brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| | Observation Trench Refusal at 2.5 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-56 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 2, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Fat CLAY (CH) - reddish brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Observation Trench Refusal at 2 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-57 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-58 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) with trace sand - brown, light brown with black mottling; firm; moist; (RESIDUUM) | 7-8-8 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-59 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (1 inch) | | | | | |
| 1.0 | Lean CLAY (CL) with sand - brown with trace black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | Fat CLAY (CH) - brown, light brown, reddish brown with black mottling; soft to firm; moist; (RESIDUUM) | 3-3-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-6 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 6-6-8 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-60 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (1 inch) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | Fat CLAY (CH) - brown, light brown with black mottling; soft to firm; moist; (RESIDUUM) | 3-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-4-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 7-7-7 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-61 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 2-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) - brown, light brown, reddish brown with black mottling; firm; moist; (RESIDUUM) | 6-7-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-62 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (1 inch) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, light brown with black mottling; firm; moist; (RESIDUUM) | 6-7-7 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 7-7-8 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-63 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with trace black mottling; firm to soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-4-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 6-8-8 | | | | |
| 7.0 | Fat CLAY (CH) with trace sand - brown, light brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-64 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Hand Shovel Refusal at 0.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-65 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with trace weathered fragments - brown, dark brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-9-10 | | | | |
| 7.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-66 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 2, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| 1.0 | Topsoil (12 inches) | | | | | |
| 2.0 | Fat CLAY (CH) with weathered rock fragments - light brown, gray; moist; (RESIDUUM) | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 8 inches below ground surface

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-67 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, reddish brown with trace black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-8-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-68 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (1 inch) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Fat CLAY (CH) with sand at depth - brown, light brown, gray; firm to stiff; moist; (RESIDUUM) | 6-7-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-7-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-9-11 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-69 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 7-7-7 @ 1' | | | | |
| 2.0 | | | | | | |
| 3.0 | | 9-10-10 @ 3' | | | | |
| 4.0 | Fat CLAY (CH) with trace sand - red-brown with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 5.0 | | 11-12-12 @ 5' | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-70 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-8-8 | | | | |
| 5.0 | Fat CLAY (CH) with trace sand at depth - brown, light brown, reddish brown with black mottling at depth; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-71 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 1, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (1 inch) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Fat CLAY (CH) with sand - brown, light brown, reddish brown; moist; (RESIDUUM) | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-72 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) - light brown, brown with black mottling; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-73 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - dark brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) - dark brown, gray; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-74 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Hand Shovel Refusal at 0.2 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-75 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-76 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.8 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-77 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | Hand Shovel Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-78 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with weathered fragments - light brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 2.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-79 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - light brown, gray with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-80 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil and trace weathered rock fragments (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 4 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-81 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| 1.0 | Topsoil (18 inches) | | | | | |
| 2.0 | Lean CLAY (CL) with sand - brown with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 3.0 | | 8-9-9 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | 11-12-12 @ 5' | | | | |
| 6.0 | Fat CLAY (CH) with sand - red-tan-brown with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-82 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 4-4-5 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark-brown; soft; moist; (RESIDUUM) | | | | | |
| 3.0 | | 5-6-6 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | 8-8-8 @ 5' | | | | |
| 6.0 | Lean CLAY (CL) with sand - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-83 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| 1.0 | Topsoil (12 inches) | | | | | |
| 2.0 | Lean CLAY (CL) with sand - brown; soft; moist; (RESIDUUM) | 4-4-4 @ 1' | | | | |
| 3.0 | | | | | | |
| 4.0 | Lean CLAY (CL) with sand - brown with black mottling; firm to stiff; moist; (RESIDUUM) | 5-6-6 @ 3' | | | | |
| 5.0 | | | | | | |
| 6.0 | | 10-10-10 @ 5' | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | Observation Trench Termination at 8 feet | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-84 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 5-5-5 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - brown; firm; moist; (RESIDUUM) | | | | | |
| 3.0 | | 5-5-6 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | 11-11-11 @ 5' | | | | |
| 6.0 | Fat CLAY (CH) with sand - red-tan-brown with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-85 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with sand - dark-brown, brown; very-soft; moist; (RESIDUUM) | 2-2-2 @ 1' | | | | |
| 2.0 | | | | | | |
| 3.0 | | 2-2-2 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-86 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with sand - brown, gray, red-brown; very-soft; moist; (RESIDUUM) | 1-2-2 @ 1' | | | | |
| 2.0 | | | | | | |
| 3.0 | | 1-1-1 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | Lean CLAY (CL) with sand - gray; very-soft; very-moist; (RESIDUUM) | 2-2-2 @ 5' | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-87 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 4-4-4 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark-brown; soft; moist; (RESIDUUM) | | | | | |
| 3.0 | | 5-5-6 @ 3' | | | | |
| 4.0 | Lean CLAY (CL) with sand - brown, gray-brown, red with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 5.0 | | 10-10-10 @ 5' | | | | |
| 6.0 | | | | | | |
| 7.0 | CLAYEY SAND - gray; moist; (RESIDUUM) | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-88 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with sand - brown, gray; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-3-4 | | | | |
| 5.0 | Fat CLAY (CH) - light brown, brown with black mottling; soft to firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | 5-5-5 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Refusal at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-89 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Lean CLAY (CL) with trace weathered fragments, boulders - light brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| | Observation Trench Refusal at 3.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-90 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered fragments - brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-91 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-92 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-5-5 | | | | |
| 5.0 | Fat CLAY (CH) - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | 7-8-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-93 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with trace chert fragments - brown, light brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| | Observation Trench Refusal at 5.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 3.5 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-94 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.3 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-95 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Hand Shovel Refusal at 0.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-96 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-97 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - dark brown, dark gray; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-4-4 | | | | |
| 3.0 | Fat CLAY (CH) - dark brown, brown, dark gray; firm to soft; moist; (RESIDUUM) | | | | | |
| 4.0 | | 4-6-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 4-4-4 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-98 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Fat CLAY (CH) with weathered fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| | Observation Trench Refusal at 2 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-99 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil and weathered rock fragments (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments and boudlers - brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Termination at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-100 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 7-7-9 | | | | |
| 3.0 | Fat CLAY (CH) with sand at depth - light brown, brown, gray with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 4.0 | | 6-8-10 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 12-13-15 | | | | |
| 7.0 | Observation Trench Termination at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-101 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 4-4-5 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark-brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 3.0 | | 5-5-5 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | 6-6-7 @ 5' | | | | |
| 6.0 | Lean CLAY (CL) with sand - brown, tan-brown; firm; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-102 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-8-9 | | | | |
| 3.0 | Fat CLAY (CH) with trace sand - light brown, brown, gray with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 4.0 | | 5-7-7 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 9-11-12 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-103 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with sand - tan-red-brown with black mottling; firm; moist; (RESIDUUM) | 8-8-8 @ 1' | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-104 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| 1.0 | Topsoil (12 inches) | | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark-brown; soft; moist; (RESIDUUM) | 4-4-5 @ 1' | | | | |
| 3.0 | Lean CLAY (CL) with sand - brown; soft; moist; (RESIDUUM) | 4-4-5 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) with sand - brown, gray with black mottling; stiff; moist; (RESIDUUM) | 10-11-11 @ 5' | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | Observation Trench Termination at 8 feet | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-105 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with sand - brown; firm; moist; (RESIDUUM) | 8-8-8 @ 1' | | | | |
| 2.0 | | | | | | |
| 3.0 | Fat CLAY (CH) with trace sand - brown, gray with black mottling; stiff; moist; (RESIDUUM) | 9-9-9 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Refusal at 5.5 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-106 | GEOServices Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 2-3-3 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark-brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 3.0 | | 7-7-7 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | Lean CLAY (CL) with sand, chert fragments - dark-brown; stiff; moist; (RESIDUUM) | 9-9-9 @ 5' | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Refusal at 6.5 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-107 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, orangish brown with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 10-11-12 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Termination at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-108 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) with siltstone at depth - brown, orangish brown, gray with black mottling; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-109 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, reddish brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-3-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-5-7 | | | | |
| 5.0 | Fat CLAY (CH) - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | 6-7-8 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-110 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, reddish brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-4-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-7-7 | | | | |
| 5.0 | Fat CLAY (CH) - brown, reddish brown with black mottling; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-111 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, dark brown; very soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 2-2-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, orangish brown with black mottling; firm to stiff; moist; (RESIDUUM) | 6-8-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-9-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-112 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Fat CLAY (CH) with weathered fragments at depth - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| | | | | | | |
| 3.0 | Observation Trench Refusal at 1.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-113 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-114 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 6 inches below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-115 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-116 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with black mottling; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-3-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, light brown; firm; moist; (RESIDUUM) | 4-4-6 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 6-7-8 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-117 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-4 | | | | |
| 3.0 | Fat CLAY (CH) with sand at depth - light brown, brown, gray with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 4.0 | | 7-7-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-10-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-118 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-9-8 | | | | |
| 5.0 | Fat CLAY (CH) - light brown, brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-119 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 4-4-5 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark brown; soft; moist; (RESIDUUM) | | | | | |
| 3.0 | Lean CLAY (CL) with sand, chert fragments - dark brown; firm; moist; (RESIDUUM) | 5-5-5 @ 3' | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-120 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By: Charlie Capps** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 5-5-5 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - dark-brown; firm; moist; (RESIDUUM) | | | | | |
| 3.0 | | 4-4-4 @ 3' | | | | |
| 4.0 | Lean CLAY (CL) with sand, chert fragments - dark-brown; soft; moist; (RESIDUUM) | | | | | |
| 5.0 | Observation Trench Refusal at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-121 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 4-4-5 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - brown, dark brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 3.0 | | 5-7-7 @ 3' | | | | |
| | Observation Trench Refusal at 3.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-122 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, orangish brown; stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 9-9-9 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) with trace sand - light brown, orangish brown with black mottling; stiff; moist; (RESIDUUM) | 8-10-10 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 9-11-11 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-123 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with chert fragments at depth - brown, orangish brown, gray at depth with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 10-11-12 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Refusal at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-124 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, reddish brown; firm to stiff; moist; (RESIDUUM) | 8-8-10 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 10-11-12 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-125 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; soft to firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Fat CLAY (CH) - brown, light brown; moist; (RESIDUUM) | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-126 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-6-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 6-8-9 | | | | |
| 5.0 | Fat CLAY (CH) - brown, orangish brown, gray with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | 8-8-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-127 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (8 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with sand and trace sandstone - brown, reddish brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 8-8-9 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-8-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-128 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with siltstone at depth - brown, light brown with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-8-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 9-10-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-129 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-7-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, light brown with black mottling; firm to stiff; moist; (RESIDUUM) | 7-8-8 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 10-11-11 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-130 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, boulders - brown, gray with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-131 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 3, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - brown, light brown; stiff; moist; (RESIDUUM) | 7-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 9-9-10 | | | | |
| 7.0 | Observation Trench Refusal at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-132 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-133 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Observation Trench Refusal at 1 foot | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-134 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, orangish brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-6-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) - orangish brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-135 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 1.0 | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-136 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - orangish brown, light brown with black mottling; firm to stiff; moist; (RESIDUUM) | 6-5-6 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-10-11 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-137 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, orangish brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 6-6-7 | | | | |
| 5.0 | Fat CLAY (CH) - orangish brown, light brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | 8-8-8 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-138 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| | | | | | | |
| | | | | | | |
| 2.0 | | 8-9-8 | | | | |
| | | | | | | |
| 3.0 | | | | | | |
| | | | | | | |
| 4.0 | | 7-8-9 | | | | |
| | | | | | | |
| 5.0 | | | | | | |
| | | | | | | |
| 6.0 | | 9-9-9 | | | | |
| | | | | | | |
| 7.0 | | | | | | |
| | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-139 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 5-5-6 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with trace sand, chert fragments - brown; firm; moist; (RESIDUUM) | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Proposed Development at Bear Creek Pike<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-140 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211 | | |
| **Date Excavated:** December 6, 2021 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | 5-6-6 @ 1' | | | | |
| 2.0 | Lean CLAY (CL) with sand - brown; firm; moist; (RESIDUUM) | | | | | |
| 3.0 | | 6-7-8 @ 3' | | | | |
| 4.0 | | | | | | |
| 5.0 | | 10-10-10 @ 5' | | | | |
| 6.0 | Fat CLAY (CH) with sand, chert fragments - light-brown with black mottling; stiff; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-141 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - orangish brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-142 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - orangish brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 6-6-8 | | | | |
| 5.0 | Fat CLAY (CH) - orangish brown, light brown with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-143 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) with trace sand at depth - orangish brown, light brown with black mottling; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-144 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - light brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Refusal at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-145 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 1.0 | Observation Trench Refusal at 1 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 6 inches below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-146 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 2.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-147 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with trace weathered rock fragments at depth - light brown, gray; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 8-8-8 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 10-11-12 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-148 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-7-7 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 8-10-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-149 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 7, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with siltstone and trace sand - orangish brown with black mottling; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-150 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-3-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-4-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) - brown, gray; firm; moist; (RESIDUUM) | 5-5-5 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-151 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-4-4 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | Fat CLAY (CH) - brown, gray; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-152 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown, dark brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Water at bedrock surface

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-153 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 1 foot below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-154 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-3-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Refusal at 7.5 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-155 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 7, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-4-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | Fat CLAY (CH) - reddish brown, brown with black mottling; firm to stiff; moist; (RESIDUUM) | 5-5-6 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 7-9-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-156 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown with black mottling; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-5-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-10-11 | | | | |
| 5.0 | | | | | | |
| 6.0 | | 10-11-11 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-157 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Refusal at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-158 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil with weathered rock fragments, boulders (6 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-159 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with trace weathered rock fragments - brown, orangish brown, light brown; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 7-7-9 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 9-10-11 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Refusal at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-160 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, boulders, siltstone at depth - brown, gray; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-161 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, boulders - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 3 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-162 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Observation Trench Refusal at 2 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-163 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, boulders - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-164 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Lean CLAY (CL) with boulders - dark brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| | Observation Trench Refusal at 2.5 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Water at bedrock surface

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-165 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 3.5 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-166 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 9-9-10 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-10-10 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | Observation Trench Refusal at 7 feet | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-167 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments, boulders - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | Observation Trench Refusal at 5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-168 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with trace weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-169 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 8, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-170 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (4 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; soft; moist; (RESIDUUM) | | | | | |
| 2.0 | | 2-3-3 | | | | |
| 3.0 | Fat CLAY (CH) with trace weathered rock fragments - brown; firm; moist; (RESIDUUM) | | | | | |
| 4.0 | | 4-5-5 | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 3.5 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-171 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Fat CLAY (CH) - brown; firm to stiff; moist; (RESIDUUM) | | | | | |
| 2.0 | | 5-6-7 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 8-9-9 | | | | |
| 5.0 | | | | | | |
| 6.0 | Observation Trench Refusal at 5.5 feet | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 4 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-172 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil with weathered rock fragments, boulders (10 inches) | | | | | |
| 1.0 | Observation Trench Refusal at 0.8 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-173 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 3-5-6 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 5-6-7 | | | | |
| 5.0 | | | | | | |
| 6.0 | Fat CLAY (CH) - brown; firm; moist; (RESIDUUM) | 8-8-9 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-174 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | | | | | | |
| | Lean CLAY (CL) - dark brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| | | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | | | | | |
| | | | | | | |
| 4.0 | | | | | | |
| | | | | | | |
| 5.0 | | | | | | |
| | | | | | | |
| 6.0 | | | | | | |
| | | | | | | |
| 7.0 | | | | | | |
| | | | | | | |
| 8.0 | | | | | | |
| | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Water at bedrock surface

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-175 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 9, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (12 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - dark brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Observation Trench Refusal at 1.5 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Water at bedrock surface

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-176 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 4-5-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 6-7-6 | | | | |
| 5.0 | Fat CLAY (CH) with weathered rock fragments at depth - light brown, brown; firm; moist; (RESIDUUM) | | | | | |
| 6.0 | | 8-8-10 | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** Rock ledge encountered at 6 feet below ground surface.

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-177 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 2.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-178 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** December 8, 2021 | **Observed By:** Jacob Barber | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-179 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (2 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - dark brown, dark gray with black mottling; firm; moist; (RESIDUUM) | | | | | |
| 2.0 | | 6-6-5 | | | | |
| 3.0 | | | | | | |
| 4.0 | | 7-8-9 | | | | |
| 5.0 | Fat CLAY (CH) - dark brown, brown, dark gray; moist; (RESIDUUM) | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-180 | Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** November 29, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) with chert fragments, small rock fragments at depth, trace siltstone at depth - brown; very soft; wet; (RESIDUUM) | | | | | |
| 2.0 | | 2-2-3 | | | | |
| 3.0 | | | | | | |
| 4.0 | Observation Trench Refusal at 3.5 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-181 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with weathered rock fragments - brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Hand Shovel Refusal at 1.5 feet | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-182 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (10 inches) | | | | | |
| 1.0 | Hand Shovel Refusal at 0.8 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: HS-183 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** January 5, 2021 | **Observed By: Jacob Barber** | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (3 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown, dark brown; moist; (RESIDUUM) | | | | | |
| 2.0 | Hand Shovel Termination at 1.5 feet | | | | | |
| 3.0 | Probe Rod through soil | | | | | |
| 4.0 | | | | | | |
| 5.0 | Hand Shovel/Probe Rod Termination at 4.5 feet | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-184 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm to stiff; moist; (RESIDUUM) | 7-7-7 | | | | |
| 2.0 | | | | | | |
| 3.0 | | 8-9-9 | | | | |
| 4.0 | | | | | | |
| 5.0 | | 8-9-9 | | | | |
| 6.0 | | | | | | |
| 7.0 | Fat CLAY (CH) - brown with black oxide nodules; moist; (RESIDUUM) | | | | | |
| 8.0 | | | | | | |
| 9.0 | Observation Trench Termination at 8.5 feet | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-185 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - dark brown, brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1.5 feet | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-186 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | 7-8-8 | | | | |
| 2.0 | | | | | | |
| 3.0 | | 8-8-8 | | | | |
| 4.0 | | | | | | |
| 5.0 | | 10-10-10 | | | | |
| 6.0 | Fat CLAY (CH) with chert fragments - brown with black oxide nodules; stiff; moist; (RESIDUUM) | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-187 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) - brown; firm; moist; (RESIDUUM) | 5-6-7 | | | | |
| 2.0 | | | | | | |
| 3.0 | | 8-8-9 | | | | |
| 4.0 | | | | | | |
| 5.0 | Fat CLAY (CH) with chert fragments - brown with black oxide nodules; firm to stiff; moist; (RESIDUUM) | 10-10-10 | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | Observation Trench Termination at 8 feet | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-188 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) with trace sand - brown; firm; moist; (RESIDUUM) | 5-6-6 | | | | |
| 2.0 | | | | | | |
| 3.0 | Lean CLAY (CL) with trace sand and chert fragments - brown; stiff; moist; (RESIDUUM) | 8-9-9 | | | | |
| 4.0 | | | | | | |
| 5.0 | | 10-11-11 | | | | |
| 6.0 | | | | | | |
| 7.0 | Fat CLAY (CH) with chert fragments - brown with black oxide nodules; moist; (RESIDUUM) | | | | | |
| 8.0 | | | | | | |
| 9.0 | Observation Trench Termination at 8.5 feet | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-189 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) trace sand, rock fragments - yellowish brown; firm; moist; (RESIDUUM) | 7-7-8 | | | | |
| 2.0 | | | | | | |
| 3.0 | | 8-8-9 | | | | |
| 4.0 | Observation Trench Refusal at 4 feet | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:** _____

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-190 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) trace sand, rock fragments - dark brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-191 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) trace sand, rock fragments - dark brown; soft to firm; moist; (RESIDUUM) | 4-4-5 | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 3 feet | 7-8-8 | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-192 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| GEOServices Project No. 31-211695 | | |
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) rock fragments - brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-193 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Lean CLAY (CL) rock fragments - brown; moist; (RESIDUUM) | | | | | |
| | Observation Trench Refusal at 1 foot | | | | | |
| 2.0 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

| Bear Creek Property<br>Columbia, Tennessee<br>GEOServices Project No. 31-211695 | TEST PIT OBSERVATION RECORD<br>Test Pit No.: OT-194 | GEOS Universal Engineering Sciences<br>Geotechnical, Environmental and Materials Engineers |
|---|---|---|
| **Date Excavated:** March 4, 2022 | **Observed By:** Charlie Capps | |

| Depth (feet) | Material Description | DCP Values | LL | PL | PI | %M |
|---|---|---|---|---|---|---|
| | Topsoil (6 inches) | | | | | |
| 1.0 | Fat CLAY (CH) trace sand, rock fragments - yellowish brown; moist; (RESIDUUM) | | | | | |
| 2.0 | | | | | | |
| 3.0 | Observation Trench Refusal at 2.5 feet | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |
| 6.0 | | | | | | |
| 7.0 | | | | | | |
| 8.0 | | | | | | |
| 9.0 | | | | | | |



Excavated test pit



Excavated material

**Comments:**

GEOServices, LLC, Geotechnical and Materials Engineers



**APPENDIX B**

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 2 | 1 | 2 | 21.2% | 28 | 19 | 9 | CL |
| | 2 | 4 | 28.6% | | | | |
| | 3 | 6 | 28.1% | | | | |
| | | | | | | | |
| 3 | 1 | 2 | 37.1% | | | | |
| | 2 | 4 | 32.6% | | | | |
| | | | | | | | |
| 4 | 1 | 2 | 32.1% | | | | |
| | 2 | 4 | 33.2% | | | | |
| | 3 | 6 | 33.7% | | | | |
| | | | | | | | |
| 6 | 1 | 2 | 31.6% | | | | |
| | 2 | 4 | 26.6% | 55 | 29 | 26 | CH |
| | | | | | | | |
| 7 | 1 | 2 | 26.0% | | | | |
| | 2 | 4 | 27.9% | | | | |
| | 3 | 6 | 28.9% | | | | |
| | | | | | | | |
| 8 | 1 | 2 | 23.9% | | | | |
| | 2 | 4 | 24.5% | | | | |
| | 3 | 6 | 28.7% | | | | |
| | | | | | | | |
| 9 | 1 | 2 | 22.9% | | | | |
| | 2 | 4 | 25.3% | | | | |
| | 3 | 6 | 26.2% | | | | |
| | | | | | | | |
| 10 | 1 | 2 | 32.2% | | | | |
| | | | | | | | |
| 11 | 1 | 2 | 25.6% | | | | |
| | 2 | 4 | 27.9% | | | | |
| | 3 | 6 | 27.4% | | | | |
| | | | | | | | |
| 12 | 1 | 2 | 24.8% | | | | |
| | 2 | 4 | 23.9% | | | | |
| | | | | | | | |
| 14 | 1 | 2 | 24.1% | | | | |
| | | | | | | | |
| 15 | 1 | 2 | 22.9% | | | | |
| | 2 | 4 | 20.7% | | | | |
| | | | | | | | |
| 19 | 1 | 2 | 23.2% | | | | |
| | 2 | 4 | 24.9% | | | | |
| | 3 | 6 | 31.0% | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 23 | 1 | 2 | 22.6% | | | | |
| | 2 | 4 | 21.7% | | | | |
| | 3 | 6 | 23.0% | | | | |
| | | | | | | | |
| 26 | 1 | 2 | 29.1% | | | | |
| | | | | | | | |
| 27 | 1 | 2 | 22.1% | | | | |
| | 2 | 4 | 20.6% | | | | |
| | | | | | | | |
| 28 | 1 | 2 | 20.5% | | | | |
| | 2 | 4 | 20.7% | | | | |
| | 3 | 6 | 31.0% | | | | |
| | | | | | | | |
| 32 | 1 | 2 | 23.7% | | | | |
| | 2 | 4 | 24.6% | | | | |
| | 3 | 6 | 31.8% | | | | |
| | | | | | | | |
| 33 | 1 | 2 | 20.8% | | | | |
| | 2 | 4 | 17.8% | | | | |
| | | | | | | | |
| 34 | 1 | 2 | 20.4% | | | | |
| | 2 | 4 | 21.1% | | | | |
| | 3 | 6 | 24.3% | | | | |
| | | | | | | | |
| 36 | 1 | 2 | 23.7% | | | | |
| | 2 | 4 | 22.0% | | | | |
| | 3 | 6 | 18.9% | | | | |
| | | | | | | | |
| 37 | 1 | 2 | 21.3% | | | | |
| | 2 | 4 | 18.2% | | | | |
| | 3 | 6 | 18.3% | | | | |
| | | | | | | | |
| 38 | 1 | 2 | 26.7% | | | | |
| | 2 | 4 | 32.0% | | | | |
| | | | | | | | |
| 39 | 1 | 2 | 22.3% | | | | |
| | 2 | 4 | 24.7% | | | | |
| | 3 | 6 | 25.5% | | | | |
| | | | | | | | |
| 41 | 1 | 2 | 20.6% | | | | |
| | 2 | 4 | 26.3% | | | | |
| | 3 | 6 | 29.7% | | | | |
| | | | | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 42 | 1 | 2 | 21.4% | | | | |
| | 2 | 4 | 26.2% | 47 | 26 | 21 | CL |
| | 3 | 6 | 26.9% | | | | |
| | | | | | | | |
| 43 | 1 | 2 | 21.9% | | | | |
| | 2 | 4 | 24.5% | | | | |
| | 3 | 6 | 27.7% | | | | |
| | | | | | | | |
| 44 | 1 | 2 | 25.7% | | | | |
| | 2 | 4 | 27.9% | | | | |
| | 3 | 6 | 29.9% | | | | |
| | | | | | | | |
| 45 | 1 | 2 | 23.7% | | | | |
| | 2 | 4 | 25.3% | | | | |
| | | | | | | | |
| 46 | 1 | 2 | 21.7% | | | | |
| | 2 | 4 | 26.9% | | | | |
| | | | | | | | |
| 48 | 1 | 2 | 25.3% | | | | |
| | 2 | 4 | 26.0% | | | | |
| | 3 | 6 | 26.0% | | | | |
| | | | | | | | |
| 49 | 1 | 2 | 23.7% | | | | |
| | 2 | 4 | 25.9% | | | | |
| | 3 | 6 | 29.8% | | | | |
| | | | | | | | |
| 51 | 1 | 2 | 20.1% | | | | |
| | 2 | 4 | 21.6% | | | | |
| | 3 | 6 | 23.0% | | | | |
| | | | | | | | |
| 52 | 1 | 2 | 25.4% | | | | |
| | 2 | 4 | 30.0% | | | | |
| | 3 | 6 | 32.4% | | | | |
| | | | | | | | |
| 53 | 1 | 2 | 25.4% | | | | |
| | 2 | 4 | 26.8% | | | | |
| | 3 | 6 | 27.9% | | | | |
| | | | | | | | |
| 57 | 1 | 2 | 26.7% | | | | |
| | | | | | | | |
| 58 | 1 | 2 | 23.5% | | | | |
| | 2 | 4 | 25.8% | | | | |
| | 3 | 6 | 28.1% | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 60 | 1 | 2 | 28.4% | | | | |
| | 2 | 4 | 30.2% | | | | |
| | 3 | 6 | 33.1% | | | | |
| | | | | | | | |
| 63 | 1 | 2 | 26.9% | | | | |
| | 2 | 4 | 27.5% | | | | |
| | 3 | 6 | 29.8% | | | | |
| | | | | | | | |
| 65 | 1 | 2 | 27.9% | | | | |
| | 2 | 4 | 26.7% | | | | |
| | 3 | 6 | 28.0% | | | | |
| | | | | | | | |
| 67 | 1 | 2 | 21.3% | | | | |
| | 2 | 4 | 22.8% | | | | |
| | 3 | 6 | 22.9% | | | | |
| | | | | | | | |
| 68 | 1 | 2 | 22.5% | | | | |
| | 2 | 4 | 25.1% | | | | |
| | 3 | 6 | 27.0% | | | | |
| | | | | | | | |
| 69 | 1 | 2 | 18.9% | | | | |
| | 2 | 4 | 20.1% | | | | |
| | 3 | 6 | 22.3% | | | | |
| | | | | | | | |
| 71 | 1 | 2 | 25.7% | | | | |
| | 2 | 4 | 26.9% | | | | |
| | 3 | 6 | 30.6% | | | | |
| | | | | | | | |
| 72 | 1 | 2 | 26.4% | | | | |
| | 2 | 4 | 27.4% | | | | |
| | 3 | 6 | 26.7% | | | | |
| | | | | | | | |
| 79 | 1 | 2 | 28.9% | | | | |
| | 2 | 4 | 33.2% | | | | |
| | | | | | | | |
| 80 | 1 | 2 | 32.1% | | | | |
| | | | | | | | |
| 81 | 2 | 3 | 19.3% | | | | |
| | 3 | 5 | 20.7% | | | | |
| | | | | | | | |
| 82 | 1 | 1 | 25.5% | | | | |
| | 2 | 3 | 27.9% | | | | |
| | 3 | 5 | 28.9% | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 84 | 1 | 1 | 24.3% | | | | |
| | 2 | 3 | 28.9% | | | | |
| | 3 | 5 | 31.2% | 57 | 33 | 24 | MH |
| | | | | | | | |
| 86 | 1 | 1 | 27.9% | | | | |
| | 2 | 3 | 31.4% | | | | |
| | 3 | 5 | 35.5% | | | | |
| | | | | | | | |
| 88 | 1 | 1 | 23.7% | | | | |
| | 2 | 3 | 25.7% | | | | |
| | 3 | 5 | 24.9% | | | | |
| | | | | | | | |
| 92 | 1 | 1 | 15.2% | | | | |
| | 2 | 3 | 22.5% | | | | |
| | 3 | 5 | 24.6% | | | | |
| | | | | | | | |
| 99 | 1 | 2 | 25.7% | | | | |
| | 2 | 4 | 31.0% | | | | |
| | | | | | | | |
| 100 | 1 | 2 | 20.9% | | | | |
| | 2 | 4 | 21.3% | | | | |
| | 3 | 6 | 22.0% | | | | |
| | | | | | | | |
| 101 | 1 | 2 | 21.3% | | | | |
| | 2 | 4 | 23.9% | | | | |
| | 3 | 6 | 24.7% | | | | |
| | | | | | | | |
| 102 | 1 | 2 | 23.0% | | | | |
| | 2 | 4 | 22.9% | | | | |
| | 3 | 6 | 24.2% | | | | |
| | | | | | | | |
| 104 | 1 | 1 | 23.9% | | | | |
| | 2 | 3 | 25.6% | | | | |
| | 3 | 5 | 26.0% | | | | |
| | | | | | | | |
| 105 | 1 | 1 | 30.0% | | | | |
| | 2 | 3 | 31.8% | | | | |
| | | | | | | | |
| 106 | 1 | 1 | 29.9% | | | | |
| | 2 | 3 | 28.7% | | | | |
| | 3 | 5 | 30.5% | | | | |
| | | | | | | | |
| 107 | 1 | 2 | 31.2% | | | | |
| | 2 | 4 | 32.6% | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 108 | 1 | 2 | 24.9% | | | | |
| | 2 | 4 | 28.6% | | | | |
| | 3 | 6 | 31.6% | | | | |
| | | | | | | | |
| 109 | 1 | 2 | 27.1% | | | | |
| | 2 | 4 | 28.9% | | | | |
| | 3 | 6 | 30.0% | | | | |
| | | | | | | | |
| 110 | 1 | 2 | 28.1% | | | | |
| | 2 | 4 | 28.9% | | | | |
| | 3 | 6 | 31.6% | | | | |
| | | | | | | | |
| 111 | 1 | 2 | 23.5% | | | | |
| | 2 | 4 | 25.2% | | | | |
| | 3 | 6 | 26.2% | | | | |
| | | | | | | | |
| 116 | 1 | 2 | 21.6% | | | | |
| | 2 | 4 | 21.1% | | | | |
| | 3 | 6 | 26.1% | | | | |
| | | | | | | | |
| 117 | 1 | 2 | 21.3% | | | | |
| | 2 | 4 | 23.0% | | | | |
| | 3 | 6 | 24.9% | | | | |
| | | | | | | | |
| 118 | 1 | 2 | 23.7% | | | | |
| | 2 | 4 | 24.6% | | | | |
| | | | | | | | |
| 119 | 1 | 1 | 26.9% | | | | |
| | 2 | 3 | 29.0% | | | | |
| | | | | | | | |
| 120 | 1 | 1 | 22.3% | | | | |
| | 2 | 3 | 24.9% | | | | |
| | | | | | | | |
| 121 | 1 | 1 | 23.7% | | | | |
| | | | | | | | |
| 122 | 1 | 2 | 22.8% | | | | |
| | 2 | 4 | 23.4% | | | | |
| | 3 | 6 | 25.0% | | | | |
| | | | | | | | |
| 123 | 1 | 2 | 24.7% | | | | |
| | 2 | 4 | 26.9% | | | | |
| | 3 | 6 | 32.4% | | | | |
| | | | | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 124 | 1 | 2 | 23.4% | | | | |
| | 2 | 4 | 22.1% | | | | |
| | 3 | 6 | 24.1% | | | | |
| | | | | | | | |
| 125 | 1 | 2 | 23.7% | | | | |
| | 2 | 4 | 23.1% | | | | |
| | | | | | | | |
| 126 | 1 | 2 | 29.1% | | | | |
| | 2 | 4 | 27.6% | | | | |
| | 3 | 6 | 30.6% | | | | |
| | | | | | | | |
| 127 | 1 | 2 | 20.5% | | | | |
| | 2 | 4 | 24.9% | | | | |
| | 3 | 6 | 25.6% | | | | |
| | | | | | | | |
| 128 | 1 | 2 | 32.5% | | | | |
| | 2 | 4 | 32.5% | | | | |
| | 3 | 6 | 32.8% | | | | |
| | | | | | | | |
| 129 | 1 | 2 | 21.4% | | | | |
| | 2 | 4 | 21.3% | | | | |
| | 3 | 6 | 26.3% | | | | |
| | | | | | | | |
| 130 | 1 | 2 | 26.3% | | | | |
| | | | | | | | |
| 134 | 1 | 2 | 28.7% | | | | |
| | 2 | 4 | 31.3% | | | | |
| | 3 | 6 | 32.9% | | | | |
| | | | | | | | |
| 136 | 1 | 2 | 29.8% | | | | |
| | 2 | 4 | 31.2% | | | | |
| | 3 | 6 | 32.1% | | | | |
| | | | | | | | |
| 137 | 1 | 2 | 30.0% | | | | |
| | 2 | 4 | 31.8% | | | | |
| | 3 | 6 | 30.9% | | | | |
| | | | | | | | |
| 138 | 1 | 2 | 18.2% | | | | |
| | 2 | 4 | 21.2% | | | | |
| | 3 | 6 | 23.1% | | | | |
| | | | | | | | |
| 140 | 1 | 1 | 21.4% | | | | |
| | 2 | 3 | 23.0% | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 141 | 1 | 2 | 22.7% | | | | |
| | 2 | 4 | 24.8% | | | | |
| | 3 | 6 | 31.4% | | | | |
| | | | | | | | |
| 142 | 1 | 2 | 33.5% | | | | |
| | 2 | 4 | 28.1% | | | | |
| | 3 | 6 | 28.2% | | | | |
| | | | | | | | |
| 143 | 1 | 2 | 43.7% | | | | |
| | 2 | 4 | 33.4% | | | | |
| | 3 | 6 | 32.9% | 49 | 29 | 20 | ML |
| | | | | | | | |
| 144 | 1 | 2 | 32.4% | | | | |
| | 2 | 4 | 33.5% | | | | |
| | 3 | 6 | 31.4% | | | | |
| | | | | | | | |
| 146 | 1 | 2 | 37.6% | | | | |
| | | | | | | | |
| 147 | 1 | 2 | 24.5% | | | | |
| | 2 | 4 | 22.8% | | | | |
| | | | | | | | |
| 148 | 1 | 2 | 22.1% | | | | |
| | 2 | 4 | 21.1% | | | | |
| | 3 | 6 | 23.2.% | | | | |
| | | | | | | | |
| 149 | 1 | 2 | 35.4% | | | | |
| | 2 | 4 | 38.7% | | | | |
| | 3 | 6 | 39.8% | | | | |
| | | | | | | | |
| 150 | 1 | 2 | 21.1% | | | | |
| | 2 | 4 | 20.0% | | | | |
| | 3 | 6 | 19.9% | | | | |
| | | | | | | | |
| 151 | 2 | 4 | 25.1% | | | | |
| | | | | | | | |
| 154 | 1 | 2 | 32.4% | | | | |
| | 2 | 4 | 30.7% | | | | |
| | | | | | | | |
| 155 | 1 | 2 | 22.4% | | | | |
| | 2 | 4 | 23.3% | | | | |
| | 3 | 6 | 25.9% | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| SOIL DATA SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bear Creek Property | | | | | | | |
| GEOServices Project No. 31-211695 | | | | | | | |
| December 13, 2021 | | | | | | | |
| Observation Trench Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits | | | Soil Type |
| | | | | LL | PL | PI | |
| 156 | 1 | 2 | 20.4% | | | | |
| | 2 | 4 | 18.3% | | | | |
| | 3 | 6 | 20.7% | | | | |
| | | | | | | | |
| 157 | 1 | 2 | 22.4% | | | | |
| | 2 | 4 | 23.3% | | | | |
| | 3 | 6 | 25.9% | | | | |
| | | | | | | | |
| 159 | 1 | 2 | 27.2% | | | | |
| | 2 | 4 | 33.2% | | | | |
| | | | | | | | |
| 160 | 1 | 2 | 20.8% | | | | |
| | 2 | 4 | 22.5% | | | | |
| | | | | | | | |
| 161 | 1 | 2 | 39.3% | | | | |
| | | | | | | | |
| 165 | 1 | 2 | 31.9% | | | | |
| | 2 | 4 | 35.9% | | | | |
| | | | | | | | |
| 166 | 1 | 2 | 35.0% | | | | |
| | 2 | 4 | 31.5% | | | | |
| | | | | | | | |
| 167 | 1 | 2 | 32.0% | | | | |
| | | | | | | | |
| 169 | 1 | 2 | 26.0% | | | | |
| | | | | | | | |
| 170 | 1 | 2 | 22.8% | | | | |
| | 2 | 4 | 23.5% | | | | |
| | | | | | | | |
| 171 | 1 | 2 | 38.9% | | | | |
| | 2 | 4 | 38.6% | | | | |
| | | | | | | | |
| 173 | 1 | 2 | 21.0% | | | | |
| | 2 | 4 | 21.6% | | | | |
| | 3 | 6 | 23.5% | | | | |
| | | | | | | | |
| 176 | 1 | 2 | 18.8% | | | | |
| | 2 | 4 | 21.2% | | | | |
| | 3 | 6 | 22.0% | | | | |
| | | | | | | | |
| 177 | 1 | 2 | 29.0% | | | | |
| | | | | | | | |
| 178 | 1 | 2 | 30.9% | | | | |
| | | | | | | | |

GEOServices, LLC, Geotechnical and Materials Engineers



**APPENDIX C**

N




Photo: 6



Photo: 5



Photo: 1



Photo: 2



Photo: 3



Photo: 4



**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Representative Photos
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

GEOS Project No. 31-211695

FIGURE: 5




Photo: 12



Photo: 11



Photo: 7



Photo: 8



Photo: 9



Photo: 10



**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Representative Photos
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

GEOS Project No. 31-211695

FIGURE: 6

N






















**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Representative Photos
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

GEOS Project No. 31-211695

FIGURE: 7

N




Photo: 24



Photo: 23



Photo: 19



Photo: 20



Photo: 21



Photo: 22



**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Representative Photos
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021
GEOS Project No. 31-211695
FIGURE: 8

N




Photo: 25



Photo: 26



**Notes:**

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (11/25/2019)

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Representative Photos
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE: 12/20/2021

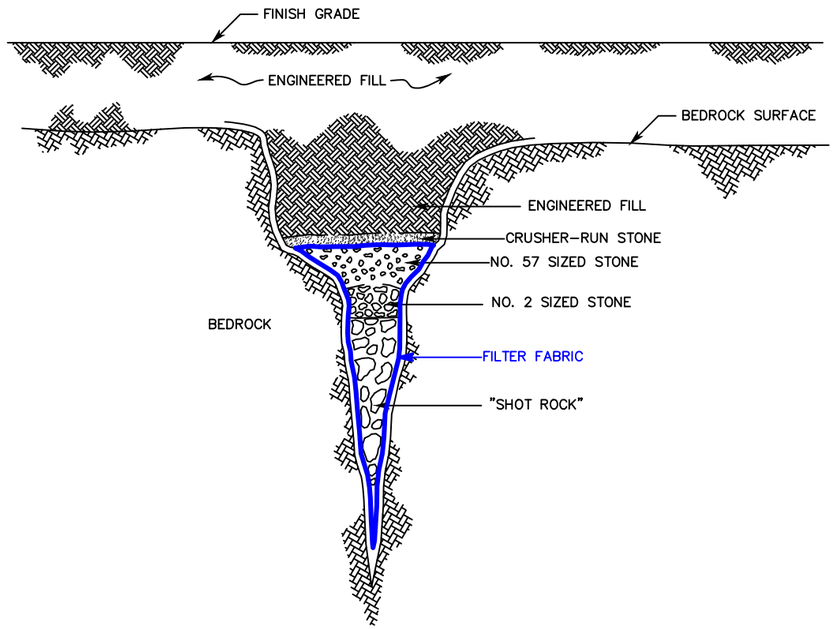
GEOS Project No. 31-211695

FIGURE: 9

GEOServices, LLC, Geotechnical and Materials Engineers

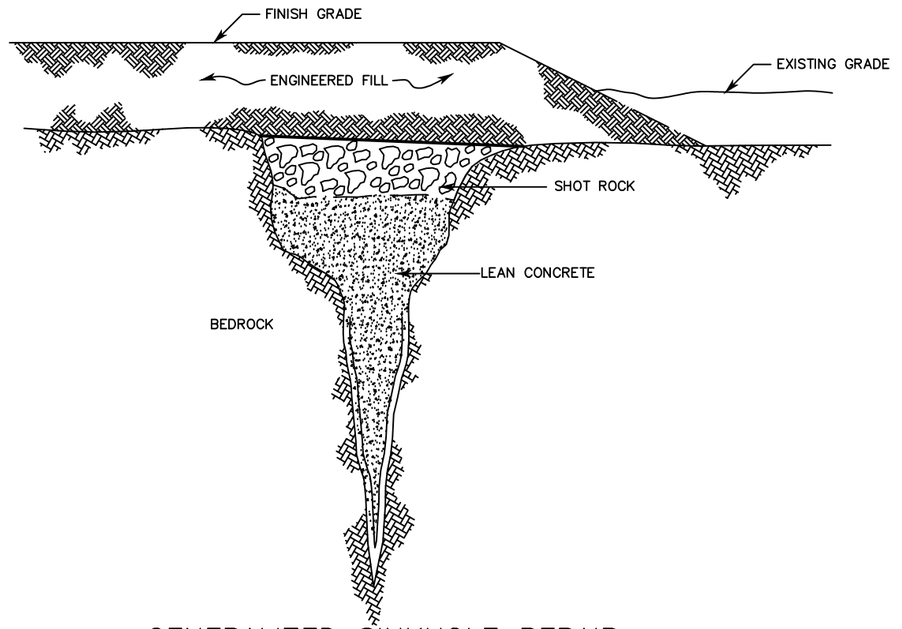


**APPENDIX D**




GENERALIZED SINKHOLE REPAIR

FOR USE IN NON–BUILDING AREAS




GENERALIZED SINKHOLE REPAIR

FOR USE IN BUILDING AREAS

ACTUAL DIMENSIONS OF EXCAVATION AND VOLUMES
OF BACKFILL MATERIAL WILL BE BASED ON THE GEOTECHNICAL
ENGINEERS FIELD OBSERVATIONS DURING THE REPAIR

Universal Engineering Sciences
GEOS
Geotechnical, Environmental and Materials Engineers

Typical Sinkhole Repair Detail
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee

DATE:
12/20/2021

GEOS Project No.
31-211695

FIGURE:
10

GEOS Universal Engineering Sciences
Geotechnical, Environmental and Materials Engineers

March 8, 2022

HK Big Bear Bluffs LLC
14025 Riveredge Drive, Suite 175
Tampa, FL 33637

Attention: Mr. James Harvey
jgibbs@kolter.com

**Subject:** **REPORT OF GEOTECHNICAL EXPLORATION SERVICES**
Proposed Bear Creek Property
Bear Creek Pike to Iron Bridge Road
Columbia, Tennessee
GEOServices Project No. 31-211695

Dear Mr. Harvey:

We are submitting the results of the geotechnical exploration performed for the proposed Bear Creek Property development in Columbia, Tennessee. The geotechnical exploration was performed in accordance with GEOServices Proposal No. 13-211952 dated October 14, 2021 and authorized by you on November 5, 2020.

The following report presents our findings and recommendations for the proposed development. Should you have any questions regarding this report, or if we can be of any further assistance, please contact us at your convenience.

Sincerely,

**GEOServices, LLC**




3/8/2022
31-211695

Jacob L. Barber, E.I.
Staff Professional

Jerry W. Gammon, PE
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# REPORT OF

# GEOTECHNICAL EXPLORATION

## Proposed Bear Creek Property
## Columbia, Tennessee

**GEOServices Project No. 31-211695**

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# 1.0 INTRODUCTION

## 1.1 PURPOSE

The purpose of this geotechnical exploration was to characterize the subsurface conditions for the design and construction of the Proposed Bear Creek Property development in Columbia, Tennessee. This report provides recommendations for general site preparation, excavation and fill requirements, foundation design, and slab-on-grade construction.

## 1.2 PROJECT DESCRIPTION

Initial project information was provided in an October 12, 2021, email transmission from Mr. Joshua Gibbs (Kolter Land Partners, LLC) to Mr. Jerry Gammon (GEOServices). A drawing titled "Bear Creek Property Boundary Survey", and an outlined aerial photo of the property was attached to the email. A site plan titled "Big Bear Farms – Master Plan" dated December 22, 2021 was provided in subsequent emails. We understand that a single-family residential development is planned to be developed on two adjoining properties, totaling approximately 420-acres located in Columbia, Tennessee. We assume the structures will be standard 1 to 2-story structures, assumed to be wood-framed with vinyl, stone, and brick veneer, slab-on-grade, and supported by shallow foundations. We have assumed cut depths and fill thicknesses will be less than about 10 feet, respectively. At this time, structural loading information has not been provided. From past experience with similar projects, we assume maximum column and wall loadings will be about 30 kips, and 1 kip per linear foot (klf), respectively.

At the time of site reconnaissance, the subject site was generally open grass areas as well as some moderate to densely forested areas. The wooded areas were generally to the southern portions and western portions of the property. Throughout the property, areas of large rock

outcropping/boulders were observed at the ground surface. Existing structures were noted onsite including barn structures toward the north, an existing residential structure in the northern area of the property, and a residential structure off of Iron Bridge Road at the southern edge of the property with accompanying barn structures. Surficial evidence of possible karst activity was noted in some areas, and representative photographs can be observed in Site Photos of the appendices. The site was observed to be generally rolling in elevation, with relatively steep changes in other areas. Several drainage features were observed throughout the property, generally in wooded areas. Several water features were observed throughout the property as well, as seen in Site Photos of the Appendices. Elevation changes across the property observed from Google Earth aerial imagery is noted to range from about 570 to about 725 feet. A proposed grading plan has not been provided at this time. GEOServices should be contacted once a final grading plan has been completed to verify the recommendations provided in the following sections still apply.

### 1.3 SCOPE OF SERVICES

This geotechnical exploration involved a site reconnaissance, field exploration, and engineering analysis. The following sections of this report present discussions of the field exploration, site conditions, and conclusions and recommendations. Following the text of this report, an observation trench summary and figures are provided in the appendices. Appendix A provides figures and observation trench summary records. Appendix B provides laboratory testing results. Appendix C provides representative site photographs. Appendix D provides a typical sinkhole repair detail.

The geotechnical scope of services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, subsurface water, or air, on, or below, or around this site. Any statements in this report

or on the observation trench summary regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

## 2.0 EXPLORATION AND TESTING PROGRAMS

### 2.1 FIELD EXPLORATION

The site subsurface conditions were explored with 183 observation trenches at or near the locations shown by Figure 3 in Appendix A and were performed on November 29 and 30, December 1, 2, 3, 6, 7, 8, and 9, 2021, and March 4, 2022. Originally, the site was planned to be explored with 180 observation trenches. However, 8 of the 180 observation trenches (OT-16, OT-17, OT-22, OT-64, OT-74, OT-77, and OT-95) were not performed due to rocky conditions which were inaccessible to the mini-excavator. Therefore, these remaining 8 test locations were explored with hand tools. Furthermore, OT-1 was not performed in an effort to avoid hitting any existing utilities associated with the existing residence on-site and was explored with hand tools as well. The test locations were selected and located in the field by GEOServices by measuring distances from known site reference points and utilizing GPS coordinates extrapolated from Google Earth.

The observation trench locations were advanced using a subcontracted mini-excavator. Sampling of overburden soils was accomplished using a dynamic cone penetrometer (DCP). In dynamic cone penetrometer (DCP) testing, a 1.5-inch diameter cone (45$^{o}$ vertex angle) is driven into the subgrade soil with a 15-pound steel mass falling 20 inches. The blows required to drive the embedded cone a depth of 1-3/4 inch have been correlated to N-values derived from the Standard Penetration Test (SPT). These DCP-values are indicated on the summary of observation trench logs at the testing depth and provide an indication of the relative density of granular materials and strength of cohesive materials.

The observation trenches were monitored for the presence of groundwater and backfilled upon completion. Minor settlement should be expected of the backfilled material over time. Detailed observation trench records are presented in Appendix A.

### 2.2 LABORATORY TEST PROGRAM

Soil samples collected during excavation were transported to our laboratory for visual classification and laboratory testing. The following laboratory testing was performed on select samples to determine various properties of the soil:

- Natural Moisture Content (ASTM D 2216): Moisture content determinations were performed. The natural moisture content is defined as the ratio of the weight of water present in the soil to the dry weight of soil.

- Atterberg Limits (ASTM D 4318): Atterberg Limits tests were performed. These tests help us to confirm our visual classifications according to the AASHTO Classification System and the Unified Soil Classification System (USCS). The plastic limit and liquid limit represent the moisture content at which a cohesive soil changes from a semi-solid to a plastic state and from a plastic state to liquid state, respectively.

The laboratory test results are presented in Appendix B.

## 3.0 SITE CONDITIONS

### 3.1 GEOLOGIC CONDITIONS

The subject site is located within the Central Basin Physiographic Province of Middle Tennessee. The Central Basin is an elliptical basin surrounded by the Highland Rim. The Basin is subdivided into inner and outer sections. The inner section is generally smooth and gently rolling in contrast to the higher and more deeply dissected outer Basin. Bedrock is primarily Ordovician limestone, shale, and dolomite in the outer Basin. The inner basin is generally covered with limestone with patches of bare platy rock and thin topsoil with glade areas supporting red cedar trees. The region

is moderate in karst development with many sinkholes and some large caves present, notably in the glade areas.

The Geologic Maps of the Carters Creek Quadrangle, Tennessee (Tennessee Division of Geology, 1963), Glendale Quadrangle, Tennessee (Tennessee Division of Geology, 1963), and Columbia Quadrangle, Tennessee (Tennessee Division of Geology, 1964) shows the site is underlain by the Hermitage, Carters, and Lebanon Limestone formations.

The Hermitage formation is typically a medium to dark brownish gray limestone. Residual soil formed by the in-place solution weathering of the parent limestone is typically a brownish sandy to silty clay. The horizontal bedding and somewhat uniform weathering characteristics of the Hermitage formation do not typically create conditions conducive to the creation of karst features, except where the formation weathers through to the underlying Carters formation, which is much more susceptible for the development of Karst.

The Carters Limestone formation is typically a hard, light gray to brownish gray, very fine grained to cryptocrystalline (i.e., microscopically crystalline), thin-bedded, with occasional thin shale lenses. The limestone weathers to produce a 5- to 10-foot thick layer of native soil (residuum) which is typically an orange to brown silty clay. The soil/rock interface may be irregular due to a layer of rounded boulders at the base of the soil zone.

The Lebanon Limestone formation is typically a medium-gray to medium dark-gray and yellowish-brown, cryptocrystalline to very fine-grained with some beds ranging up to coarse grained, thin-bedded limestone with thin shale partings, fossiliferous, and dolomitic fucoids common. These limestones generally weather to produce a layer of native soil (residuum) which is typically a brown or reddish-brown high plasticity clay with chert. Glades (i.e., areas of very thin soil) are common on which only limited vegetation, other than cedar trees, will grow.

The limestone bedrock consisting of Carters Limestone formation is susceptible to solution weathering and the creation of karst features, such as sinkholes. In general, because of the shallow overburden soils, karst features are relatively small in horizontal extent, but can extend into the bedrock several feet. Review of the topographic mapping indicated the presence of a closed depression onsite as shown in Figure 2 of the Appendices. Several other closed depressions are indicated within 1 mile of the site, primarily to the west and south of the site. We note the scale of the map often precludes mapping of smaller depressions. The area indicated on the topographic mapping as a closed depression can be seen in Site Photos 22, 23, and 24 of the Appendices, as well as other small locations containing surficial signs of possible karst activity in Site Photos 17 and 25. Due to the heavy underbrush encountered throughout the site, it is possible that other locations of possible karst activity were not observed during field activities.

Since the bedrock underlying the site mainly consists of carbonate rock, the site is susceptible to the typical carbonate hazards of irregular weathering, cave and cavern conditions, and overburden sinkholes. Carbonate rock, while appearing very hard and resistant, is soluble in slightly acidic water. This characteristic, plus differential weathering of the bedrock mass, is responsible for the hazards. Of these hazards, the occurrence of sinkholes is potentially the most damaging to overlying soil-supported structures. In Middle Tennessee, sinkholes occur primarily due to differential weathering of the bedrock and "flushing" or "raveling" of overburden soils into the cavities in the bedrock. The loss of solids creates a cavity or "dome" in the overburden. Growth of the dome over time or excavation over the dome can create a condition in which rapid, local subsidence or collapse of the roof of the dome occurs.

**3.2 SUBSURFACE CONDITIONS**

At the surface of each of the 183 observation trenches, topsoil was encountered to depths ranging from about 1 to 18 inches below the existing ground surface elevation. Beneath the

surficial layers, excavator refusal or residual soils were encountered to excavator refusal or termination depths ranging from about 0.2 to 8.5 feet below the existing ground surface elevation.

### *3.2.1 Residual Soils*

Beneath the surficial layers, residual soils were encountered in 169 of the 183 observation trenches to excavator refusal or termination depths ranging from about 0.8 to 8.5 feet below the existing ground surface elevation. The residual soils generally consisted of brown, light brown, reddish brown, dark brown, orangish brown, and gray clays with varying amounts of siltstone, sandstone, sand, chert fragments, boulders, weathered rock fragments, and black mottling. A dynamic cone penetrometer (DCP) is used to evaluate the consistency or density of the subsurface soils. The DCP values of the residual soils ranged from 1 blow per increment to in excess of 15 bpi, indicating a consistency of very soft to very stiff. The natural moisture content of the residual soil samples retrieved from the exploration ranged from 15.2 to 43.7 percent. Atterberg limits testing on samples of the residual soils retrieved observation trenches OT-2, OT-6, OT-42, OT-84, OT-143 yielded liquid limits (LL) ranging from 28 to 57 percent and plasticity indices ranging (PI) from 9 and 26 percent. These soils are classified as lean clay (CL), fat clay (CH), silt (ML) and silt (MH), in accordance with the Unified Soil Classification System (USCS).

### *3.2.2 Refusal Conditions*

Observation trench refusal materials were encountered in 92 of the 183 observation trenches at depths ranging from about 0.2 to 8 feet below existing ground surface elevation. Refusal is a designation applied to any material that cannot be penetrated by the bucket of the mini-excavator. Refusal may indicate dense gravel or cobble layers, boulders, rock ledges or pinnacles, dense siltstone layers, or the top of continuous bedrock. Based on our observations during the observation trench excavations, we anticipate the refusals are due to encountering limestone

bedrock, and/or immovable boulders. The following table presents the observation trench refusal depths at the observation trench locations:

| OBSERVATION TRENCH REFUSAL DEPTHS | | | | | |
|---|---|---|---|---|---|
| **Location** | **Refusal Depth (feet)** | **Location** | **Refusal Depth (feet)** | **Location** | **Refusal Depth (feet)** |
| OT-1 | TNP | OT-66 | 3 ½ | OT-131 | 7 |
| OT-2 | > 8 | OT-67 | > 8 | OT-132 | ½ |
| OT-3 | 6 ½ | OT-68 | > 8 | OT-133 | 1 |
| OT-4 | > 8 | OT-69 | > 8 | OT-134 | > 8 |
| OT-5 | 3 | OT-70 | > 8 | OT-135 | 1 |
| OT-6 | > 8 | OT-71 | > 8 | OT-136 | > 8 |
| OT-7 | > 8 | OT-72 | > 8 | OT-137 | > 8 |
| OT-8 | > 8 | OT-73 | > 8 | OT-138 | > 8 |
| OT-9 | > 8 | OT-74 | TNP | OT-139 | 3 |
| OT-10 | 3 ½ | OT-75 | 1 | OT-140 | > 8 |
| OT-11 | > 8 | OT-76 | 1 | OT-141 | > 8 |
| OT-12 | 6 | OT-77 | TNP | OT-142 | > 8 |
| OT-13 | 7 ½ | OT-78 | 2 ½ | OT-143 | > 8 |
| OT-14 | 3 ½ | OT-79 | 4 ½ | OT-144 | 7 ½ |
| OT-15 | > 8 | OT-80 | 4 | OT-145 | 1 |
| OT-16 | TNP | OT-81 | > 8 | OT-146 | 2 ½ |
| OT-17 | TNP | OT-82 | > 8 | OT-147 | > 7 ½ |
| OT-18 | 1 | OT-83 | > 8 | OT-148 | > 8 |
| OT-19 | > 8 | OT-84 | > 8 | OT-149 | > 8 |
| OT-20 | 1 | OT-85 | 4 ½ | OT-150 | > 8 |
| OT-21 | 2 ½ | OT-86 | > 8 | OT-151 | > 7 ½ |
| OT-22 | TNP | OT-87 | > 8 | OT-152 | 4 ½ |

| | | | | | |
|---|---|---|---|---|---|
| OT-23 | > 8 | OT-88 | 8 | OT-153 | 3 ½ |
| OT-24 | 0 | OT-89 | 3 ½ | OT-154 | 7 ½ |
| OT-25 | 2 | OT-90 | 1 ½ | OT-155 | > 8 |
| OT-26 | 3 | OT-91 | ½ | OT-156 | > 8 |
| OT-27 | > 6 | OT-92 | > 8 | OT-157 | 7 |
| OT-28 | > 8 | OT-93 | 5 ½ | OT-158 | ½ |
| OT-29 | 1 ½ | OT-94 | ½ | OT-159 | 7 |
| OT-30 | 0 | OT-95 | TNP | OT-160 | > 8 |
| OT-31 | 2 | OT-96 | 1 | OT-161 | 5 |
| OT-32 | > 8 | OT-97 | > 8 | OT-162 | 2 |
| OT-33 | 4 ½ | OT-98 | 2 | OT-163 | 3 ½ |
| OT-34 | > 6 | OT-99 | > 7 | OT-164 | 2 ½ |
| OT-35 | 1 | OT-100 | > 7 | OT-165 | 4 ½ |
| OT-36 | > 7 | OT-101 | > 8 | OT-166 | 7 |
| OT-37 | > 8 | OT-102 | > 7 ½ | OT-167 | 5 |
| OT-38 | 6 | OT-103 | 3 ½ | OT-168 | 3 |
| OT-39 | > 8 | OT-104 | > 8 | OT-169 | 3 ½ |
| OT-40 | > 8 | OT-105 | 5 ½ | OT-170 | > 8 |
| OT-41 | > 8 | OT-106 | 6 ½ | OT-171 | 5 ½ |
| OT-42 | > 8 | OT-107 | > 7 | OT-172 | 1 |
| OT-43 | > 8 | OT-108 | > 8 | OT-173 | > 8 |
| OT-44 | > 8 | OT-109 | > 8 | OT-174 | 3 |
| OT-45 | 6 | OT-110 | > 8 | OT-175 | 1 ½ |
| OT-46 | 5 ½ | OT-111 | > 8 | OT-176 | > 8 |
| OT-47 | > 8 | OT-112 | 1 ½ | OT-177 | 2 ½ |
| OT-48 | > 8 | OT-113 | 1 | OT-178 | 3 ½ |
| OT-49 | > 8 | OT-114 | 1 | OT-179 | > 8 |
| OT-50 | 4 | OT-115 | 3 ½ | OT-180 | 3 ½ |

| | | | | | |
|---|---|---|---|---|---|
| OT-51 | 7 | OT-116 | > 8 | OT-181 | TNP |
| OT-52 | > 8 | OT-117 | > 8 | OT-182 | TNP |
| OT-53 | > 8 | OT-118 | > 8 | OT-183 | TNP |
| OT-54 | > 8 | OT-119 | 3 ½ | OT-184 | > 8 ½ |
| OT-55 | 2 ½ | OT-120 | 4 ½ | OT-185 | 1 ½ |
| OT-56 | 2 | OT-121 | 3 ½ | OT-186 | 8 |
| OT-57 | 3 | OT-122 | > 8 | OT-187 | > 8 |
| OT-58 | > 8 | OT-123 | 7 ½ | OT-188 | > 8 ½ |
| OT-59 | > 8 | OT-124 | > 8 | OT-189 | 4 |
| OT-60 | > 8 | OT-125 | > 8 | OT-190 | 1 |
| OT-61 | > 8 | OT-126 | > 8 | OT-191 | 3 |
| OT-62 | > 8 | OT-127 | > 8 | OT-192 | 1 |
| OT-63 | > 8 | OT-128 | > 8 | OT-193 | 1 |
| OT-64 | TNP | OT-129 | > 8 | OT-194 | 2 ½ |
| OT-65 | > 8 | OT-130 | 5 | | |

Note: Refusal depths are taken from the ground surface elevation at the time of exploration and should be considered approximate. Depths rounded to the nearest ½ foot. TNP – Test Locations were explored via hand tools.

### *3.2.3 Subsurface Water*

Subsurface water was encountered at OT-152 at a depth of about 4.5 feet below existing ground surface elevation. Additionally, discontinuous zones of perched water may exist within the overburden and/or at the contact with bedrock in other areas of the site. Subsurface water levels may fluctuate due to seasonal change in precipitation amounts or due to construction activities in the area. The groundwater presented in this report is the information that was collected at the time of our field activities. We recommend that the contractor determine the actual groundwater level at the site at the time of the construction activities.

### *3.2.4 General*

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The summary included in Appendix A should be reviewed for specific information at individual test locations. The depth and thickness of the subsurface strata indicated on the boring and observation trench summaries were generalized from and interpolated between test locations. The transition between materials will be more or less gradual than indicated and may be abrupt. Information on actual subsurface conditions exists only at the specific observation trench locations and is relevant to the time the exploration was performed. Variations may occur and should be expected between test locations. The stratification lines were used for our analytical purposes and, unless specifically stated otherwise, should not be used as the basis for design or construction cost estimates.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 SITE ASSESSMENT

The results of the subsurface exploration indicate that the site is adaptable for the proposed construction. However, as is the case with most sites, some inherent challenges are associated with this development of this site. These challenges include soft soil conditions, moisture sensitive soils, shallow refusal conditions, differential bearing concerns, and the underlying karst geology.

### *4.1.1 Soft Soil Conditions*

Soft residual soil conditions were encountered in 37 of the 183 observation trenches at depths as deep as about 6 feet below existing ground surface elevation. Additional weak zones may be

encountered during construction phases. These weak zones encountered can potentially impact the performance of proposed structures and/or pavements depending on final grades. At this time, we have not been provided with a final grading plan. It is likely that some of the weak soils will be removed during mass grading activities. However, if these areas are not completely removed during mass grading activities, they will perform unsatisfactorily during initial proofroll activities in their current condition. Therefore, we recommend that the owner carry a contingency budget to undercut these weak areas during mass grading activities. We recommend that the contractor determine the consistency of the soil in these areas at the site at the time of the construction activities prior to undercutting and replacing.

### *4.1.2 Moisture Sensitive Soils*

The subgrade soils at this site, as with most sites in middle Tennessee, consist of clayey and silty soils. These materials will be sensitive to changes in moisture contents. As such, it will be advantageous to perform grading activities during periods of warm and/or dry weather. Areas that are wet or become unstable can possibly be repaired by scarification and recompaction if grading occurs during warm, dry weather. If grading occurs during wet, cool weather, we expect that any possible soft soil at or near the surface soils across the site will have to be undercut and replaced. A budget contingency should be established for subgrade stabilization consistent with the time of year that grading will take place.

### *4.1.3 Shallow Refusal Conditions*

Observation trench refusal materials were encountered in 84 of the 183 observation trenches at depths ranging from about 0.2 to 8 feet below existing ground surface elevation. The refusal materials encountered were generally hard and could not be penetrated by the bucket of the mini-excavator. These refusal materials are anticipated to be encountered in a portion of the

building footprints. As such, we anticipate excavation of the refusal materials could require blasting or hoe-ramming for removal.

### *4.1.4 Differential Bearing Concerns*

Based on the results of our subsurface exploration, the possibility exists that a portion of the building foundations may bear in clay soil overburden material, while a portion could be bearing on bedrock conditions. This condition will result in a differential bearing condition which could result in excessive differential settlement across the buildings. As a result, recommendations to reduce the concern with differential settlement are provided in further sections.

### *4.1.5 Karst Geology*

A certain degree of risk with respect to sinkhole formation and subsidence should be considered with any site located within geologic areas underlain by potentially soluble rock units. While an extensive effort to assess the potential for sinkhole formation on this site was beyond the scope of this evaluation, our observation trenches did not encounter obvious indications of sinkhole development. However, we do note apparent evidence a closed depression shown onsite from publicly available topographic maps. This area is depicted in Site Photos 22, 23, and 24 in the Appendices. Other areas containing surficial signs of possible karst activity are shown in Site Photos 17 and 25. If any karst feature is located in an area that require fill materials to achieve subgrade elevation, the observed karst feature should be stripped of clayey soil and the “throat” be remediated prior to structural backfill. GEOServices should be retained to provide recommendations during development activities.

## 4.2 SITE PREPARATION

### *4.2.1 Subgrade*

Vegetation, topsoil, existing utilities, existing foundations, organic soils, rock fragments greater than 6 inches, and other debris should be removed from the proposed construction area. In the more wooded areas, thicker topsoil depths or deep root zones may be encountered which will also require removal. The actual depth of removal should be determined by a representative of the geotechnical engineer at the time of construction.

After completion of stripping operations and any required excavations to reach planned subgrade elevation, we recommend that the subgrade be proofrolled with a fully loaded, tandem-axle dump truck or other pneumatic-tired construction equipment of similar weight. The geotechnical engineer or his representative should observe proofrolling. Please note isolated undercutting should be expected within lots or roadways following proofroll activities and during the foundation observation process to eliminate isolated zones of weak soil layers. Weak or unstable areas should be undercut and remediated at the geotechnical engineer's recommendation. Areas to receive structural soil fill should also be proofrolled prior to the placement of any fill.

### *4.2.2 Structural Soil Fill*

Material considered suitable for use as structural fill should be clean soil free of organics, trash, and other deleterious material, containing no rock fragments greater than 6 inches in any one dimension. Preferably, structural soil fill material should have a standard Proctor maximum dry density of 90 pcf or greater and a plasticity index (PI) of 35 percent or less. Materials with a PI greater that 35 percent are susceptible to volume changes with changes in moisture content. Volume changes in the foundation subgrade can cause structural distress in buildings, floor slabs, and pavements. Material to be used as structural fill should be tested by the geotechnical engineer to confirm that it meets the project requirements before being placed. This testing typically requires

at least 3 to 4 days to complete. To avoid delays during grading, samples of proposed fill materials (both on-site and off-site) should be collected during site preparation activities.

Structural fill should be placed in loose, horizontal lifts not exceeding 8 inches in thickness. Each lift should be compacted to at least 95 percent of the soil's maximum dry density per the standard Proctor method (ASTM D698) and within the range of minus (-) 2 percent to plus (+) 3 percent of the optimum moisture content. Each lift should be tested by geotechnical personnel to confirm that the contractors' method is capable of achieving the project requirements before placing any subsequent lifts. Any areas, which have become soft or frozen, should be removed before additional structural fill is placed.

### *4.2.3 Imported Shotrock / Processed Rock Fill*

Shotrock, with acceptable gradation, can be used as structural fill. Shotrock utilized as structural fill should be well graded with a maximum rock size of 18 inches and be placed in lifts not to exceed 24 inches thick at depths deeper than 3 feet below planned subgrade elevation. Shotrock shallower than 3 feet below planned subgrade elevation should have a maximum rock size of 8 inches in largest dimension and placed in lifts not to exceed 12 inches thick.

Rock fill should have adequate fines to effectively "choke" the larger rock pieces, adequately filling voids or open spaces. The larger rock pieces should lie flat and not overlap each other. The percentage of soil in the fill should be limited to a maximum of 10 percent. Rock fill should be compacted using complete passes of a D-8 class crawler tractor, or equivalent. A pass is defined as a complete coverage of the surface with the D-8 track overlapping 50 percent. Half of the passes should be in each perpendicular direction. Rock fill placement should be accomplished under the full-time observation of a representative of the geotechnical engineer.

### *4.2.4 Compacted Crushed Stone Fill*

Compacted crushed stone fill should be Type A, Class A, and Grading D in accordance with Section 903.05 of the Tennessee Department of Transportation specifications. The crushed stone fill should be placed in loose, horizontal lifts not exceeding 10 inches in loose thickness. Each lift should be compacted to at least 95 percent of maximum dry density per the standard Proctor method (ASTM D698). Each lift should be compacted and tested by geotechnical personnel to confirm that the contractor's method is capable of achieving the project requirements before placing any subsequent lifts.

## 4.3 FOUNDATIONS

### *4.3.1 Shallow Foundations*

***Soil Bearing Foundations***

Foundations for the proposed construction can bear on stiff or better residual soils or properly placed and compacted structural soil fill. The recommended allowable bearing capacity for design of these foundations is 2,000 pounds per square foot (psf) or less. We recommend that continuous foundations be a minimum of 18 inches wide and isolated spread footings be a minimum of 24 inches wide to reduce the possibility of a localized punching shear failure. Exterior footings should be designed to bear at least 18 inches below finished exterior grade to protect against frost.

As mentioned previously, observation trench refusal was encountered at depths ranging about 0.2 to 8 feet below the existing ground surface elevation. It should be anticipated that bedrock may be encountered during foundation and/or utility excavations. If rock is encountered at the foundation bearing elevation, we recommend the rock be removed to a minimum depth of 12 inches below planned bearing elevation. The area can then be backfilled with properly compacted crushed stone or structural soil fill. The backfill will help act as a “cushion” to prevent point loading of the

foundation. If desired, the foundation designer may also elect to include additional reinforcing steel into the foundations at these transition points to help resist negative moment forces.

***Rock Bearing Foundations***

If bedrock is encountered over the majority of the building foundations, the remaining isolated foundation areas underlain by soil can be over-excavated to bedrock or a maximum of 4 feet, cleaned of remaining soil particles, and backfilled with lean concrete, flowable fill, or compacted rock fill. The recommended allowable bearing capacity for design of the foundations bearing on bedrock or rock fill is 4,000 pounds per square foot (psf) or less.

Foundation excavations should be opened, the subgrade evaluated, remedial work performed, and concrete placed in an expeditious manner. Exposure to weather often reduces foundation support capabilities, thus necessitating remedial measures prior to concrete placement. It is also important that proper surface drainage be maintained both during construction (especially in terms of maintaining dry footing trenches) and after construction.

### *4.3.2 Slabs-on-Grade*

For slab-on-grade construction, the site should be prepared as previously described. We recommend that the subgrade be topped with a minimum 4-inch layer of crushed stone. A polyethylene vapor barrier is not required if the designer utilizes a dense graded aggregate base. The subgrade should be proofrolled and approved prior to the placement of the crushed stone. Based on the conditions encountered on this site, we recommend that the floor slabs be designed using a subgrade modulus of 100 pounds per cubic inch (pci). This subgrade modulus value is for small diameter loads (i.e., a 1 foot by 1-foot plate) and should be adjusted for wider loads.

At sites that have high plasticity soils, certain precautions should be considered to minimize or eliminate the potential for volume changes. If high plasticity clay is encountered at final subgrade

elevations, we recommend the soils directly beneath the slab undergo additional plasticity testing during construction to determine the plasticity of the underlying soils. Once this has been completed, recommendations for the required depth of removal can be provided, if needed. If removal of the highly plastic soils is not desirable, then measures should be taken to protect the soils from excessive amounts of wetting or drying. In addition, modification of the soils by lime or cement treatment can be utilized to reduce the soil plasticity.

## 5.0 CONSTRUCTION CONSIDERATIONS

### 5.1 EXCAVATIONS

Excavator refusal materials were encountered at depths ranging from about 0.4 to 8 feet below the existing ground surface elevation. Excavator refusal conditions generally correspond to materials which require blasting for removal. Typically, soils penetrated by the bucket of the excavator can be removed with conventional earthmoving equipment. However, excavation equipment varies, and field refusal conditions may vary. The weathering process is erratic and variations in the rock profile can occur in small lateral distances. Therefore, it is possible that some partially weathered rock and/or rock pinnacles or ledges requiring difficult excavation techniques may be encountered in isolated areas of the site between our observation trench locations.

#### *Excavation Safety*

Excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. The contractor is usually solely responsible for site safety. This information is provided only as a service and under no circumstances should GEOServices be assumed to be responsible for construction site safety.

***Overblasting Concerns***

We caution against extensive overblasting in building areas during the site grading operations. Overblasting typically damages below grade bedrock by fracturing or heaving the rock from its original position. This often creates difficulties for foundations and floor slabs supported on these materials by creating voids in the rock unit and greatly reducing the support capacity. Any areas damaged by overblasting should be evaluated by the geotechnical engineer to determine appropriate corrective measures.

## 5.2 FOUNDATION CONSTRUCTION

Foundation excavations should be opened, the subgrade evaluated, remedial work performed, and concrete placed in an expeditious manner. Exposure to weather often reduces foundation support capabilities, thus necessitating remedial measures prior to concrete placement. It is also important that proper surface drainage be maintained both during construction (especially in terms of maintaining dry footing trenches) and after construction. Soil backfill for footings should be placed in accordance with the recommendations for structural fill presented herein.

Foundation subgrade observations should be performed by a GEOServices geotechnical engineer, or his qualified representative, so that the recommendations provided in this report are consistent with the site conditions encountered. A dynamic cone penetrometer (DCP) is commonly utilized to provide information that is compared to the data obtained in the geotechnical report. Where unacceptable materials are encountered, the material should be excavated to stiff, suitable soils or remediated at the geotechnical engineer's direction. Typical remedial measures consist of undercutting, overexcavation, or combinations thereof.

## 5.3 MOISTURE SENSITIVE SOILS

The fine-grained soils encountered at this site will be sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Construction traffic patterns should be varied to prevent the degradation of previously stable subgrade. In addition, plastic soils which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. We caution if site grading is performed during the wet weather season, methods such as discing and allowing the material to dry will be required to meet the required compaction recommendations. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

## 5.4 DRAINAGE AND SURFACE WATER CONCERNS

To reduce the potential for undercut activities and construction induced dropouts, water should not be allowed to collect in the foundation excavations, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped to facilitate removal of any collected rainwater, subsurface water, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slab. The grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

## 5.5 SINKHOLE CORRECTIVE ACTIONS AND CONSIDERATIONS

As mentioned previously, possible karst features were observed within the anticipated development area. We recommend that existing weak soils be removed from the depressed areas to underlying stiff or better residual soil or bedrock and evaluated by GEOServices. At that

time, recommendations will be provided for backfill, which will likely consist of an inverted filter or lean concrete placement if a throat is encountered or lining the bottom of the excavation with geotextile prior to backfilling with clean structural fill.

During construction and based on our experience, corrective actions, such as proper grade selection and positive site drainage, can be performed to decrease but not eliminate the potential for sinkhole development.

In general, the portions of a site that are excavated to achieve the desired grades will have a higher risk of sinkhole development than the areas that are filled, because of the exposure of relic fractures in the soil to rainfall and runoff. On the other hand, those portions of a site that receive a modest amount of fill (or that have been filled in the past) will have a decreased risk of sinkhole development caused by rainfall because that placement of a cohesive soil fill over these areas effectively caps the area with a relatively impervious "blanket" of remolded soil. Therefore, the recommendations that follow incorporate a modest remedial treatment program designed to make the surface of the soil in excavated areas less permeable.

Although it is our opinion that the risk of ground subsidence associated with sinkhole formation cannot be eliminated, we have found that several measures are useful in site design and development to reduce this potential risk. These measures include:

- Maintaining positive site drainage to route surface waters well away from structural areas both during construction and for the life of the structure.
- The scarification and re-compaction of the upper 6 to 10 inches of soil in earthwork cut areas.
- Verifying that subsurface piping beneath structures is carefully constructed and pressure tested prior to its placement in service.
- The use of pavement or lined ditches, particularly in cut areas, to collect and transport surface water to areas away from structures.

Considerations when building within a sinkhole prone area are to provide positive surface drainage away from any proposed building or parking area both during and after construction. Backfill in utility trenches of other excavations should consist of compacted, well-graded material such as dense graded aggregate or compacted on site soils. The use of an open graded stone such as No. 57 stone is not recommended unless the stone backfill is provided an exit path and not allowed to pond. If sinkhole conditions are observed, the type of corrective action is most appropriately determined by GEOServices on a case-by-case basis.

### 5.6 SLOPES

Analysis of proposed slopes for stability was not included in the authorized scope of services. If the client would like this service completed for proposed slopes, GEOS can perform these services for an additional fee, upon request. When requested, GEOS will issue an additional services proposal for review and authorization.

## 6.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. This report is for our geotechnical work only, and no environmental assessment efforts have been performed. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the exploration. The nature and extent of variations between the observation trenches will not become evident until construction. We recommend that GEOServices be retained to observe the

project construction in the field. GEOServices cannot accept responsibility for conditions which deviate from those described in this report if not retained to perform construction observation and testing. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structures are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing. Also, if the scope of the project should change significantly from that described herein, these recommendations may have to be re-evaluated.

January 23, 2024

Paul Keltner, Director
Development Services
City of Columbia, TN

RE: Project# 23-0414; Re-Submittal 400 Bear Creek Parkway – Annexation Request and PUD-R Rezoning

Dear Mr. Keltner,
The accompanying documents and comment responses below are for the resubmittal of the above referenced project. It is our understanding that this project will be on the February CMPC agenda.

Below, please find written responses to the Technical Review comments provided on January 9, 2024.

Included in the submittal are the following:

1. Online/Digital upload of revised PUD-R documents
2. Comment responses to Development Review Committee (below)
3. Revised PUD justification letter
4. PUD-R Deviations Request Document

## Staff Comments:

### Planning

1. City Planner Kevin McCarthy, AICP and Planner Austin Brass, AICP will jointly prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process or technical comments.
   ***Response: Noted.***
2. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, or the comment was previously addressed, please simply note that the information has been acknowledged.
   ***Response: Noted.***
3. As part of the resubmittal, please format the proposed alternative standards to the PUD in a table similar to 4.3.9.1-K either restating the prescribed standard or the proposed alternative as applicable. Alternative standards should be highlighted or otherwise noted to assist the Planning Commission in its evaluation of the proposal. The resubmittal deadline for this and the related application (23-0421) is extended to January 23rd in order to accommodate the time necessary


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to meet this request. Planning staff will meet with the applicant team to explain this request or answer questions about the formatting.
***Response: Please see the new PUD Deviations request document uploaded with this submittal.***

4. Please provide standard for "other open space use" in the format used in Article 5 for Civic Spaces. Use more than one if necessary to convey the unique amenities and protected lands proposed for the site.
   ***Response: The applicant is asking for two deviations from the "greens" standard in order to adapt this existing civic space type to the Columbia Bluffs project. There are open spaces on site that are not civic spaces. These spaces are typically the PUD-R Buffer, riparian areas, and tree save areas.***
5. The justification letter describes the conservation benefits of the proposed PUD-R achieved by clustering. However, the plans depict significant alteration of the site, effectively flattening portions of the landscape in order to create additional single-family lots. Please consider shifting this density to a different structure type or a different location on the site in order to minimize the alteration of western portion of the site, as detailed in comments below.
   ***Response: The applicant has considered the Staff comments and has worked with staff to redesign areas of the plan on the western portion of the site. As a result, the total number of lots on the property is 800. A reduction of 36 lots from the previous submittal.***
6. The plan of development for the site, particularly in the northwestern portion of the site, is too intense and many deviations from the standards of the ordinance stem from this proposed intensity. It may be appropriate to shift density to other parts of the site and/or other structure types; alternatively, it may be appropriate to reduce the overall number of units. Consider eliminating or relocating lots 936-944, and 722-733, 161-164, 104-117, 930-932, and 913-926 (civic space opportunity).
7. ***Response: The applicant has considered the Staff comments and has worked with staff to redesign areas of the plan on the western portion of the site. As a result, the total number of lots on the property is 800. A reduction of 36 lots from the previous submittal.***
8. Consider shifting more tree preservation are into the areas occupied by lots referenced previously 4.3.126.L.
   ***Response: The applicant has considered the Staff comments and has worked with staff to redesign areas of the plan on the western portion of the site. As a result, the total number of lots on the property is 800. A reduction of 36 lots from the previous submittal.***
9. Please identify any areas with naturally occurring slopes of 20 percent or greater which are outside of tree preservation areas.
   ***Response: Naturally occurring slopes of 20% or greater shown on C0.01 Existing Conditions Plan.***
10. The Zoning Administrator generally agrees with the proposed alternative thoroughfare assemblies proposed by the applicant is tailored to the purposes of the proposed PUD and appropriate for the site, provided the City Engineer deems them an acceptable equivalent to the prescribed thoroughfare assemblies in Article 5 of the Zoning Ordinance.
    ***Response: Noted.***
11. The Zoning Administrator has no advice to Planning Commission regarding reduction of setback from 10' to 7.5'.
    ***Response: Noted***

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12. The Zoning Administrator does not support a reduction of side setbacks from 10’ to 5’ on detached alley loaded homes and active adult homes. The proposed alternative provides inadequate spacing between structures.
    ***Response: The applicant is proposing that the alley loaded and active adult homes are to have yards maintained by the HOA. In order to be reduce the maintenance burden to these properties, the setbacks are requested to be reduced. It is the opinion of the applicant that the 5’ minimum setback still allows for the adequate movement of air and positive drainage.***
13. The Zoning Administrator has no advice to Planning Commission regarding the request to allow garages in the 2nd layer for courtyard style homes except to note that this would be allowed in base Character Districts and does not by itself diminish the street-scape.
    ***Response: Noted.***
14. The Zoning Administrator does not support 16' wide doors as an alternative to the 9' maximum prescribed by the Zoning Ordinance.
    ***Response: The applicant is proposing options to de-emphasize the front facing garage doors in most home styles. For most front accessed homes, the applicant is proposing lot diagrams which place the garage in the 3rd layer or perpendicular to the street. The applicant is requesting the alternative size to utilize a smaller garage footprint, but still providing the home with parking for more than one vehicle and/or storage space.***
15. The Zoning Administrator does not support 18' wide driveways as an alternative to the 10 ' maximum prescribed by the Zoning Ordinance. The Zoning Administrator has no advice for Planning Commission regarding the proposed 12' driveway standard.
    ***Response: The 18’ wide driveway is only being requested in the Active Adult homes where the applicant is also requesting a the ability to have a two-car garage in the second layer. In order to allow access to either side of this garage space, an 18’ driveway is necessary. Please see the lot diagrams provided in this submittal for a graphic representation of this request.***
16. The Zoning Administrator generally agrees with the proposed alternative to allow active adult lots to have a finished floor level lower than 18 inches above finished grade at the façade to provide greater accessibility.
    ***Response: Noted.***
17. The Zoning Administrator has no advice for Planning Commission regarding the proposed reduction of window sill height at the façade from 5’ minimum above average grade at façade to 3’ minimum in the active adult and courtyard style homes.
    ***Response: Noted.***
18. The Zoning Administrator does not support a waiver for the use of cul-de-sacs on the site. The large greenfield site can be designed to accommodate network connectivity. Portions of the site where topography makes connecting Thoroughfares impractical are not suitable for development. The creation of new cul-de-sacs exposes the city to liability and long-term maintenance costs for a portion of roadway which only benefits adjacent property owners.
    ***Response: The applicant has redesigned the site to remove the cul-de-sacs from the design.***
19. The Zoning Administrator supports the alternative Civic Space standards and relaxation of Thoroughfare enfronment for Civic Spaces proposed by the applicant.
    ***Response: noted.***
20. The parking area serving the daycare is located in the first layer. Please revise.
    ***Response: The applicant has redesigned this area to remove the parking area from the 1st layer.***

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21. Page 29 of Connect Columbia as part of the future Bicycle and Greenway Plan indicates a proposed greenway trail on the subject site located at the east side of the Duck River connecting with Yanahli Park to the south. Please indicate this connection on the PUD master plan in adherence to the Comp Plan.
    ***Response: The applicant is proposing a multi-use path down the public spine road that connects Iron Bridge Road with Bear Creek Parkway. The applicant proposes that this multi-use path is a more appropriate location to serve the spirit of the Connect Columbia plan than for a paved path than adjacent to the banks of the Duck River. The applicant is seeking to protect the steep slopes and tree canopy in this area and construction of a paved and accessible path through this zone is counterproductive to this goal.***
22. Parking which requires backing directly into a Thoroughfare or Internal drive is prohibited. However, 4.3.12.E.4 (p. 283). 4.3.12.C.14.c (p. 281) implies that an alley can serve as a drive aisle. The parking spaces located on Alleys in the townhomes section not associated with a specific lot or building site should be designated as parking lots and conform to the standards of 4.3.12.C.
    ***Response: Noted.***

## Fire

23. Alleys are not to be used for access for emergency vehicles. An approved fire apparatus road must be within 150' of all points of structures. The townhomes in the back and nearest Bear Creek will not meet this code. Also, unit 205 will be outside this code as well.
    ***Response: The applicant has removed the civic space from in front of the townhomes.***

## Engineering

24. Subject to Construction Plans and Traffic Impact Study.
    ***Response: Noted.***
25. 8% maximum grade on alleys. Lots 206-223, 580-593, 609-620 are at 10%
    ***Response: Alleys revised to meet 8% maximum.***
26. Whenever a proposed street intersects a street with an equal or greater classification, a tangent (measured from the edge of traveled way, or the right-of-way line when determined by the City Engineer, along the centerline of the intersecting street) shall be provided. See ESS Table 3
    Provide road names on all 100 scale sheets. Road names will require E-911 approval
    ***Response: This information has been added to the plans. The applicant is still working through Street Name approval with the E-911 Staff and will add the names currently approved at the time of submittal.***
27. Provide alley street section. Provide boulevard street section. Label dimension for C&G and on-street as 8.5'
    ***Response: Alley Street Section has been provided and 2.5' C&G labels have been added to the street sections.***
28. Alley drainage should be located in the center of the roadway. Inlet spacing generally 150 ft. max. Note alleys will have driveway style aprons when intersecting streets.
    ***Response: Understood, drainage located in center & approximately 150' spacing.***
29. Note: Drainage channels within a subdivision providing drainage for the following shall be located on a common or open space lot a minimum of ten (10) feet in width within a dedicated

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public drainage easement or public right-of-way. 1. Eight (8) or more lots, either in whole or a portion of; 2. Public infrastructure; or 3. An area equivalent to two (2.0) acres.
***Response: Understood, drainage to comply.***

*30.* Wetland north of cul-de-sac on Street O appears to be a sinkhole. Additionally, there are other small depressions that will require evaluation. See ESS section 5.4
Storm network is incomplete for the southern portion of the site.
***Response: Understood, depressions will be evaluated with geotechnical assessment. Preliminary storm network completed for full site.***

31. Overall site geotechnical assessment and geotechnical analysis and recommendation of all closed depressions will be required at final master plan and preliminary plat.
***Response: Noted.***
32. Many of the lots have a 3:1 slope adjacent to the rear of the building site. This historically causes issues, because the builder tries to create a flatter back yard and violates the max 3:1; or adequate drainage is not provided when the slope is towards the building site.
***Response: Understood, layout adjusted for better grading flexibility behind lots.***
33. Many of the retaining walls are not constructible without encroachment into the aquatic buffer.
***Response: Understood, proposed layout reduced the number & heights of walls compared to previous layout. Walls have been shifted further off of buffers.***
34. Label existing contour elevations, highlight all retaining wall, provide tow and bow elevations along each retaining wall. See ESS 5.15 Retaining Walls
***Response: Understood, contours labeled. Retaining walls highlighted on grading sheets, with approximate wall heights labeled.***
35. Confirm all lot numbers match on all sheets
***Response: The lot numbers have been renumbered and are consistent on all sheets.***
36. Remove parking from the inside of curves along the alleys
***Response: This parking has been removed.***

## Maury County E-911

37. No comment on annexation. Columbia Bluffs is still actively working on 32 street name requests.
***Response: noted.***

## Columbia Water

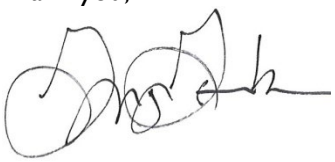
38. A water availability letter was issued on October 13, 2023, it remains valid for 120 days. The availability of capacity to serve is based on a determination by the Fire Marshal of fire flow requirements and the information submitted on the Water Service Availability Request application. Any off-site improvements detailed in the availability letter are the responsibility of the developer/owner. All public water system improvements are subject to the preparation and approval of detailed construction plans prepared in accordance with CPWS and Tennessee Department of Environment and Conservation requirements.
***Response: The current water availability letter is valid through February 13, 2024. The applicant has applied for an extension of letter and expects to have this extension in hand prior to the Planning Commission meeting.***

DEVELOPMENT PLANNING
DESIGN
MANAGEMENT

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If there are any questions or additional information needed, please feel free to reach out to me, or Keli Frymire (keli@gdc-tn.com) in my office.

Thank you,



**Gamble Design Collaborative**
Greg Gamble

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, January 9, 2024

**ITEM NO.**
23-0414

**DESCRIPTION:** Annexation request and PUD-R Preliminary Master Development Plan rezoning request for +/-410 acres between Bear Creek and Iron Bridge Road. PUD-R neighborhood to provide a variety of homes including Active Adult/Age restricted area, town homes, and large single-family home lots. PMDP also includes a daycare site and multiple amenities.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

## Planning

1. Please provide standard for "other open space use" in the format used in Article 5 for Civic Spaces. Use more than one if necessary to convey the unique amenities and protected lands proposed for the site.
2. The justification letter describes the conservation benefits of the proposed PUD-R achieved by clustering. However, the plans depict significant alteration of the site, effectively flattening portions of the landscape in order to create additional single family lots. Please consider shifting this density to a different structure type or a different location on the site in order to minimize the alteration of western portion of the site..
3. City Planner Kevin McCarthy, AICP and Planner Austin Brass, AICP will jointly prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process or technical comments.
4. Please expand upon the modification of standards listed on page five of the PUD-R justification letter. The list should include **all** requested deviations from the PUD-R standards at 4.3.1-K, as well as other deviations from standards of the ordinance (e.g. use of cul-de-sacs contrary to 5.2.2.E). For each requested deviation, please explain how the customized standard offers a better built environment to residents of the city of Columbia and/or better implements the Suburban Neighborhood future land use classification than the CD-3L or CD-3 character districts. The revised letter should support an explanation that the public purpose of the standards is satisfied "to equivalent or greater degree" by utilizing the proposed alternative (8.5.21.D; p. 452). Items two and three on the list provided with the application are a good template (i.e. explain the gain in open space from the modification).
5. Please add a projected timeline to phasing plan shown on sheet C1.00. The plan should be sufficiently detailed to provide adjacent property owners of the duration of actual

construction activity near their property. The phasing plan should comply with section 8.5.21.F (p. 453). The plan should indicate when Final PUD master plan and subsequent plats are projected (8.5.21.R; p. 461). The phasing plan should indicate if any extension requests are anticipated related to the timing of actual construction under 8.5.21.W (p. 464). The phasing timeline may be provided as a separate document if that is easier to prepare.

6. Advisory: The applicant has a separate but related application for the upcoming development review cycle. The other application rezones an adjacent parcel to CD-4 for commercial development. It may be advisable to combine these applications into a single large multi-use PUD at resubmittal (this will require review the Architectural Design Review Team).
7. Please expand upon the Environmental Uniqueness section on page two of the PUD-R justification letter. Please add information from the "Commitment to Environmental Stewardship" notes on the cover sheet of the master plan. Please explain which strategies could not be utilized under a CD-3 zoning.
8. Advisory: Consult with Asst. City Engineer regarding alternative design for segments of Street A.
9. Advisory: Please consult with the Director and Assistant Director of the City of Columbia Parks & Recreation department about composition of Civic Spaces (especially LI.6) and potential public access easement/alignment with Parks & Rec goals for level of service in East Columbia. If there are opportunities for public access/public benefit, please identify these in the revised PUD justification letter.
10. Please revise phasing plan to provide construction of Road A connecting Bear Creek Pike and Iron Bridge Road in the first phase.
11. Please revise to eliminate the cul-de-sacs in phases 3 and 6 per 5.2.2.E (or request as part of PUD deviations with explanation of equivalent public benefit).
12. The zoning ordinance contains contradictions related to PUD-R Civic Space types. Table 4.3.1-K (p. 157) indicates Sport fields are not a permitted Civic Space type in PUD-R. Table 5.3.3-B indicates otherwise. Please add this to the requested deviations and accompanying explanation.
13. 50" right of way shown on PUD does not conform to thoroughfare assemblies applicable to PUDs in 5.2.2.G-1. This is addressed in justification letter but please explain why it is necessary throughout the development and why the additional open space is a greater benefit than the omitted elements of the thoroughfare.
14. Due to the size and complexity of this request, it is the strong preference of planning staff that this request be reviewed again by the DRC following resubmittal to these comments before advancing to the Planning Commission agenda.
15. Sheet C2.0 indicates a tree save figure. Please provide a tree preservation plan with recent aerial image as described in 4.3.16.L of the zoning ordinance.
16. There appears to be small gaps in the pedestrian shed, please revise.
17. Please revise to show bicycle network and bikeway types utilized (5.2.4.A, p. 322-325).
18. The parking area serving the daycare is located in the first layer. Please revise.
19. Please provide greater detail on the lot/building site for the daycare site.

20. Please indicate pedestrian connection with townhomes that enfront a pedestrian path. Please ensure that this connection is with a proposed sidewalk.
21. As reviewed, there has been several waivers requested for setbacks, garage designs, and driveway widths exceeding 10' in first layer. Please coordinate with engineering requiring details of 5' side setbacks and drainage swales.
22. Impervious coverage for Development Parcel, daycare, and for typical lots.
23. Revise pattern book to show conforming interior garage dimensions.
24. Page 29 of Connect Columbia as part of the future Bicycle and Greenway Plan indicates a proposed greenway trail on the subject site located at the east side of the Duck River connecting with Yanali Park to the south. Please indicate this connection on the PUD master plan in adherence to the Comp Plan.

## Fire

1. Alleys are not to be used for access for emergency vehicles. An approved fire appratus road must be within 150' of all points of structures. The townhomes in the back and nearest Bear Creek will not meet this code. Also unit 205 will be outside this code as well.

## Engineering

2. Subject to Construction Plans and Traffic Impact Study.
3. Provide traffic improvement commitment letter with phasing based on improvement identified in the TIS and a overall diagram of all improvements.
4. 8% maximum grade on alleys. Lots 206-223, 580-593, 609-620 are at 10%
5. Whenever a proposed street intersects a street with an equal or greater classification, a tangent (measured from the edge of traveled way, or the right-of-way line when determined by the City Engineer, along the centerline of the intersecting street) shall be provided. See ESS Table 3

6. Provide road names on all 100 scale sheets. Road names will require E-911 approval
7. Provide alley street section. Provide boulevard street section. Label dimension for C&G and on-street as 8.5'
8. Alley drainage should be located in the center of the roadway. Inlet spacing generally 150 ft. max. Note alleys will have driveway style aprons when intersecting streets.
9. Note: Drainage channels within a subdivision providing drainage for the following shall be located on a common or open space lot a minimum of ten (10) feet in width within a dedicated public drainage easement or public right-of-way. 1. Eight (8) or more lots, either in whole or a portion of; 2. Public infrastructure; or 3. An area equivalent to two (2.0) acres.
10. Wetland north of cul-de-sac on Street O appears to be a sinkhole. Additionally, there are other small depressions that will require evaluation. See ESS section 5.4

11. Storm network is incomplete for the southern portion of the site.

12. Overall site geotechnical assessment and geotechnical analysis and recommendation of all closed depressions will be required at final master plan and preliminary plat.
13. Many of the lots have a 3:1 slope adjacent to the rear of the building site. This historically causes issues, because the builder tries to create a flatter back yard and violates the max 3:1; or adequate drainage is not provided when the slope is towards the building site.
14. Many of the retaining walls are not constructible without encroachment into the aquatic buffer.
15. Label existing contour elevations, highlight all retaining wall, provide tow and bow elevations along each retaining wall. See ESS 5.15 Retaining Walls
16. Confirm all lot numbers matches on all sheets
17. Remove parking from the inside of curves along the alleys

## Building

18. No comment.

## Wastewater

19. All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided. Note: Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.

## Police

20. No comments provided.

## ATT

21. ATT TO SERVE

## Maury County E911

22. No comment on annexation. Columbia Bluffs is still actively working on 32 street name request.

## Maury County Schools

23. Howell Elementary, Cox Middle School, Battle Creek High School
    See Attached Capacity Numbers
    The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.

## Public Works

24. Single family homes will receive City of Columbia trashcan service. For 189 townhomes, we recommend five or six 8-yard dumpsters with 3x/week collection if utilizing City of Columbia sanitation services. Private sanitation services, including dumpsters, compactors, individual receptacles or valet service, may be utilized. Individual trash receptacles will not be provided by the City of Columbia to townhome residents. Please see attached Plan of Services and City of Columbia Dumpster Guidelines & Accessibility Requirements.

## Columbia Power

25. Columbia Power System has an existing power line near your proposed development. We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction. • Unfortunately, due to current supply chain challenges, no timeframe can be guaranteed regarding the availability of meters or transformers appropriate. for your development.

## Columbia Water

26. "A water availability letter was issued on October 13, 2023, it remains valid for 120 days. The letter will need to be updated prior to the applicable meeting of the Planning Commission. The availability of capacity to serve is based on a determination by the Fire Marshal of fire flow requirements and the information submitted on the Water Service Availability Request application. Any off-site improvements detailed in the availability letter are the responsibility of the developer/owner. All public water system improvements are subject to the preparation and approval of detailed construction plans prepared in accordance with CPWS and Tennessee Department of Environment and Conservation requirements."

## Atmos Energy

27. Natural gas available along Bear Creek Pike

## Duck River Electric Membership Corp

28. No comments provided.

## Maury County Highway Dept.

29. No comments provided.

**ATTACHMENTS: Concept Plan**

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

# COLUMBIA BLUFFS AERIAL IMPROVEMENT MAP

## # 2-Tom J Hitch and Bear Creek: **(Phase 2**)

Construct a northbound right turn lane on Tom J Hitch Parkway with approximately 100 feet of storage and 60 feet of taper. The northbound right turn lane could be constructed using the existing shoulder and should not extend beyond the start of the bridge over Duck River.

**Staff Response:** *We agree that a northbound right turn lane on Tom J Hitch Parkway should be constructed. This improvement should be constructed according to AASHTO, TDOT, and City of Columbia standards.*

Restripe the northbound approach to provide one left turn lane and one through lane, plus the recommended right turn lane.

**Staff Response:** *We agree that the northbound approach on Tom J Hitch Parkway should include a left turn lane, through lane, and right turn lane.*

Modify the traffic signal design to provide a northbound right turn overlap during the westbound left turn phase and change the eastbound approach from protected/permissive left turn phasing to permissive only left turn phasing.

**Staff Response:** *We agree that providing northbound right turn overlap would improve traffic conditions.*

Optimize and coordinate the signal timing along Bear Creek Pike.

## # 1 -Bear Creek Pike & Mt. Olive Road/School Access: **(Phase 1)**

Bear Creek Pike and Mt Olivet Road/School Access

- Restripe the southbound approach to a shared left turn/through lane and a right turn only lane.
  **Staff Response:** *We agree that the southbound approach should include a shared left turn/through lane and a right turn lane. This improvement should be constructed according to AASHTO, TDOT, and City of Columbia standards.*
- Modify the traffic signal design for the northbound approach to provide protected/permissive left turn signal phasing.
  **Staff Response:** *We agree that a northbound protected/permissive left turn signal phase would improve traffic operations.*
- Modify the traffic signal design for the southbound approach to provide a right turn overlap during the eastbound left turn phase.
  **Staff Response:** *We agree that a southbound right turn overlap would improve traffic operations.*
- Optimize and coordinate the signal timing along Bear Creek Pike.
  **Staff Response:** *We agree that optimizing and coordinating the signal timing along Bear Creek Pike would improve traffic operations.*

## # 3-Bear Creek and Patterson Drive(South Bound Left Turn Lane) Improvements-Site Access # 1: **(Phase 3)-**

Bear Creek Pike and Patterson Drive/Site Access 1

- Site Access 1 should be constructed and aligned with Patterson Drive at Bear Creek Pike.
  **Staff Response:** *We agree that Site Access 1 should be constructed to align with Patterson Drive.*
- Site Access 1 should be designed to include width for one entering lane and two exiting lanes, which should be a northbound left turn lane and a northbound shared through/right turn lane.
  **Staff Response:** *We agree that one entering, and two exiting lanes is sufficient for Site Access 1. This access should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*
- An eastbound right turn deceleration lane should be constructed for Bear Creek Pike at Site Access 1 to accommodate the project traffic. The eastbound right turn lane should be designed so that the widening and taper does not begin until east of the guardrail over Bear Creek and include approximately 180 feet of storage and 160 feet of bay taper, or as approved by the City and TDOT.
  **Staff Response:** *We agree that an eastbound right turn deceleration lane along Bear Creek Pike is warranted. This improvement should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*
- A westbound right turn deceleration lane is recommended for Bear Creek Pike at Patterson Drive. The westbound right turn lane should be designed to include approximately 160 feet of storage and 180 feet of bay taper, or as approved by the City and TDOT.
  **Staff Response:** *We agree that a westbound right turn deceleration lane along Bear Creek Pike is warranted. This improvement should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*
- A westbound left turn deceleration lane is recommended for Bear Creek Pike at Site Access 1 to accommodate the project traffic. The westbound left turn lane should be designed to include approximately 225 feet of storage, 180 feet of bay taper, and 270 feet of approach taper assuming the widening is centered on the roadway.
  **Staff Response:** *We agree that a westbound left turn deceleration lane on Bear Creek Pike is warranted. This improvement should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*
- Install a traffic signal at the intersection of Bear Creek Pike and Patterson Drive/Site Access 1. Signal warrant analyses indicates a traffic signal will be warranted by the traffic volumes generated by the project site prior to completion of Phase 2, or comparable number of dwelling units. The signal design should include protected/permissive left turn signal phasing for the northbound and westbound approaches and permissive left turn signal phasing for the southbound and eastbound approaches.
  **Staff Response:** *We agree that a traffic signal should be installed at this intersection prior to the completion of Phase 2.*
- Optimize and coordinate the signal timing along Bear Creek Pike.
  **Staff Response:** *We agree that optimizing and coordinating the signal timing along Bear Creek Pike would improve traffic operations.*

## # 4 Iron Bridge Road & Site Access #2: **(Phase 4 & Phase 5)**

Iron Bridge Road and Site Access 2

- Site Access 2 should be constructed and connected to Iron Bridge Road prior to the beginning of construction for Phase 4, of comparable number of dwelling units.
  **Staff Response:** *We agree that Site Access 2 should constructed prior to the beginning of construction for Phase 4. This access should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*
- Site Access 2 should be aligned with the Maury County Yanahli Park Access on Iron Bridge Road.
  **Staff Response:** *We agree that Site Access 2 should be aligned with the Maury County Yanahli Park Access.*
- At a minimum, Site Access 2 should be designed to include width for one entering lane and one exiting lane.
  **Staff Response:** *We agree that Site Access 2 should include one entering and one exiting lane. This access should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*
- Stop-control should be provided for the southbound approach of Site Access 2 at Iron Bridge Road.
  **Staff Response:** *We agree that this intersection will operate acceptably with stop-control along Site Access 2.*
- The Site Access 2 should be designed and constructed to allow for sufficient intersection sight distance, clear of any obstructions such as vegetation, landscaping, hardscaping, signs, and fencing within the departure sight triangles.
  **Staff Response:** *We agree that Site Access 2 should be constructed to provide sufficient sight distance. This access should be constructed according to AASHTO, TDOT, and City of Columbia standards.*
- An eastbound left turn deceleration lane is recommended for Iron Bridge Road at Site Access 2 to accommodate the project traffic. The eastbound left turn lane should be designed to include approximately 160 feet of storage, 180 feet of bay taper, and 270 feet of approach taper assuming the widening is centered on the roadway, or as approved by the City.
  **Staff Response:** *We agree that an eastbound left turn deceleration lane on Iron Bridge Road is warranted. This improvement should be constructed according to AASHTO, TDOT, and City of Columbia standards, including providing sufficient sight distance.*

**Projected Phase Completion**

Phase 1- 2026-28 #1
Phase 2-2027-29 #2
Phase 3-2028-31 # 3
Phase 4-2029-32 # 4
Phase 5-2030-33 #5
Phase 6- All improvements completed

## # 5-James Campbell BLVD & Tom J. Hitch PKWY: **(Phase 5)**

Install a traffic signal at the intersection of James Campbell Boulevard and Tom J Hitch Parkway. The traffic signal design should include protected/permissive left turn signal phasing for the eastbound approach and a southbound right turn overlap.

**Staff Response:** *We agree that a signal should be installed at this intersection prior to the completion of Phase 3 of the proposed project. We agree that protected/permissive left turn phasing and right turn overlap will improve traffic operations. The City of Columbia is willing to share the responsibility of this improvement. The City will provide the design and the developer of this proposed development will provide the installation.*

Downtown Columbia

Tom J Hitch Pkwy

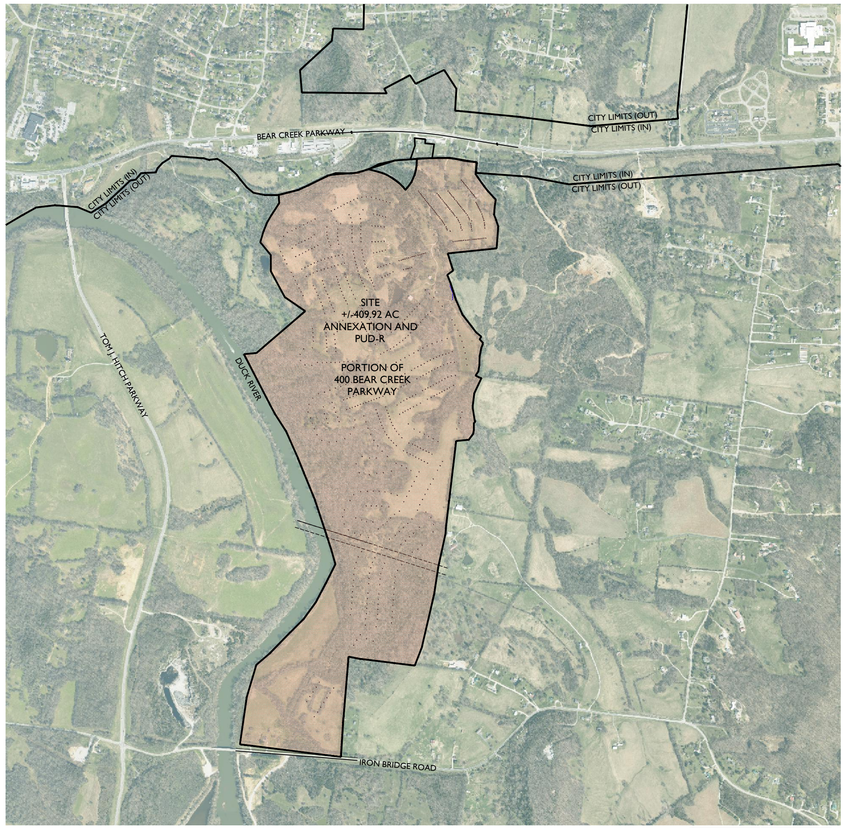
Iron Bridge Rd

Mapleash Ave

Google Earth

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 BEAR CREEK PARKWAY
COLUMBIA, TENNESSEE




LOCATION MAP

0 500 1000 2000
GRAPHIC SCALE 1"=1,000'-0"


**OWNER:**
HK BIG BEAR BLUFFS, LLC
14025 RIVEREDGE DRIVE, SUITE 175
TAMPA, FL33637
JIM HARVEY

**DEVELOPER:**
KOLTER LAND
14025 RIVEREDGE DRIVE, SUITE 175
TAMPA, FL33637
JIM HARVEY
615.582.3253
jgibbs@kolter.com

**APPLICANT/ LAND PLANNER:**
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37064
GREG GAMBLE
615-975-5765
greg.gamble@gdc-tn.com

**ENGINEER:**
CSDG
2305 KLINE AVENUE, SUITE 300
NASHVILLE, TN 37211
JIM HARRISON
615-248-9999
jimh@csdgtn.com


## COMMITMENT TO ENVIRONMENTAL STEWARDSHIP

1. **Strategy for Resource Protection utilizing a PUD Planning and Design Approach**

   a. Establish a Limits of Disturbance along the Duck River and its tributaries based upon slopes, natural drainage ways, floodplain areas, and mature tree canopy.

   b. Design new development around open space areas to highlight them as community amenities with pedestrian systems that will connect the entire conservation design open space throughout the community.

   c. Pedestrian circulation and trails are highly encouraged along the river, along stream corridors, and through scenic areas.

   d. The quantity of Open Space preservation should greatly exceed any established base zone district.

   e. New home lots should generally be smaller, clustered areas away from the protected banks of the Duck River.

   f. Document on-site natural resources through a State approved Hydrologist and concurrence reports with local, state, and federal agencies.

   g. Remove debris removal along creek banks to prevent impact to Bear Creek (shoes, clothing, random bottles, containers, fencing, wood)

   h. Use Best Management Practices for Stormwater Pollution Prevention Plans during construction.

   i. Use only one crossing point (< less than approx. 50' - 60' feet that spans the creek with no structures within Bear Creek (similar to several crossings visible from US (Highway 412).

2. **Strategy for Protection through Construction**

   Implementation of the Plan requires protective measures. PUD phasing and areas of disturbance should be documented and considered through the PUD process. Protection practices shall include:

   A. Storm water erosion control applications I.E.

      i. Stormwater Detention Areas,

      ii. natural riparian buffers

      iii. silt fencing

      iv. sediment ponds

      v. Check dams

      vi. Ongoing stormwater monitoring of Environmental Controls of water runoff areas and tributaries

   B. Compliance with CGP, ARAP and NPDES permitting to address the protections that provide additional oversight to the project.

   Throughout the duration of the project, these types of practices within the action areas will ensure environmental compliance with local, state and federal requirements.

3. **Strategy for Protection when construction is completed.**

   Once development is completed permanent storm water detention areas and water out fall locations will be cleaned and stabilized in accordance with the local, state, and federal guidelines.

## SHEET INDEX


| | |
|---|---|
| C0.0 | COVER SHEET |
| C0.01 | EXISTING CONDITIONS |
| C1.0 | PHASING PLAN |
| C2.0 | OVERALL PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.1 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.2 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.3 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.3 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.4 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.5 | ENLARGED PRELIMINARY MASTER DEVELOPMENT PLAN |
| C2.6 | PROPOSED LOT DIAGRAMS |
| C2.7 | STREET SECTIONS |
| C2.8 | TREE CANOPY COVERAGE |
| C3.00 | OVERALL SITE UTILITY PLAN |
| C3.01 | SITE UTILITY PLAN |
| C3.02 | SITE UTILITY PLAN |
| C3.03 | SITE UTILITY PLAN |
| C3.04 | SITE UTILITY PLAN |
| C4.00 | OVERALL GRADING & DRAINAGE PLAN |
| C4.01 | GRADING & DRAINAGE PLAN |
| C4.02 | GRADING & DRAINAGE PLAN |
| C4.03 | GRADING & DRAINAGE PLAN |
| C4.04 | GRADING & DRAINAGE PLAN |
| C4.05 | LOT DRAINAGE DIAGRAMS |
| L1.0 | OVERALL CIVIC SPACE PLAN |
| L1.1 | CIVIC SPACE ENLARGEMENT |
| L1.2 | CIVIC SPACE ENLARGEMENT |
| L1.3 | CIVIC SPACE ENLARGEMENT |
| L1.4 | CIVIC SPACE ENLARGEMENT |
| L1.5 | CIVIC SPACE ENLARGEMENT |
| L1.6 | CIVIC SPACE ENLARGEMENT |


JEFFREY A. ROSS
REGISTERED LANDSCAPE ARCHITECT
TN PE 12.18.23

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE


PRE-APP: August 30, 2023
INITIAL SUBMITTAL: October 16, 2023
RESUBMITTAL: December 18, 2023




CSDG
Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL

JAMES T. HARRISON
REGISTERED
LANDSCAPE
ARCHITECT
No. 021998
12-16-23
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |

DRAWN BY: TWG
CHECKED BY: TWG

## EXISTING CONDITIONS PLAN

# C0.01

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:51pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C0.01 - Existing Conditions Plan.dwg

**PHASING BREAKDWON:**

PHASE 1: LOT NUMBERS 100-161 (62 SINGLE FAMILY LOTS)
LOT NUMBERS 200-277 (78 TOWNHOME LOTS)

PHASE 2A: LOT NUMBERS 300-387 (88 TOWNHOME LOTS)
PHASE 2B: LOT NUMBERS 400-445 (46 SINGLE FAMILY LOTS)

PHASE 3A: LOT NUMBERS 500-644 (145 SINGLE FAMILY LOTS)

PHASE 4: LOT NUMBERS 700-848 (149 SINGLE FAMILY LOTS)

PHASE 5: LOT NUMBERS 900-1049 (150 SINGLE FAMILY LOTS)

PHASE 6: LOT NUMBERS 1100-1217 (118 SINGLE FAMILY LOTS)

**PROJECTED TIMELINE*:**

| | |
|---|---|
| PHASE 1 (±140 UNITS) | |
| 2024-2025 | FINAL MASTER PLAN |
| 2025-2026 | BEGIN CONSTRUCTION |
| 2025-2026 | PLATTING |
| 2028-2029 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 2 (±134 UNITS) | |
| 2025-2026 | FINAL MASTER PLAN |
| 2026-2027 | BEGIN CONSTRUCTION |
| 2026-2027 | PLATTING |
| 2029-2030 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 3 (±145 UNITS) | |
| 2026-2027 | FINAL MASTER PLAN |
| 2027-2028 | BEGIN CONSTRUCTION |
| 2027-2028 | PLATTING |
| 2031-2032 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 4 (±149 UNITS) | |
| 2027-2028 | FINAL MASTER PLAN |
| 2028-2029 | BEGIN CONSTRUCTION |
| 2028-2029 | PLATTING |
| 2032-2033 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 5 (±150 UNITS) | |
| 2029-2030 | FINAL MASTER PLAN |
| 2031-2032 | BEGIN CONSTRUCTION |
| 2031-2032 | PLATTING |
| 2033-2034 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 6 (±118 UNITS) | |
| 2030-2031 | FINAL MASTER PLAN |
| 2032-2033 | BEGIN CONSTRUCTION |
| 2032-2033 | PLATTING |
| 2033-2034 | VERTICAL CONSTRUCTION COMPLETE |

*PROJECTED TIMELINE IS AN ESTIMATE ONLY. TIMING OF ACTUAL COMMENCEMENT OF HORIZONTAL & VERTICAL CONSTRUCTION FOR ALL PHASES WILL BE PREDICATED ON LOCAL AND STATE APPROVALS.*

PHASE 0
ENTRANCE AND BRIDGE

PHASE 1
±140 UNITS

PHASE 2A
±88 UNITS

PHASE 2B
±46 UNITS

PHASE 3A
±145 UNITS

PHASE 4
±149 UNITS

PHASE 5
±150 UNITS

PHASE 3B

PHASE 6
±118 UNITS

BEAR CREEK PIKE
U.S. 412 - SR99
(R.O.W. VARIES)

IRON BRIDGE ROAD
(ROW VARIES)

DUCK RIVER

N

0 300 600
SCALE: 1"=300'


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SEAL

JAMES T. HARRISON
REGISTERED
ENGINEER
No. 021998
STATE OF TENNESSEE
12-16-23

# COLUMBIA BLUFFS

PMDP

Bear Creek Pike
Columbia, Maury County, Tennessee

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| 1 | Initial Submittal | 10/16/23 |
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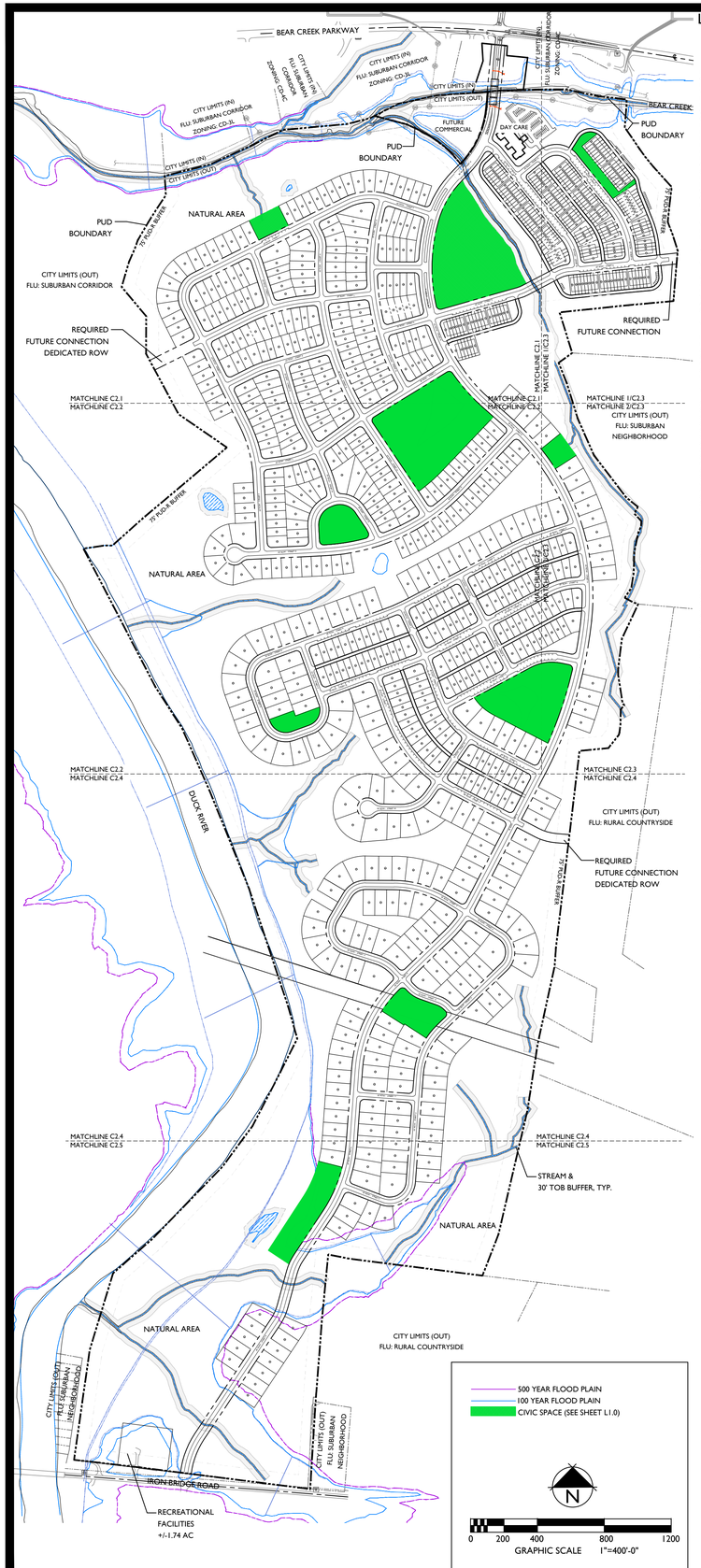
## PHASING PLAN

C1.00

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:48pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C1.00 - Phasing Plan.dwg




# LEGAL DESCRIPTION OF PROPERTY:

**LEGAL DESCRIPTION FOR ANNEXATION OF 409.92 ACRES TO PUD**
**FOR PART OF MAP 99, PARCEL 12.01**
**DEED BOOK R2051, PAGE 792**
**BIG BEAR BLUFFS, LLC**

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY BEAR CREEK PIKE, ROCK 'N' ROLL JESUS, LLC, AS OF RECORD IN DEED BOOK R2727, PAGE 1242 OF THE REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN); AMIT J. PATEL AND WIFE, MINAXIBEN G. PATEL AS OF RECORD IN DEED BOOK R2411, PAGE 1348, ROMCTN; HK BIG BEAR BLUFFS, LLC (R BOOK 2878, PAGE 981, ROMCTN; ON THE EAST BY JEFFERY L. HEAD AND ROSE HEAD, WIFE & HUSBAND AS OF RECORD IN DEED BOOK R2230, PAGE 388, ROMCTN, STEVEN CHARLES FOSTER AND REBECCA JANE FOSTER, HUSBAND & WIFE AS OF RECORD IN DEED BOOK R2497, PAGE 1334, ROMCTN, BARRY C. BLACKBURN, TRUSTEE FOR BARRY C. BLACKBURN REVOCABLE TRUST AS OF RECORD IN DEED BOOK R2301, PAGE 1492, ROMCTN, BRENT W. THORNTON AND WIFE TERRI L. THORNTON AS OF RECORD IN DEED BOOK R0396, PAGE 766, ROMCTN, CALVIN DEAN JOHNSON FORMERLY CARL JOHNSON AND WIFE, BARBARA D. JOHNSON AS OF RECORD IN DEED BOOK 375, PAGE 542, ROMCTN, AND CALVIN DEAN JOHNSON AND WIFE SHERYL GAY JOHNSON AS OF RECORD IN DEED BOOK R747, PAGE 602, ROMCTN; ON THE SOUTH BY IRON BRIDGE ROAD; AND ON THE WEST BY JIMMY MATHEWS AS OF RECORD IN DEED BOOK 1311, PAGE 80, DAVID LUNN HARRIS ETUX AS OF RECORD IN DEED BOOK R2415, PAGE 1148, ROMCTN, DUCK RIVER, AND MARK A. SEAGO AND WIFE TINA SEAGO AS OF RECORD DEED BOOK R2369, PAGE 973 ROMCTN, AND CONTINUED TO THE NORTH BY MIKE BIKES AS OF RECORD IN DEED BOOK R1884, PAGE 1082, DWAYNE SAM GOODMAN AS OF RECORD IN DEED BOOK R2732, PAGE 1288, AND IS MORE PARTICULARLY DESCRIBED AS FOLLOWS

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT AN 1 INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.95 EAST 1,872,344.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 05°01'16" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 21°32'47" E, FOR A DISTANCE OF 51.20 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK N ROLL JESUS;
THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFFS, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 85°53'31" E, 307.86 FEET TO THE TRUE POINT OF BEGINNING;

THENCE, CONTINUING WITH BEAR CREEK, THE FOLLOWING CALLS:

N 85°53'31" E, FOR A DISTANCE OF 85.49 FEET TO A POINT;
N 83°39'27" E, FOR A DISTANCE OF 218.80 FEET TO A POINT;
S 89°57'56" E, FOR A DISTANCE OF 168.93 FEET TO A POINT;
S 78°39'31" E, FOR A DISTANCE OF 77.46 FEET TO A POINT;
S 78°01'13" E, FOR A DISTANCE OF 120.71 FEET TO A POINT;
S 83°35'45" E, FOR A DISTANCE OF 172.70 FEET TO A POINT ALONG THE WEST BOUNDARY OF -JEFFERY L. HEAD;

THENCE, WITH THE WEST BOUNDARY OF HEAD, THE FOLLOWING CALLS:

S 0°56'50" W, FOR A DISTANCE OF 40.52 FEET TO AN IRON PIN;
S 04°40'44" W, FOR A DISTANCE OF 127.32 FEET TO A 1-1/2" PIPE FOUND;
S 34°29'27" E, FOR A DISTANCE OF 153.87 FEET TO A T-POST;
S 35°04'16" E, FOR A DISTANCE OF 55.17 FEET TO A T-POST;
S 39°22'56" E, FOR A DISTANCE OF 84.02 FEET TO A T-POST;
S 42°05'33" E, FOR A DISTANCE OF 106.39 FEET TO A T-POST;
S 42°31'20" E, FOR A DISTANCE OF 55.23 FEET TO AN 1-1/2" PIPE FOUND;
S 7°06'58" W, FOR A DISTANCE OF 101.11 FEET TO A 3" METAL POST;
S 5°45'07" W, FOR A DISTANCE OF 110.19 FEET TO AN 1-1/2" PIPE FOUND;
S 21°14'47" E, FOR A DISTANCE OF 78.14 FEET TO A T-POST;
S 17°34'01" E, FOR A DISTANCE OF 102.59 FEET TO A 24" CEDAR;
S 4°57'22" W, FOR A DISTANCE OF 172.54 FEET TO A T-POST;
S 4°52'31" W, FOR A DISTANCE OF 130.65 FEET TO 36" OAK;
S 84°49'25" W, FOR A DISTANCE OF 270.35 FEET TO 20" MAPLE;
S 84°01'38" W, FOR A DISTANCE OF 414.11 FEET TO A FENCE POST;
S 17°15'39" E, FOR A DISTANCE OF 254.68 FEET TO A 6" ROTTED HACKBERRY FENCE POST TIED TO THE SOUTHWEST CORNER OF HEAD;

THENCE, WITH THE WEST BOUNDARY OF FOSTER, THE FOLLOWING CALLS:

S 54°11'5" W, FOR A DISTANCE OF 100.29 FEET TO 6' ROTTED HACKBERRY FENCE POST;
S 21°53'18" E, FOR A DISTANCE OF 130.86 FEET TO A CEDAR FENCE POST;
S 17°11'57" E, FOR A DISTANCE OF 221.38 FEET TO A 12" ELM;
S 23°49'07" E, FOR A DISTANCE OF 240.66 FEET TO A T-POST;
S 37°24'05" E, FOR A DISTANCE OF 315.73 FEET TO 14" ELM;
S 50°37'42" E, FOR A DISTANCE OF 91.73 FEET TO 60" TWIN OAK;
S 28°59'39" W, FOR A DISTANCE OF 35.62 FEET TO 60" OAK;
S 40°35'26" W, FOR A DISTANCE OF 9.08 FEET TO A T-POST;
S 42°52'20" E, FOR A DISTANCE OF 62.79 FEET TO A POINT;
S 1°50'17" W, FOR A DISTANCE OF 30.25 FEET TO A POINT;
S 23°53'47" W, FOR A DISTANCE OF 42.59 FEET TO 14" HACKBERRY;
S 11°25'58" W, FOR A DISTANCE OF 117.75 FEET TO A T-POST;
S 2°03'52" W, FOR A DISTANCE OF 130.34 FEET TO ROTTED HACKBERRY;
S 9°12'29" W, FOR A DISTANCE OF 87.18 FEET A POINT;
S 33°58'56" W, FOR A DISTANCE OF 69.04 FEET TO A 30" HACKBERRY;
S 61°19'48" E, FOR A DISTANCE OF 54.74 FEET TO A 24" HACKBERRY;
S 70°11'17" E, FOR A DISTANCE OF 34.53 FEET TO 12" CEDAR POST AT THE SOUTHWEST CORNER OF FOSTER;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN, THE FOLLOWING CALLS:

S 25°13'18" W, FOR A DISTANCE OF 225.44 FEET TO A 36" HACKBERRY;
S 7°09'46" W, FOR A DISTANCE OF 177.84 FEET TO A 8" DOGWOOD;
S 0°16'28" W, FOR A DISTANCE OF 41.40 FEET TO A 24" HACKBERRY FLAGGED;
S 8°53'22" E, FOR A DISTANCE OF 173.37 FEET TO A T-POST;
S 50°40'30" E, FOR A DISTANCE OF 13.02 FEET TO 6' FENCE POST;
S 39°18'12" W, FOR A DISTANCE OF 34.16 FEET TO A POINT;
S 1°12'16" W, FOR A DISTANCE OF 95.58 FEET TO A 12" OSAGE;
S 7°58'27" W, FOR A DISTANCE OF 43.94 FEET TO A 6" ROTTED TREE;
S 41°43'30" W, FOR A DISTANCE OF 13.75 FEET TO A 4" TREE USED AS FENCE POST;
S 38°17'00" W, FOR A DISTANCE OF 100.34 FEET TO A 14" ROTTEN CEDAR;
S 84°35'04" W, FOR A DISTANCE OF 173.30 FEET TO FENCE CORNER PK FOUND;
S 6°40'35" W, FOR A DISTANCE OF 1187.64 FEET TO A POINT;
S 4°03'46" W, FOR A DISTANCE OF 112.89 FEET TO A 26" CEDAR;
S 12°22'22" W, FOR A DISTANCE OF 465.96 FEET TO A 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN AND CONTINUING TO THORNTON, THE FOLLOWING CALLS:

S 8°47'46" W, FOR A DISTANCE OF 411.13 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY THORNTON, THE FOLLOWING CALLS:

S 13°08'41" W, FOR A DISTANCE OF 759.59 FEET TO 1" PIPE FOUND;
S 21°10'50" W, FOR A DISTANCE OF 265.00 FEET TO 1" PIPE FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

N 82°44'49" W, FOR A DISTANCE OF 800.97 FEET TO 1" PIPE FOUND;
N 78°43'22" W, FOR A DISTANCE OF 130.34 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

S 5°33'34" W, FOR A DISTANCE OF 375.75 FEET TO 1" PIPE FOUND;
S 4°27'28" W, FOR A DISTANCE OF 508.55 FEET TO A POINT;
S 5°35'19" W, FOR A DISTANCE OF 523.31 FEET TO 5/8" IRON PIN FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF IRON BRIDGE ROAD RIGHT-OF-WAY, THE FOLLOWING CALLS:

N 82°45'55" W, FOR A DISTANCE OF 501.29 FEET TO AN 5/8" IRON PIN FOUND;
N 82°46'22" W, FOR A DISTANCE OF 525.64 FEET TO RAILROAD SPIKE PK FOUND;
N 83°23'15" W, FOR A DISTANCE OF 396.04 FEET TO 5/8" IRON PIN FOUND AT SOUTHEAST CORNER OF MATTHEWS;

THENCE, WITH THE EAST BOUNDARY OF MATHEWS, HARRIS AND DUCK RIVER, THE FOLLOWING CALLS:

N 8°06'23" E, FOR A DISTANCE OF 864.54 FEET TO 1/2" IRON PIN FOUND;
N 16°56'08" E, FOR A DISTANCE OF 478.23 FEET TO A POINT;
N 48°48'57" E, FOR A DISTANCE OF 312.04 FEET TO A POINT;
N 44°09'56" E, FOR A DISTANCE OF 600.70 FEET TO A POINT;
N 36°27'00" E, FOR A DISTANCE OF 305.02 FEET TO A POINT;
N 27°21'22" E, FOR A DISTANCE OF 284.82 FEET TO A POINT;
N 26°51'08" E, FOR A DISTANCE OF 301.40 FEET TO 1" PIPE FOUND;

N 15°43'20" W, FOR A DISTANCE OF 197.42 FEET TO A POINT;
N 16°27'24" W, FOR A DISTANCE OF 744.16 FEET TO A POINT;
N 21°56'04" W, FOR A DISTANCE OF 031.16 FEET TO A POINT;
N 23°44'52" W, FOR A DISTANCE OF 409.10 FEET TO A POINT;
N 32°40'41" W, FOR A DISTANCE OF 286.98 FEET TO A POINT;
N 27°28'08" W, FOR A DISTANCE OF 932.36 FEET TO A POINT;

THENCE, DIRECTING RIGHT AWAY FROM CLICK RIVER TO THE SOUTH AND EAST BOUNDARY OF SEAGO, THE FOLLOWING CALLS:

N 85°09'29" E, FOR A DISTANCE OF 22.00 FEET TO A POINT;
N 81°22'35" E, FOR A DISTANCE OF 109.60 FEET TO A POINT;
S 87°39'25" E, FOR A DISTANCE OF 42.46 FEET TO 26" OAK;
N 46°08'47" E, FOR A DISTANCE OF 244.67 FEET TO A POINT;
N 46°58'39" E, FOR A DISTANCE OF 291.18 FEET TO 10" HACKBERRY AND 8" CEDAR;
N 49°46'28" E, FOR A DISTANCE OF 367.28 FEET TO 1" PIPE FOUND;
N 55°27'24" W, FOR A DISTANCE OF 350.42 FEET TO A POINT;
N 28°16'29" W, FOR A DISTANCE OF 411.36 FEET TO A 1" PIPE FOUND;
N 71°17'50" E, FOR A DISTANCE OF 220.64 FEET TO AN IRON PIN FOUND;
N 39°56'42" W, FOR A DISTANCE OF 228.86 FEET TO AN IRON PIN FOUND;
N 16°17'40" E, FOR A DISTANCE OF 158.31 FEET TO A POINT;
N 24°10'55" E, FOR A DISTANCE OF 52.03 FEET TO A POINT;
N 27°26'49" E, FOR A DISTANCE OF 28.14 FEET TO 1" PIPE IRON PIPE;
N 19°40'08" E, FOR A DISTANCE OF 57.72 FEET TO A 12" CEDAR;
N 30°13'56" E, FOR A DISTANCE OF 123.71 FEET TO A POINT;
N 32°10'27" E, FOR A DISTANCE OF 87.89 FEET TO A POINT;
N 33°44'57" E, FOR A DISTANCE OF 105.82 FEET TO 1" PIPE FOUND;
N 3°11'17" W, FOR A DISTANCE OF 118.30 FEET TO A POINT AT THE NORTHEAST CORNER OF SEAGO AND THE CENTER OF BEAR CREEK;

THENCE, ALONG BEAR CREEK AND SOUTHERN BOUNDARY OF MIKES BIKES, THE FOLLOWING CALLS:

N 75°48'45" E, FOR A DISTANCE OF 280.14 FEET TO A POINT;
N 85°23'51" E, FOR A DISTANCE OF 281.90 FEET TO A POINT AT THE SOUTHEAST CORNER OF BIKES;

THENCE, ALONG SOUTH BOUNDARY OF GOODMAN, N 83°42'14" E, 199.86 FEET TO A POINT;

THENCE, CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:

N 84°40'48" E, FOR A DISTANCE OF 385.89 FEET TO A POINT;
N 75°36'41" E, FOR A DISTANCE OF 141.99 FEET TO A POINT;
N 83°11'05" E, FOR A DISTANCE OF 28.87 FEET TO A POINT AT AN INTERSECTION OF MCKAY BRANCH
CONTINUING ALONG MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:
S 7°51'27" E, FOR A DISTANCE OF 201.23 FEET TO A POINT;
S 85°15'03" E, FOR A DISTANCE OF 74.45 FEET TO A POINT;
S 61°08'47" E, FOR A DISTANCE OF 61.78 FEET TO A POINT;
S 58°09'42" E, FOR A DISTANCE OF 42.46 FEET TO A POINT;
S 63°12'54" E, FOR A DISTANCE OF 88.37 FEET TO A POINT;
S 45°49'08" E, FOR A DISTANCE OF 65.41 FEET TO A POINT;
S 39°48'13" E, FOR A DISTANCE OF 73.31 FEET TO A POINT;

THENCE, LEAVING MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:

NORTHEASTERLY ALONG A CURVE THROUGH A CENTRAL ANGLE OF 38°33'55", AN ARC DISTANCE OF 380.30 FEET TO A POINT OF TANGENCY, SAID CURVE IS CONCAVE NORTHWESTERLY AND HAS A RADIUS OF 565.50 FEET, CHORD BEARING N 24°33'52" E WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT OF TANGENCY;
N 05°15'54" E, 84.04 FEET TO THE POINT OF BEGINNING CONTAINING 409.92 ACRES (17,855,971 SQ FT.) AND BEING A PORTION OF THE PROPERTY SHOWN ON TAX MAP 99 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFFS, LLC BY DEED OF RECORD IN BOOK R2827, PAGE 287 IN THE REGISTER'S OFFICE OF MAURY COUNTY, TENNESSEE.

# ANNEXATION AND REZONING REQUEST:

REQUEST TO ANNEX +/-409.92 ACRES AND REZONE TO PUD-R
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

CONNECT COLUMBIA FINDINGS:
*Annexation should provide for a continuation of orderly, planned development of the City. Lot sizes and development scale should be compatible with surrounding development. If proposed development abuts land that is undeveloped or has low density/intensity, the density and intensity of the proposed development should taper towards the periphery to provide compatibility of the development pattern. Land annexed into the City should follow the transect and Character Area Matrix to provide the most appropriate land uses and zoning for the newly annexed land.*
Response: The proposed Columbia Bluffs subdivision is 2 miles from the downtown core. Density and lot size transitions from higher density/intensity at the north, along the Bear Creek Parkway corridor to the south, where a more rural character is appropriate adjacent to Iron Bridge Rd and the Yanahli Park. The properties along Bear Creek Parkway have been identified as "area of change." With the development along this corridor, residential development in close proximity to downtown and new commercial development along Tom Hitch Parkway is a logical progression of development pattern.

*Connectivity, directly through street, sidewalks, bikeways, greenways, and trails, and indirectly, through a mixture of housing and business types, should be encouraged throughout Columbia..*
Response: In addition to roadway and sidewalk connections, Columbia Bluffs proposes nature trails through out the property. The development will also provide a roadway connection between Bear Creek Parkway and Iron Bridge Road. A variety of housing types are proposed, including an age restricted Active Adult neighborhood.

*Suburban Neighborhood: Future development should emphasize connectivity and housing diversity.*
Response: Columbia Bluffs proposes a variety of housing styles
*Near-term Priorites: HOUSING MIX/TYPES: Promote mastered planned housing opportunities for a "full-life cycle" community to accommodate retirees and young professionals. Review Zoning standards to permit smaller lot and home sizes to encourage such developments.*

# MODIFICATIONS FROM STANDARD PUD-R ZONING REQUEST:

RESIDENTIAL LOT DIAGRAMS: SEE SHEET C2.6
1. ACTIVE ADULT AND PRIMARY ALLEY LOADED HOMES SIDE-SETBACK REDUCED TO 5'.
2. OTHER PRIMARY RESIDENTIAL SIDE-SETBACK REDUCED TO 7.5'.
3. ACTIVE ADULT, COURTYARD, AND LARGE LOT GARAGE LOCATED IN 2ND LAYER
4. ACTIVE ADULT, COURTYARD, AND LARGE LOT ALLOWED DOUBLE CAR GARAGE DOORS, WITH A MAXIMUM WIDTH OF 16'
5. ACTIVE ADULT DRIVEWAYS TO BE 18' IN FIRST LAYER.
6. COURTYARD AND LARGE LOT DRIVEWAY TO BE 12' IN FIRST LAYER.

THOROUGHFARE STANDARDS:
1. UTILIZATION OF MODIFIED ROWS INSTEAD OF 70' URBAN NEIGHBORHOOD ROW. SEE C2.7.

CIVIC SPACE:
1. ACTIVE ADULT NEIGHBORHOOD TO BE EXCLUDED FROM REQUIRED PLAYGROUND CRITERIA.
2. CIVIC SPACES B, F, AND J ALLOWED TO HAVE LESS THAN 50% OF CIVIC SPACE PERIMETER ALONG A THOROUGHFARE.

ARCHITECTURE:
3. WINDOW SILL HEIGHT REQUIRED TO BE 5' ABOVE AVERAGE GRADE AT FACADE REDUCED TO 3' ABOVE AVERAGE GRADE FOR ACTIVE ADULT HOMES AND COURTYARD HOMES.
4. ACTIVE ADULT HOMES NOT REQUIRED TO HAVE FFE 2.5 FEET ABOVE FINISHED GRADE IN ORDER TO ACCOMMODATE ADA ACCESS.

# PROJECT DESCRIPTION AND SITE DATA:

REQUEST TO ANNEX AND REZONE THE COLUMBIA BLUFFS PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN.

THE PUD-R PLAN PROPOSES AN ENVIRONMENTALLY SENSITIVE MASTER PLAN FOR A DIVERSE RESIDENTIAL DEVELOPMENT. APPROXIMATELY ONE-THIRD OF THE PROPOSED DEVELOPMENT IS RESERVED FOR ACTIVE ADULT/AGE RESTRICTED SINGLE-FAMILY HOMES. ADDITIONALLY, TOWN HOMES AND A VARIETY OF DETACHED SINGLE-FAMILY HOMES ARE PROPOSED.

IN ADDITION TO THE RESIDENTIAL COMPONENT, THE PUD-R PLANS PROPOSES A DAY CARE FACILITY AND A VARIETY OF NEIGHBORHOOD AMENITIES.

TOTAL SITE AREA: 409.92 ACRES
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

TOTAL AREA OF ROWS/ALLEY EASEMENTS: 62.9 AC; 15% OF GROSS AREA
OPEN SPACE: 199.3 AC; 48% OF GROSS AREA
ESTIMATED SITE ISR: 51%

TOTAL DWELLING UNITS: 836 HOMES
OVERALL SITE DENSITY: 2.04 DUA

| RESIDENTIAL BREAKDOWN | | NON RESIDENTIAL |
|---|---|---|
| ACTIVE ADULT HOMES: | 299 | DAYCARE 12,000 - 14,000 SF |
| TOWNHOMES: | 166 | RECREATION FACILITY LOT - 75,789 SF |
| ALLEY SINGLE-FAMILY: | 146 | |
| COURTYARD HOMES: | 103 | |
| LARGE LOT HOMES: | 122 | |

EXISTING TREE CANOPY COVERAGE: 262.2 ACS; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%; SEE SHEET C2.8

TOTAL OPEN SPACE PROVIDED: 199.3 AC; 48% OF GROSS SITE AREA
OPEN SPACE BREAKDOWN
CIVIC SPACE: 22.8 AC
ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC
ALL OTHER OPEN SPACE: 101.5 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC
CIVIC SPACE PROVIDED: 5.4%; 22.2 AC (SEE SHEET L1.0)

PARKING: SEE LOT DIAGRAMS (C2.6) FOR PROPOSED RESIDENTIAL PARKING;
AND SHEETS L1.0-L1.6 FOR CIVIC SPACE PARKING
RESIDENTIAL: 2 PARKING SPACES PER UNIT
DAYCARE: 1 PER STAFF + 0.5 PER CHILD
CIVIC SPACE: 1 PER 5,000 SF

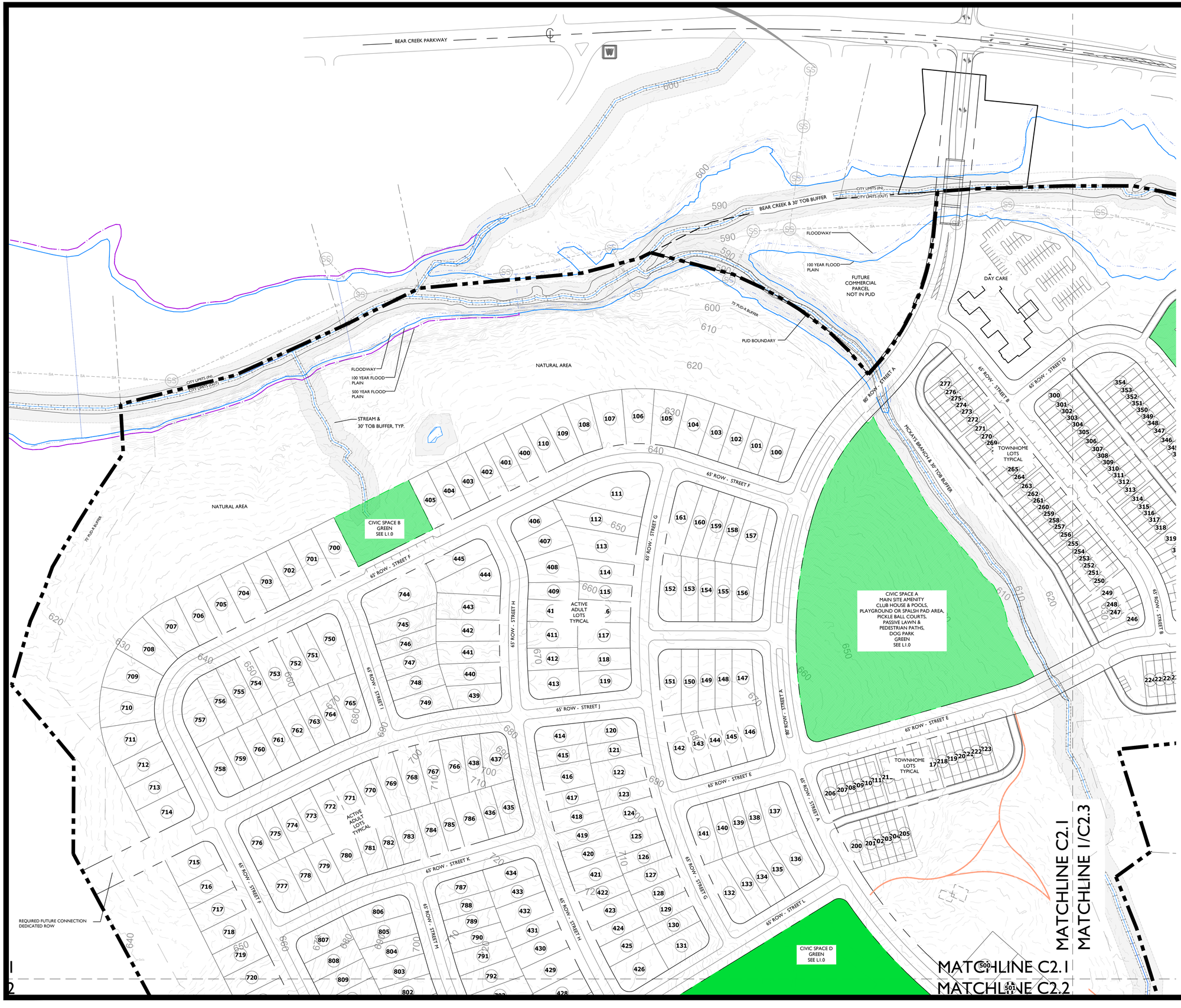
GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT 12.18.23

Date: October 16, 2023
Revision Date
1 December 18, 2023
2
3

OVERALL PUD-R PMDP
SHEET
C2.0




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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3

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

ENLARGED PUD-R PMDP SHEET

C2.1

MATCHLINE C2.1
MATCHLINE C2.2

MATCHLINE C2.1
MATCHLINE C2.2

MATCHLINE C2.2
MATCHLINE C2.4

CIVIC SPACE D
MAIL KIOSK
SEATING, PASSIVE LAWN & PEDESTRIAN PATHS,
GREEN
SEE L1.0

CIVIC SPACE G
ACTIVE ADULT AMENITY
COVERED SEATING, PASSIVE LAWN &
PEDESTRIAN PATHS,
DOG PARK,
COMMUNITY GARDEN,
GREEN
SEE L1.0

CIVIC SPACE H
PASSIVE LAWN &
PEDESTRIAN PATHS,
PLAYGROUND
GREEN
SEE L1.0

CIVIC SPACE E
MAIL KIOSK, PASSIVE LAWN &
PEDESTRIAN PATHS,
PLAYGROUND
GREEN
SEE L1.0

ACTIVE ADULT LOTS TYPICAL

COURTYARD LOTS TYPICAL

LARGE LOTS TYPICAL

ALLEY HOMES TYPICAL

NATURAL AREA

65' ROW - STREET A
65' ROW - STREET F
65' ROW - STREET H
65' ROW - STREET L
65' ROW - STREET N
65' ROW - STREET O
60' ROW - STREET P
60' ROW - STREET Q
55' ROW - STREET P
55' ROW - STREET R
55' ROW - STREET S
55' ROW - STREET T
60' ROW - STREET T
55' ROW - STREET W
65' ROW - STREET C
60' ROW

75' M.D.X BUFFER

FLOODWAY
100 YEAR FLOOD PLAIN

STREAM &
30' TOB BUFFER, TYP.

DUCK RIVER

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

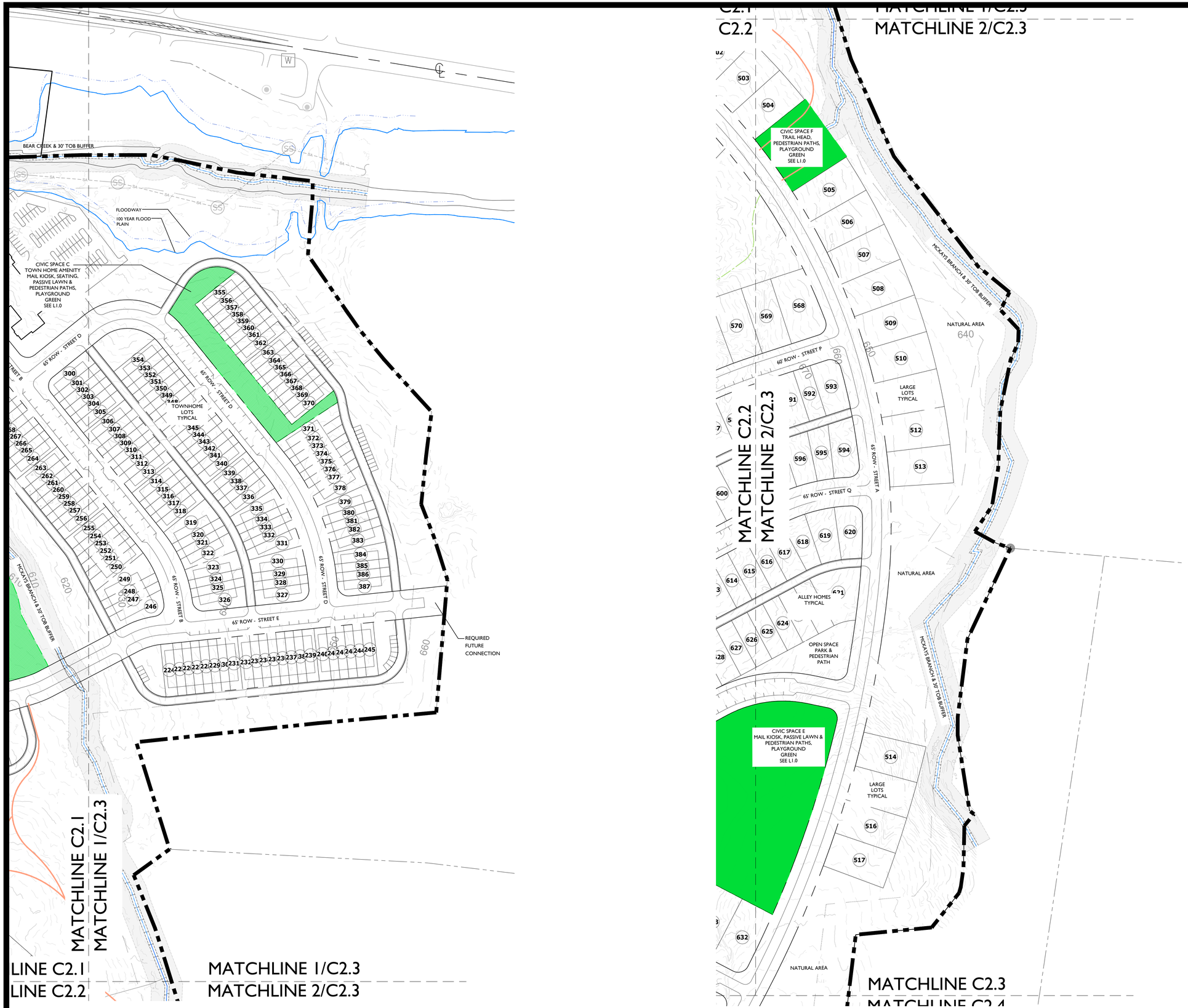
# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED LANDSCAPE ARCHITECT
12.18.23

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
| 2 |
| 3 |

ENLARGED
PUD-R PMDP
SHEET
C2.2




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED LANDSCAPE ARCHITECT
STATE OF TENNESSEE
12.18.23

Date: October 16, 2023

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|---|
| ⚠1 December 18, 2023 |
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500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

ENLARGED
PUD-R PMDP

SHEET
C2.3

MATCHLINE C2.3
MATCHLINE C2.4

NATURAL AREA
75' RIDGE & BUFFER
FLOODWAY
100 YEAR FLOOD PLAIN
DUCK RIVER
55' ROW - STREET W
60' ROW - STREET T
65' ROW - STREET A
COURTYARD LOTS TYPICAL
DEDICATED ROW REQUIRED FUTURE CONNECTION
LARGE LOTS TYPICAL
55' ROW - STREET V
55' ROW - STREET U
OPEN SPACE
OHE
100' TVA LINE AND EASEMENT
55' ROW - STREET X
50' ROW - STREET U
CIVIC SPACE I
MAIL KIOSK, SEATING, PASSIVE LAWN & PEDESTRIAN PATHS, PLAYGROUND GREEN
SEE L1.0
STREAM & 30' TOB BUFFER, TYP.
55' ROW - STREET Y

MATCHLINE C2.4
MATCHLINE C2.5

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
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12.18.23

Date: October 16, 2023

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|---|
| 1 December 18, 2023 |
| 2 |
| 3 |

ENLARGED PUD-R PMDP

SHEET C2.4

MATCHLINE C2.4
MATCHLINE C2.5

NATURAL AREA
DUCK RIVER
65' ROW - STREET A
55' ROW - STREET U
COURTYARD LOTS TYPICAL
LARGE LOTS TYPICAL
CIVIC SPACE J
TRAIL HEAD, SEATING, PASSIVE LAWN & PEDESTRIAN PATHS, GREEN
SEE LI.0
STREAM & 30' TOB BUFFER, TYP.
500 YEAR FLOOD PLAIN
FLOODWAY
100 YEAR FLOOD PLAIN
75' PUD-R BUFFER
RECREATIONAL FACILITIES
37.5' FROM CENTER LINE OF IRON BRIDGE ROAD ROW DEDICATION REQUIRED AT CORNER OF PROPERTY DUE TO STAFF REQUEST FOR ROW MINIMUM DISTANCE OF 37.5' FROM CENTERLINE

500 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
CIVIC SPACE (SEE SHEET L1.0)
PAVED TRAIL (TO BE FIELD LOCATED)
PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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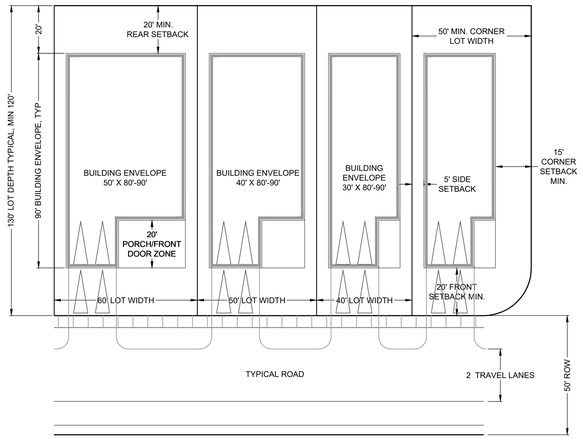
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| 1 December 18, 2023 |
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ENLARGED PUD-R PMDP

SHEET
C2.5

ACTIVE ADULT/ AGE RESTRICTED DETACHED SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 40' X 120'; 50' X 120'; 60' X 120'

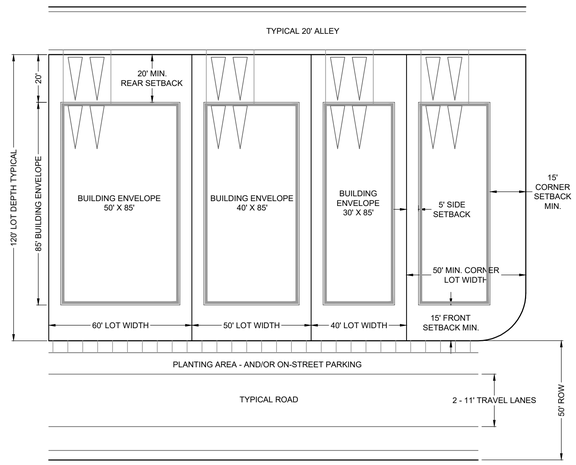
| SETBACKS: | MODIFICATION REQUESTS: | LOT DISTRIBUTION: | TYPICAL ISR: |
|---|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 18' WIDE IN FIRST LAYER<br>WINDOW SILL HEIGHT 3' ABOVE MIN. GRADE AT FACADE | 60' LOTS: 61<br>50' LOTS: 141<br>40' LOTS: 97 | 60% |



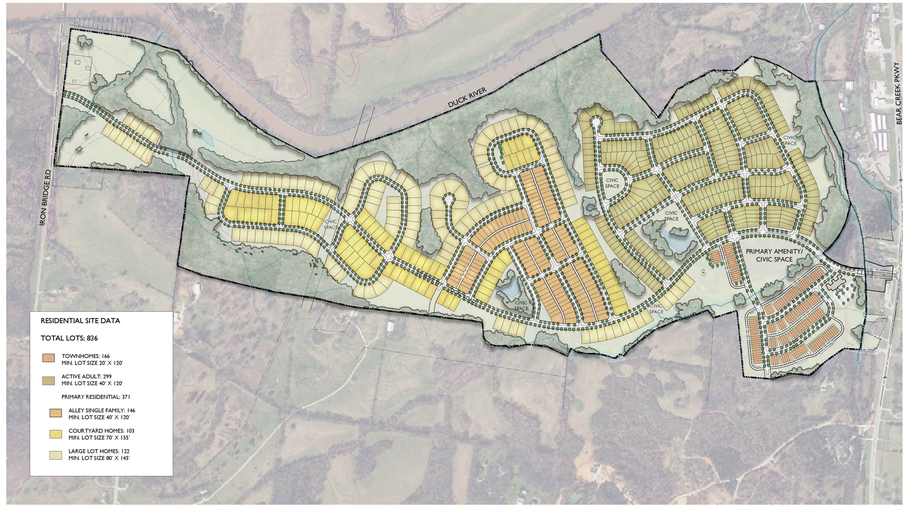

1 C2.6 ACTIVE ADULT LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL - ALLEY LOADED DETACHED SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 40' X 120'; 50' X 120'; 60' X 120'

| SETBACKS: | MODIFICATION REQUESTS: | LOT DISTRIBUTION: | TYPICAL ISR: |
|---|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 5' | 50' LOTS: 68<br>40' LOTS: 78 | 63% |



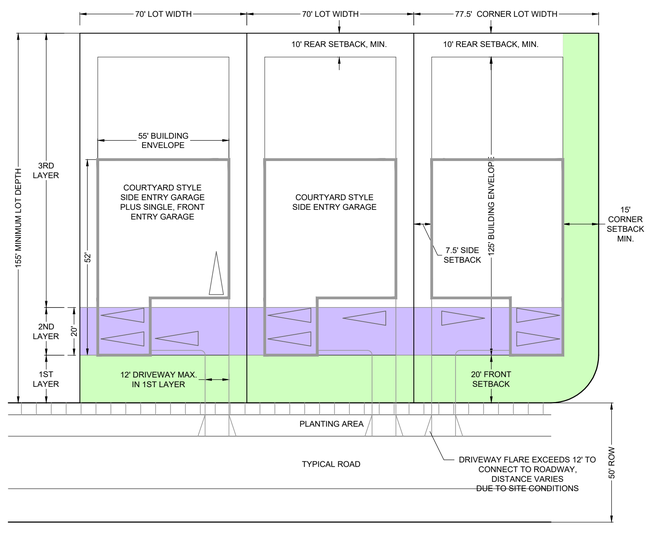

2 C2.6 SINGLE-FAMILY ALLEY LOT DIAGRAM N.T.S




3 C2.6 KEY MAP N.T.S

PRIMARY RESIDENTIAL COURTYARD SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 70' MIN. X 155'

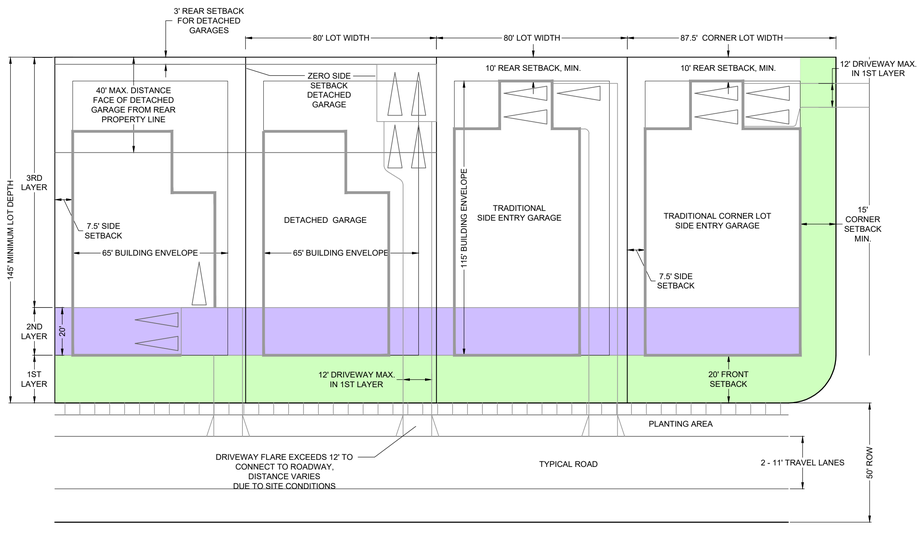
| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 10' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 12' WIDE IN FIRST LAYER<br>WINDOW SILL HEIGHT 3' ABOVE FINISHED GRADE MIN. | 30% |




4 C2.6 COURTYARD HOME LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL LARGE LOT SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 80' MIN. X 145'

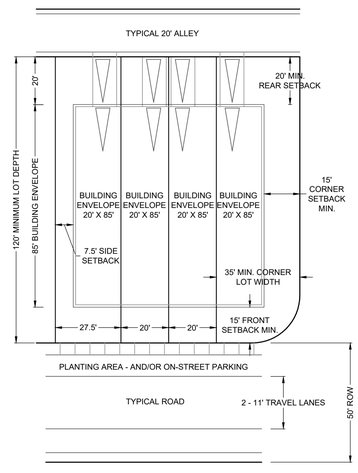
| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 10' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 12' WIDE IN FIRST LAYER | 60% |




5 C2.6 LARGE LOT HOME LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL ALLEY LOADED TOWN HOMES
TYPICAL INTERIOR LOT DIMENSIONS 20' MIN. X 120'
UNITS PER BUILDING: 4, 6, 7, OR 8

| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 15' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5' | 80% INTERIOR UNITS |




6 C2.6 TOWN HOME LOT DIAGRAM N.T.S

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT 12.18.23

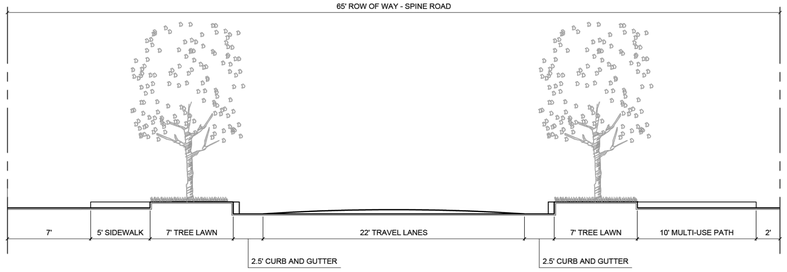
Date: October 16, 2023

| Revision Date |
|---|
| ⚠ December 18, 2023 |
| △ |
| △ |

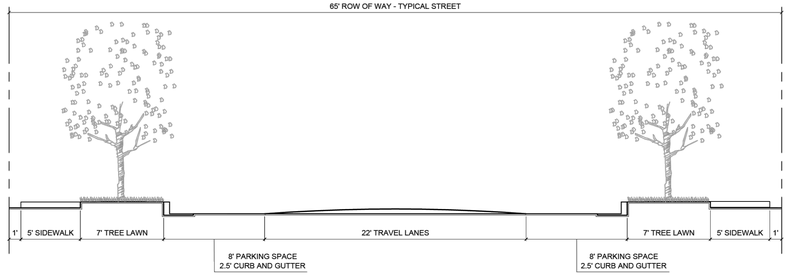
LOT DIAGRAMS

SHEET
C2.6

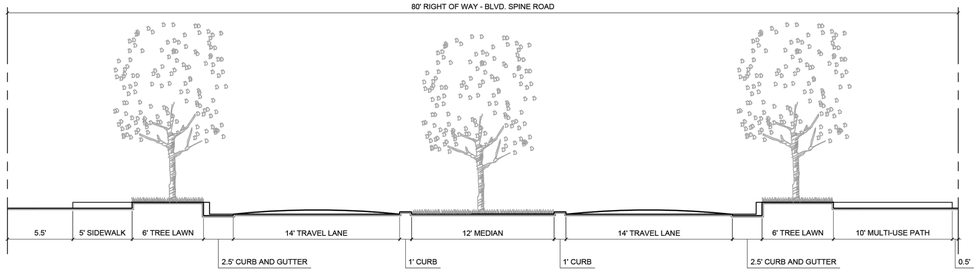
65' ROW OF WAY - SPINE ROAD




65' ROW OF WAY - TYPICAL STREET

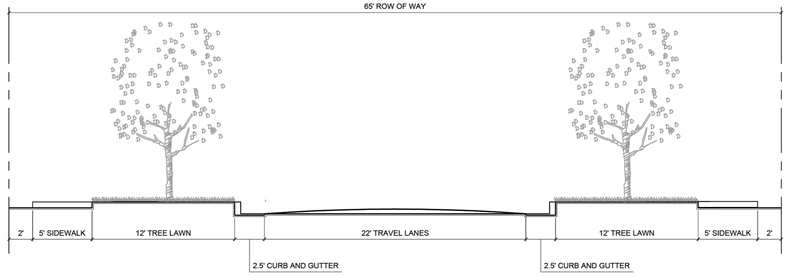



80' RIGHT OF WAY - BLVD. SPINE ROAD

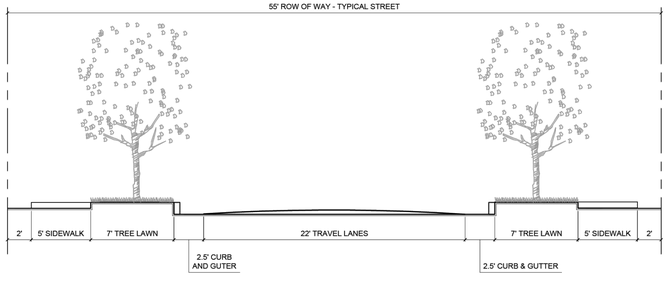



65' ROW - CD4 - NO PARKING

65' ROW OF WAY

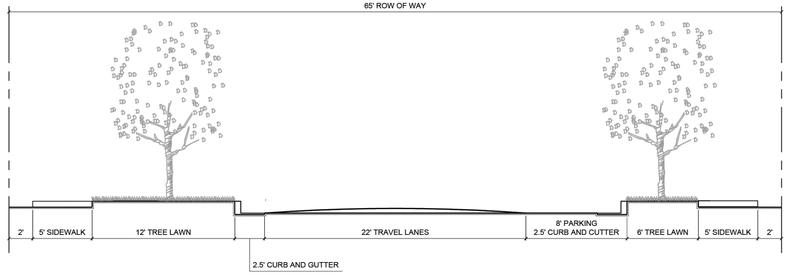



55' ROW OF WAY - TYPICAL STREET

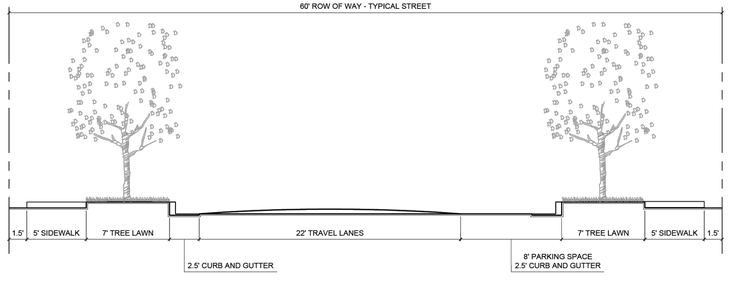



65' ROW - LOCAL CD4
WITH PARKING ONE SIDE

65' ROW OF WAY

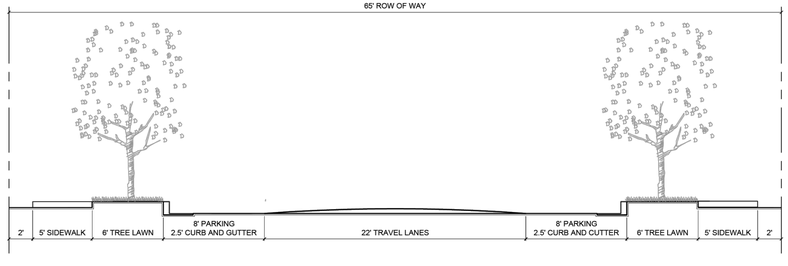



60' ROW OF WAY - TYPICAL STREET




65' ROW - LOCAL CD4
WITH PARKING ONE SIDE

65' ROW OF WAY




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED
LANDSCAPE
ARCHITECT
12.18.23

Date: December 18, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

LOT DIAGRAMS

SHEET
C2.7




## SITE DATA:

EXISTING TREE CANOPY COVERAGE: 262.2 AC; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%; 94.4 AC MIN
ESTIMATED PRESERVATION: 109.63 AC; 42%

ANTICIPATED PRESERVATION AREAS TO BE DETERMINED WITH FINAL GRADING/STORMWATER.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

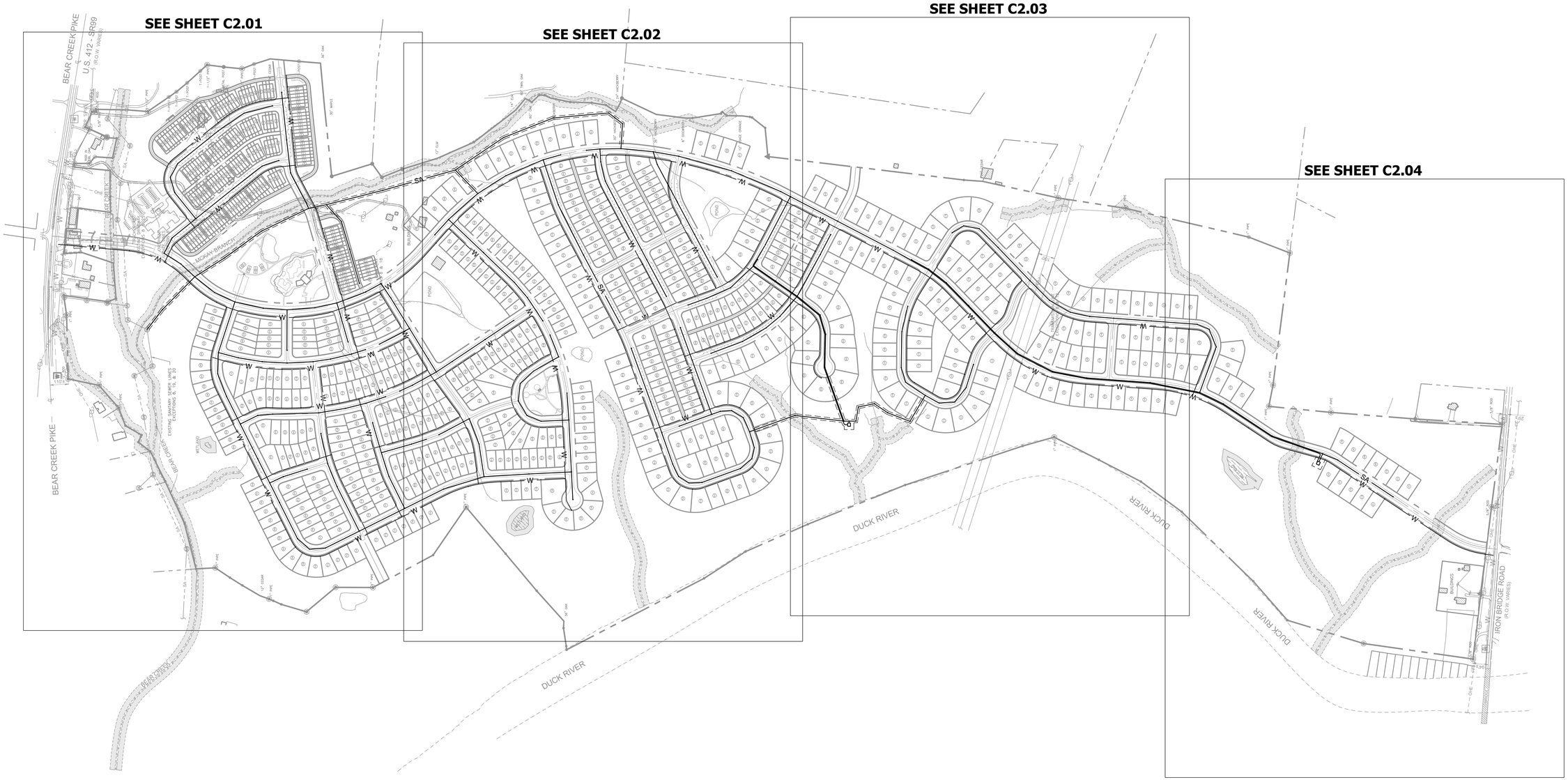
JEFFREY A. ROSS
REGISTERED
No. 104
PROFESSIONAL
ENGINEER
STATE OF TENNESSEE
12.18.23

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
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| △ |

OVERALL PUD-R PMDP

SHEET
C2.8




N

0 300 600
SCALE: 1"= 300'

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Landscape Architecture
2305 Kline Ave, Ste 300
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csdgtn.com

SEAL

JAMES T. HARRISON
REGISTERED
ENGINEER
12-18-23
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

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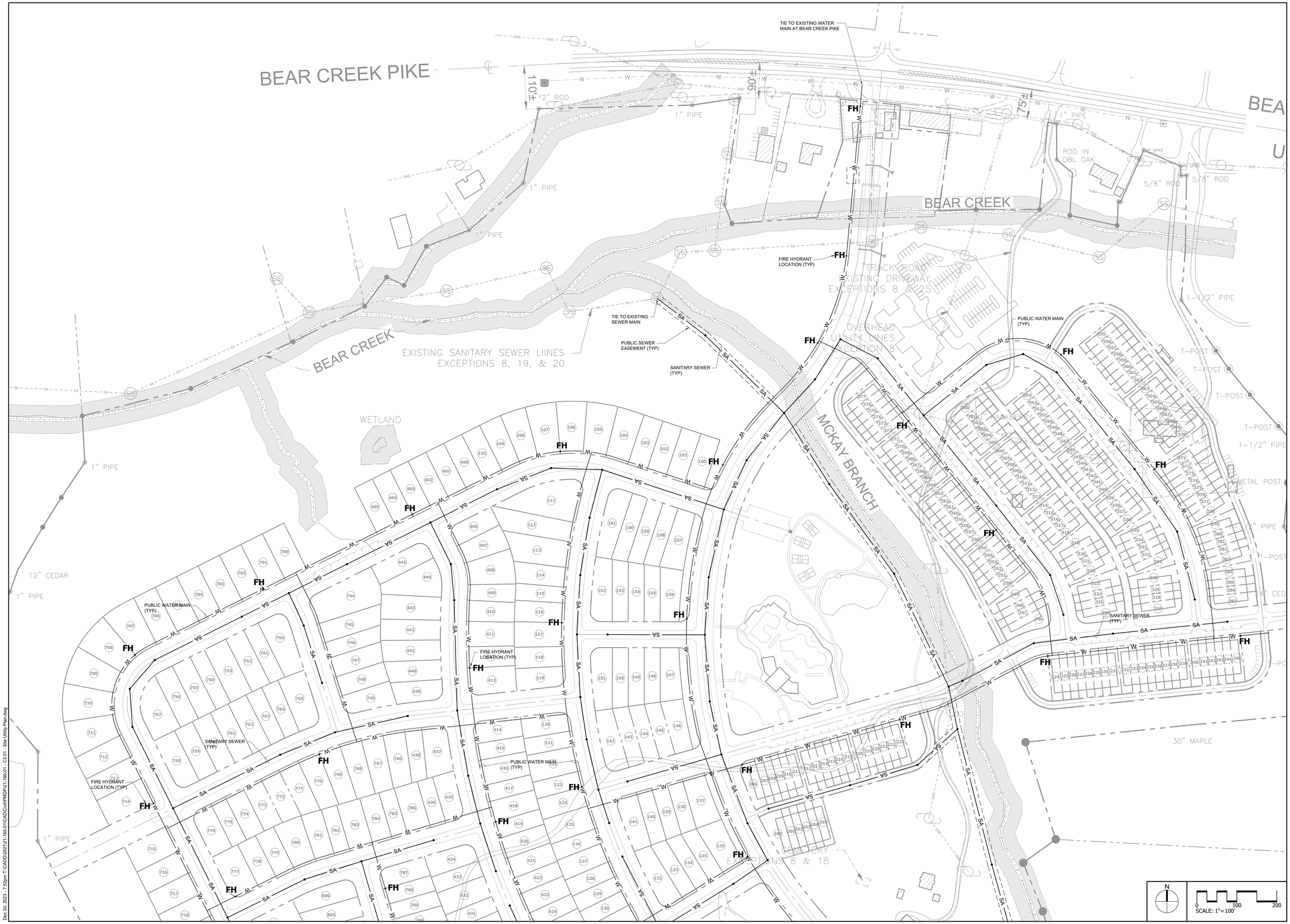
DRAWN BY: TWG
CHECKED BY: TWG

## OVERALL UTILITY PLAN

# C3.00

PROJECT NO.: 21-160-01

Dec 20, 2023 - 7:52pm T:\CAD\20\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.00 - Overall Utility Plan.dwg




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# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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INITIAL SUBMITTAL
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SITE UTILITY PLAN

C3.01
PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:52pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.01 - Site Utility Plan.dwg




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# COLUMBIA BLUFFS
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Bear Creek Pike
Columbia, Maury County, Tennessee

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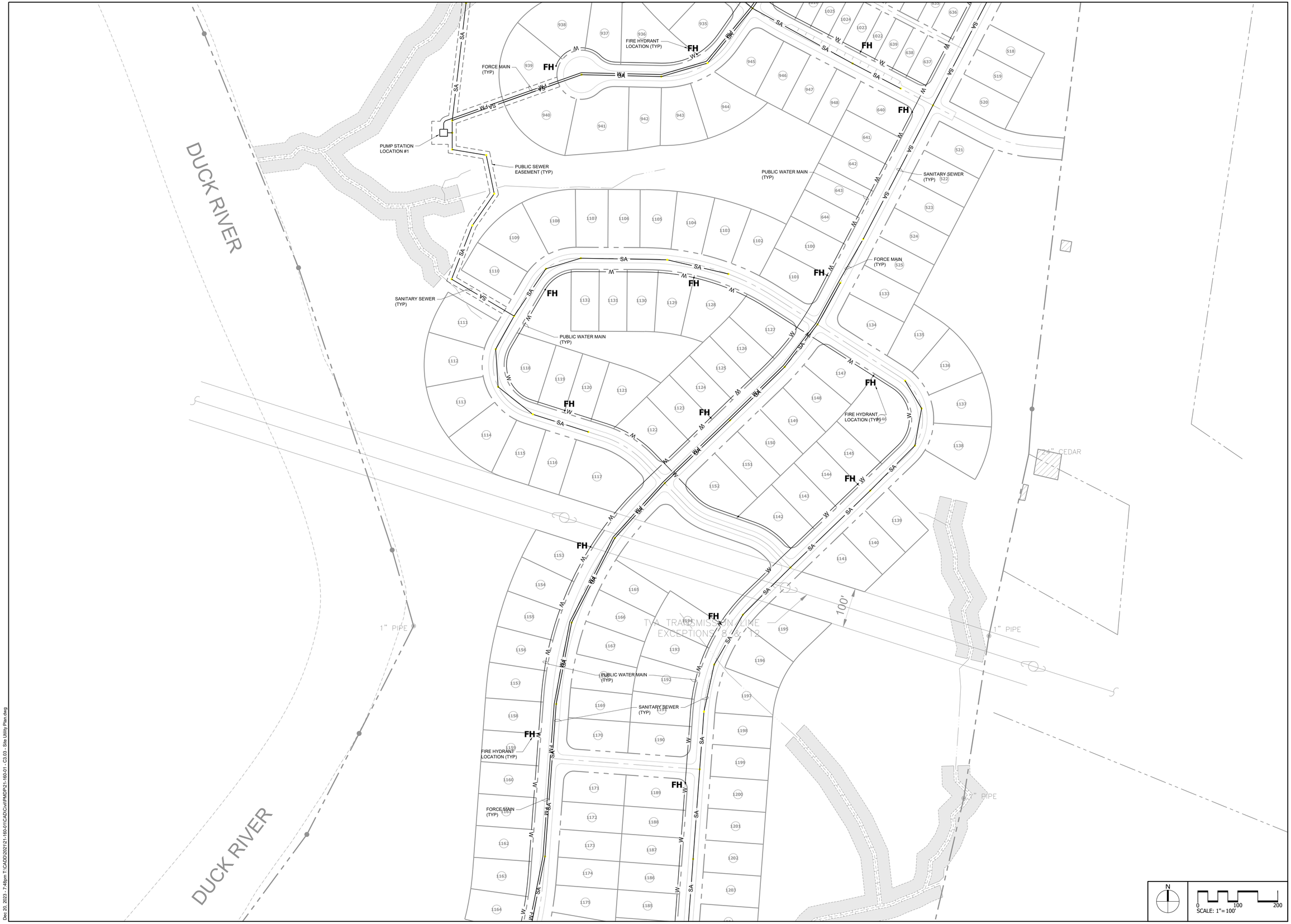
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|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
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SITE UTILITY PLAN

C3.02
PROJECT NO.: 21-160-01

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12-16-23
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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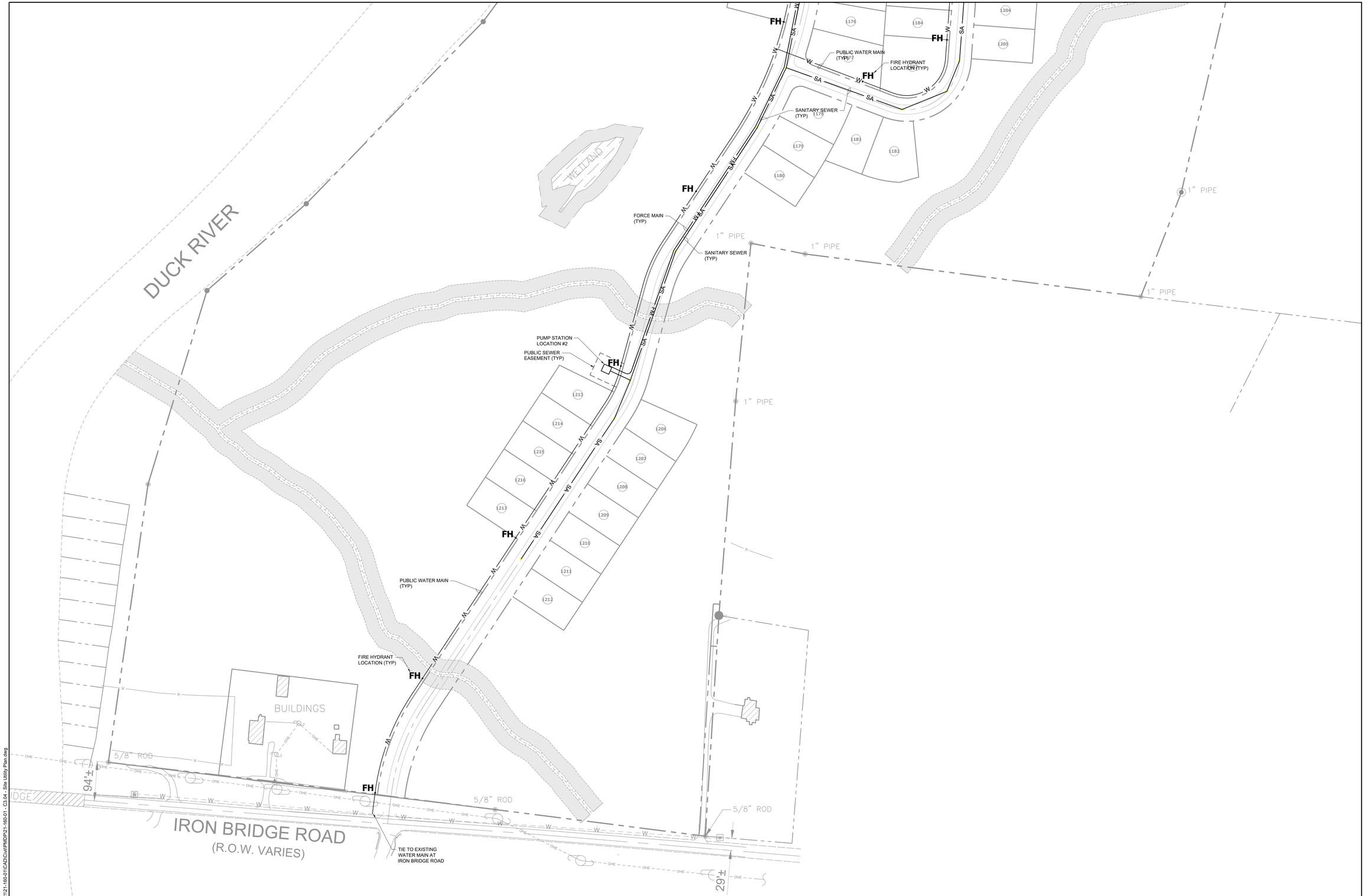
DRAWN BY: TWG
CHECKED BY: TWG

SITE UTILITY PLAN

C3.03
PROJECT NO.: 21-160-01

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SCALE: 1"= 100'

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SITE UTILITY PLAN

N
0 100 200
SCALE: 1"= 100'

C3.04
PROJECT NO.: 21-160-01

Dec 20, 2023 - 7:48pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.04 - Site Utility Plan.dwg




N

0 300 600
SCALE: 1"= 300'

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# COLUMBIA BLUFFS
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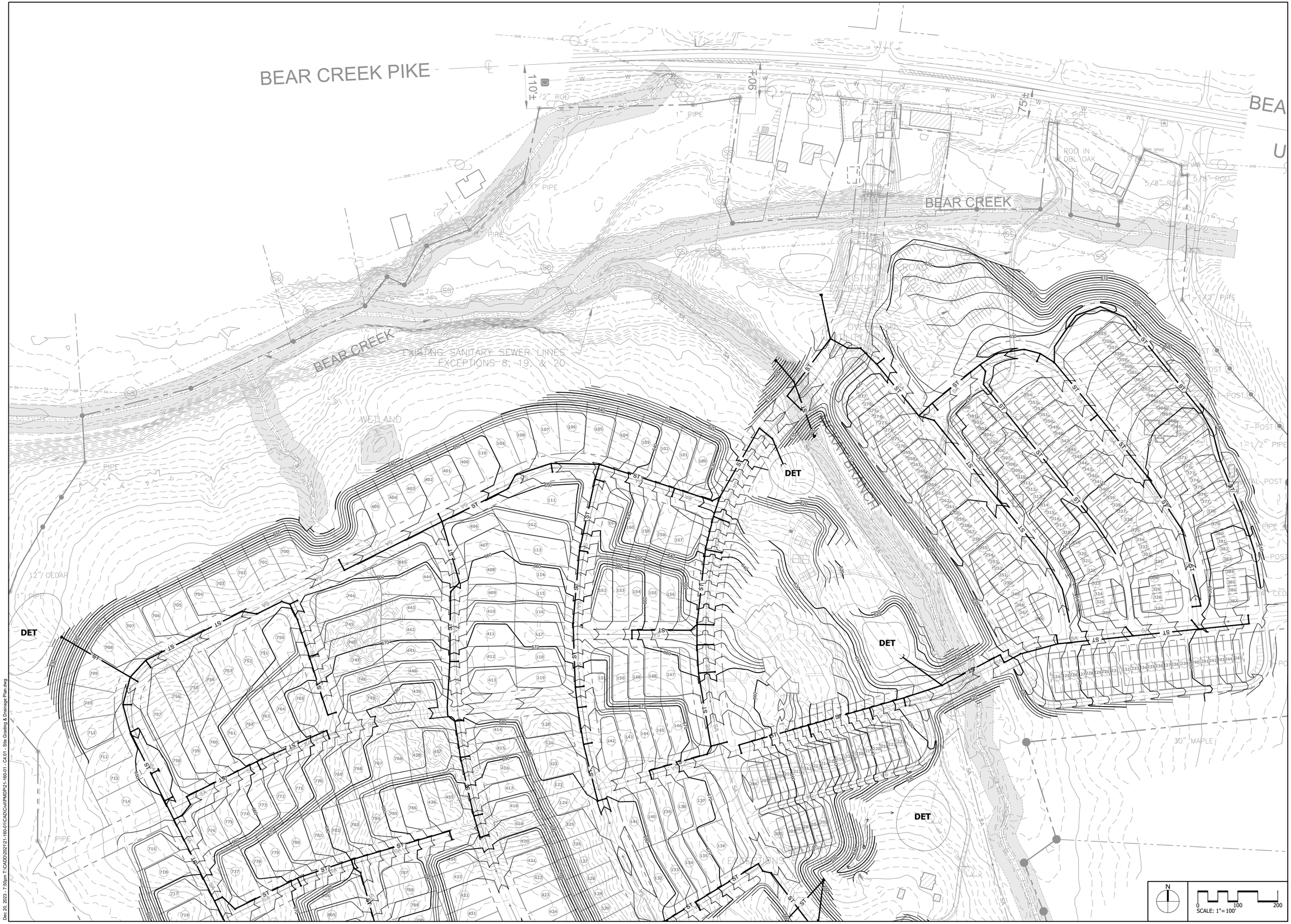
## OVERALL GRADING & DRAINAGE PLAN

# C4.00

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:49pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.00 - Overall Grading & Drainage Plan.dwg




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PROFESSIONAL
ENGINEER
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STATE OF TENNESSEE
12-16-23

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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## SITE GRADING & DRAINAGE PLAN

# C4.01

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:59pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.01 - Site Grading & Drainage Plan.dwg




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No. 021998
STATE OF TENNESSEE
12-16-23

# COLUMBIA BLUFFS
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Bear Creek Pike
Columbia, Maury County, Tennessee

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## SITE GRADING & DRAINAGE PLAN

# C4.02

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:50pm T:\CADD\2021\21-160-01\CADD\civil\PMDP\21-160-01 - C4.02 - Site Grading & Drainage Plan.dwg




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12-16-23

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

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## SITE GRADING & DRAINAGE PLAN

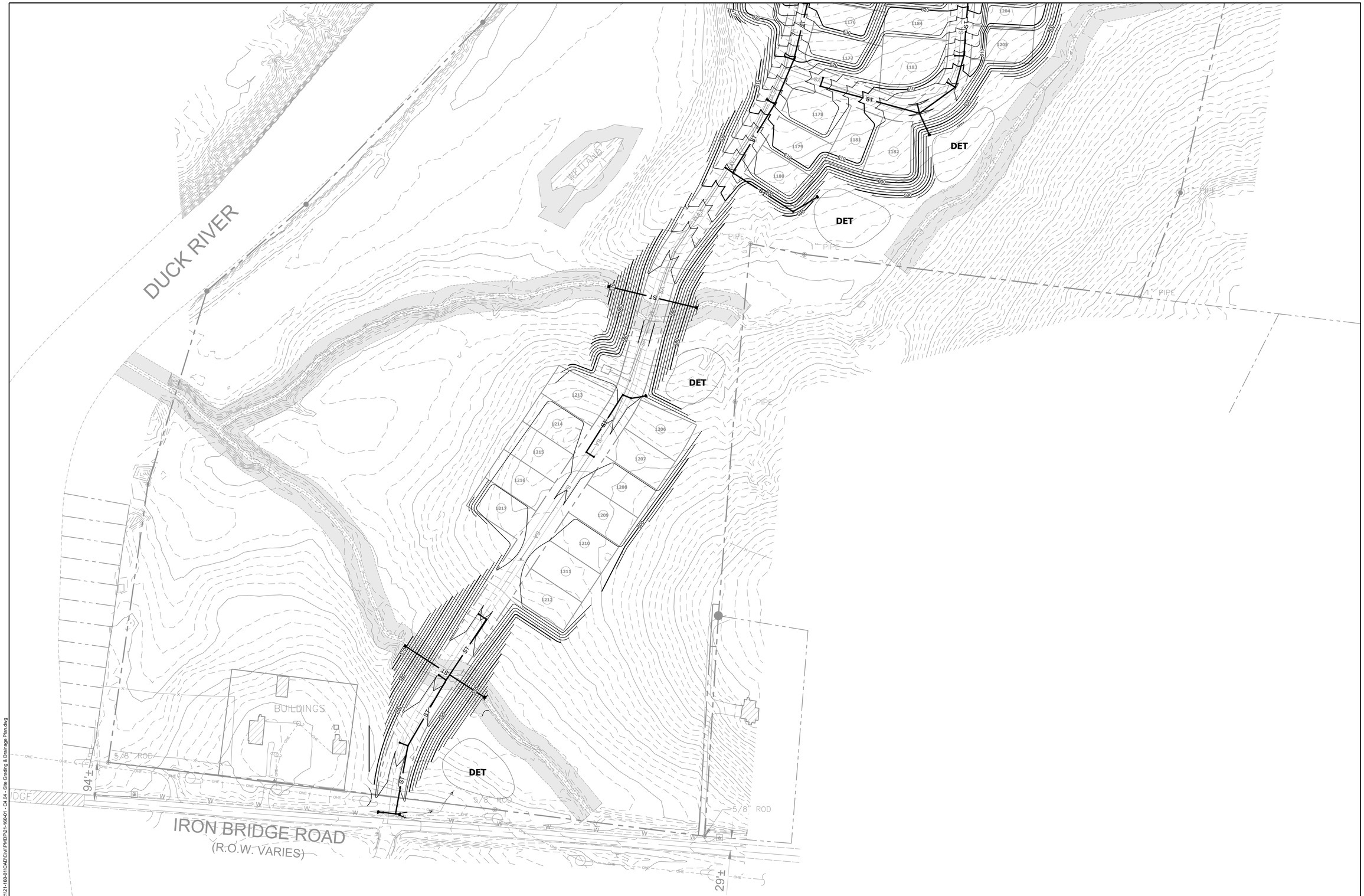
# C4.03

PROJECT NO.: 21-160-01

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SCALE: 1"=100'

Dec 20, 2023 - 7:50pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.03 - Site Grading & Drainage Plan.dwg




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ENGINEER
12-16-23
No. 021998
STATE OF TENNESSEE

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## SITE GRADING & DRAINAGE PLAN

# C4.04

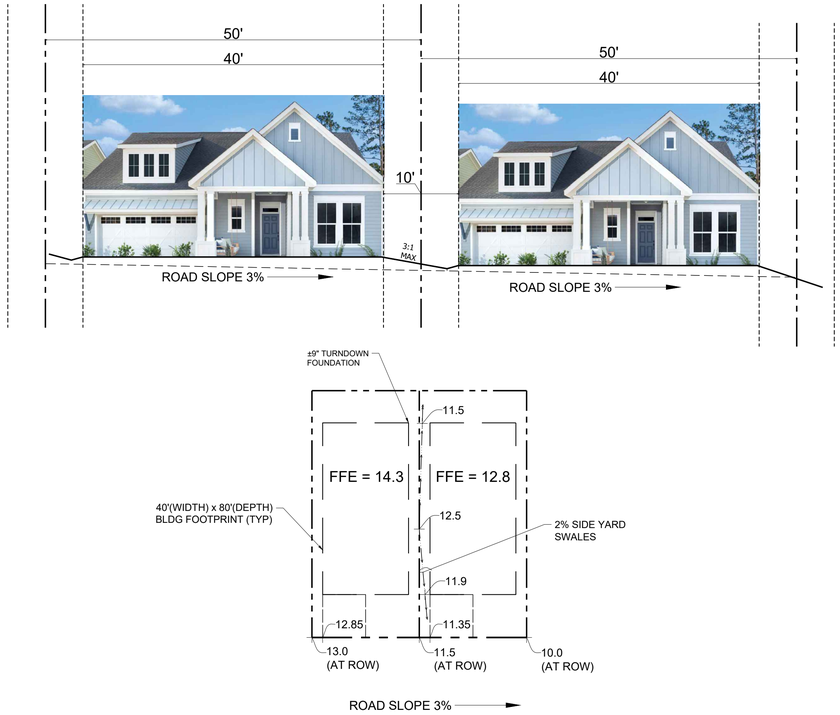
PROJECT NO.: 21-160-01

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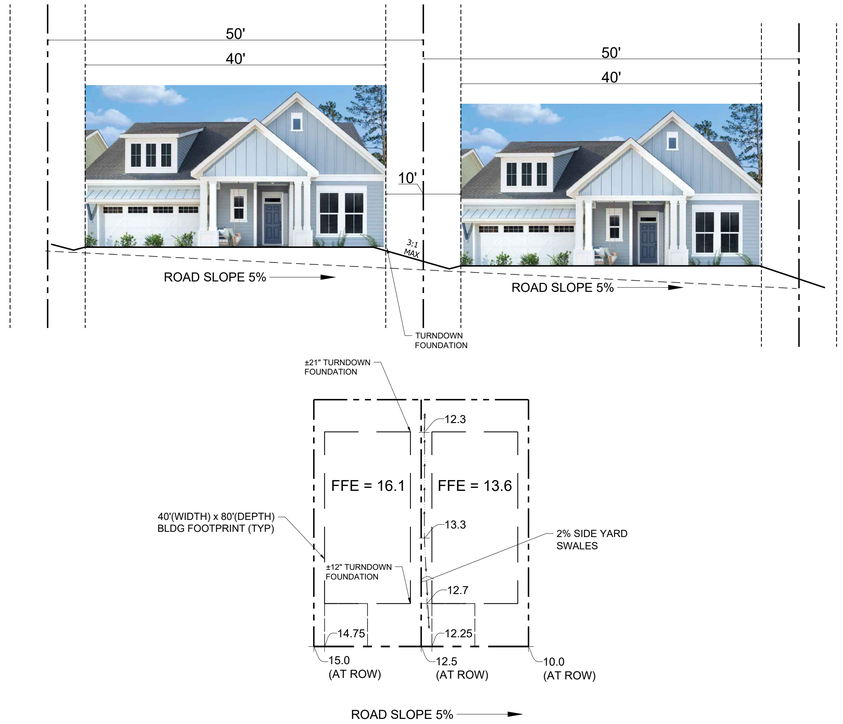


Dec 20, 2023 - 7:51pm T:\CAD\D\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.04 - Site Grading & Drainage Plan.dwg



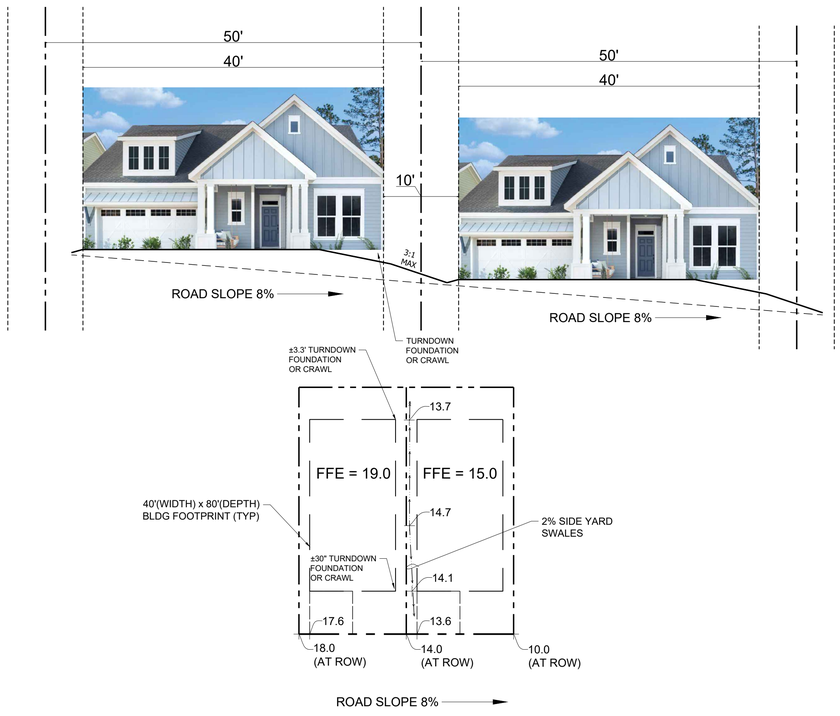

## LOT GRADING DIAGRAM - 3% ROAD SLOPE

NTS



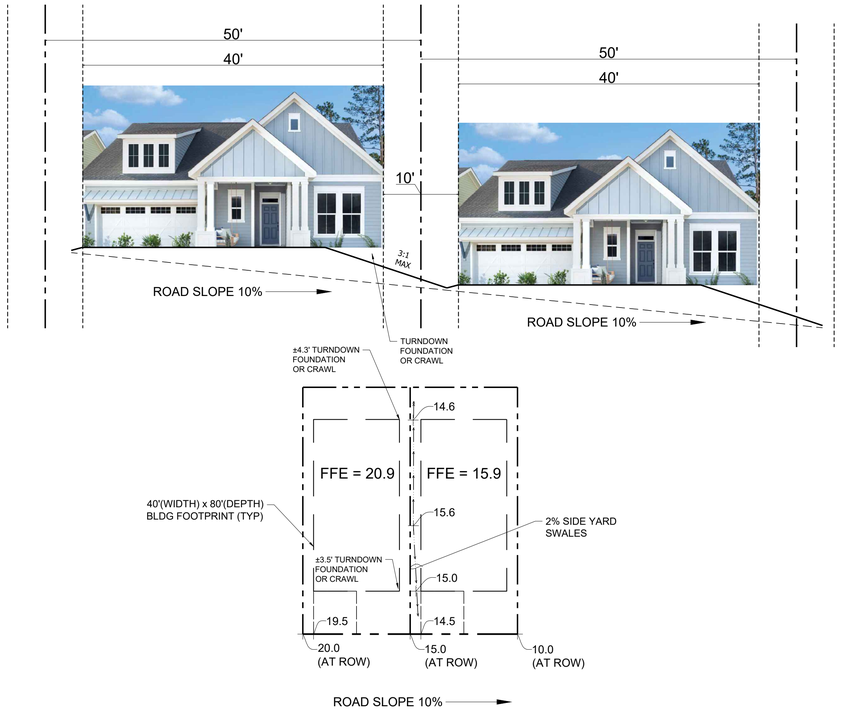

## LOT GRADING DIAGRAM - 5% ROAD SLOPE

NTS




## LOT GRADING DIAGRAM - 8% ROAD SLOPE

NTS

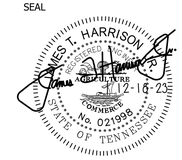



## LOT GRADING DIAGRAM - 10% ROAD SLOPE

NTS

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Landscape Architecture
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# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

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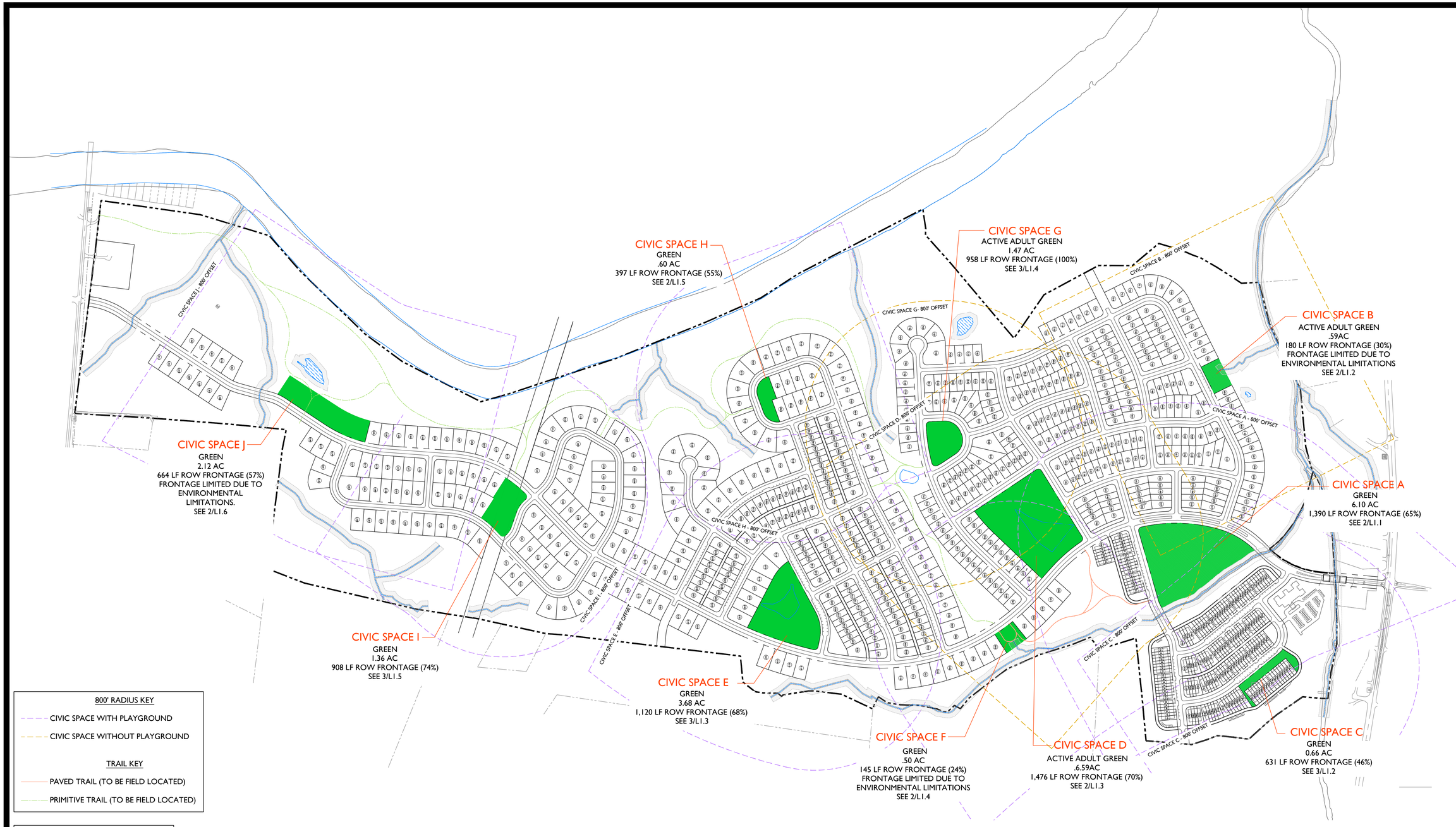
LOT DRAINAGE DIAGRAMS

C4.05

PROJECT NO.: 21-160-01



Dec 20, 2023 - 7:51pm T:\CAD\20\21\21-160-01\CAD\Civil\PMDP\21-160-01 - C4.05 - Lot Drainage Diagrams.dwg




800' RADIUS KEY

- CIVIC SPACE WITH PLAYGROUND
- CIVIC SPACE WITHOUT PLAYGROUND

TRAIL KEY

- PAVED TRAIL (TO BE FIELD LOCATED)
- PRIMITIVE TRAIL (TO BE FIELD LOCATED)

OVERALL CIVIC SPACE PLAN

0 300 600 900
GRAPHIC SCALE 1"=300'-0"

TOTAL OPEN SPACE PROVIDED: 199.8 AC; 48.7% OF GROSS SITE AREA

OPEN SPACE BREAKDOWN

CIVIC SPACE: 22.2 AC
ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC
ALL OTHER OPEN SPACE: 102.6 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC
CIVIC SPACE PROVIDED: 5.4%; 22.2 AC (SEE SHEET L1.0)

CIVIC SPACE BREAKDOWN

| KEY | SIZE | PLAYGROUND |
|---|---|---|
| A | 5.89 AC | YES |
| B | .59 AC | NO |
| C | .66 AC | YES |
| D | 6.12 AC | NO |
| E | 3.68 AC | YES |
| F | .50 AC | YES |
| G | 1.24 AC | YES |
| H | .60 AC | YES |
| I | 1.36 AC | YES |
| J | 2.12 AC | YES |

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED
LANDSCAPE
ARCHITECT
PE
12.18.23

Date: December 18, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

OVERALL CIVIC SPACE PLAN

SHEET
L1.0




1 LI.1 KEY MAP N.T.S

NEIGHBORHOOD CLUBHOUSE





PICKLE BALL COURTS



DOG PARK

WALKING PATHS





POOL



SWING BENCH



PICKLE BALL COURTS




2 LI.1 CIVIC SPACE - A
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 50' 100'

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE PE 12.18.23

Date: December 18, 2023

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|---|
| △ |
| △ |
| △ |

OVERALL CIVIC SPACE PLAN

SHEET LI.1




1 / LI.2 KEY MAP N.T.S




2 / LI.2 CIVIC SPACE - B

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'

BENCHES



FORMAL PLANTING





FORMAL LAWN



WALKING PATH




3 / LI.2 CIVIC SPACE - C

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'

PLAYGROUND





FORMAL PLANTING

PLAYGROUND



GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS Registered Engineer PE 12.18.23

Date: December 18, 2023

Revision Date

△

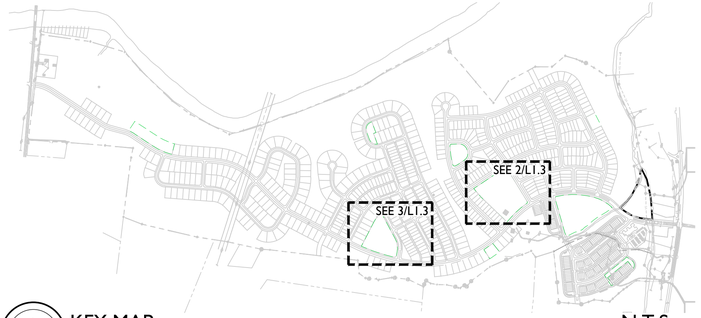
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OVERALL CIVIC SPACE PLAN

SHEET LI.2




1 / L1.3 KEY MAP N.T.S




2 / L1.3 CIVIC SPACE - D
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 50' 100'


POND


TRAIL HEAD

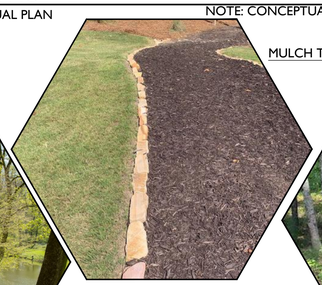

MAIL KIOSK

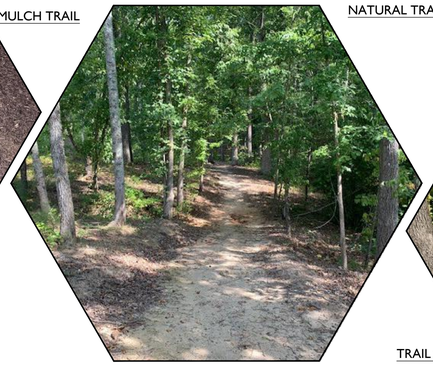
3 / L1.3 CIVIC SPACE - E
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'


NATURAL POND


MULCH TRAIL


NATURAL TRAIL



TRAIL SIGN

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE PE 12.18.23

Date: December 18, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

OVERALL CIVIC SPACE PLAN

SHEET L1.3




2 L1.4 CIVIC SPACE - F

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



SWINGS



FORMAL PARK



PLAYGROUND




1 L1.4 KEY MAP N.T.S

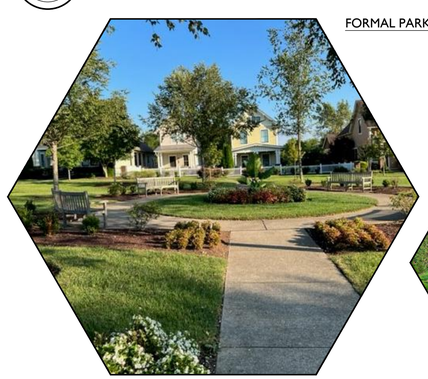



3 L1.4 CIVIC SPACE - G

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

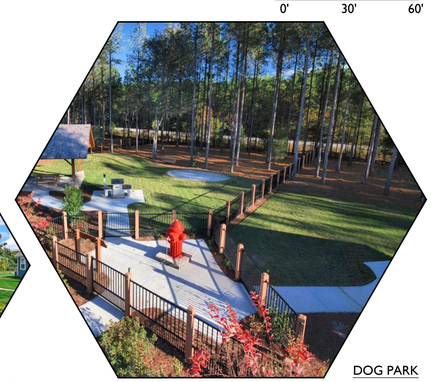
0' 30' 60'



FORMAL PARK



COMMUNITY GARDEN



DOG PARK

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

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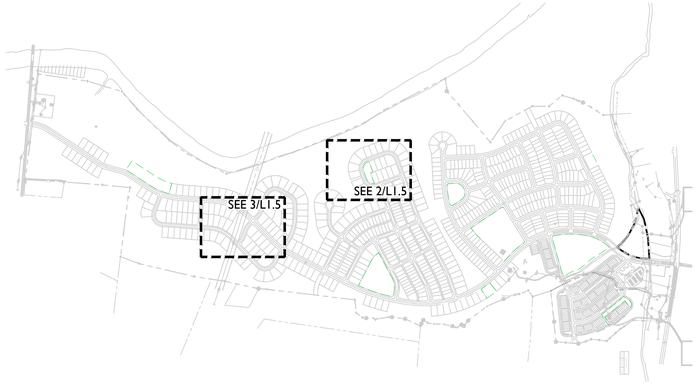
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OVERALL CIVIC SPACE PLAN

SHEET

L1.4




1 / LI.5 KEY MAP N.T.S




2 / LI.5 CIVIC SPACE - H
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'


SWINGS


PLAYGROUND


PLAYGROUND




3 / LI.5 CIVIC SPACE - I
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'


SWINGS


MAIL KIOSK


FORMAL PLANTING

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE 12.18.23

Date: December 18, 2023
Revision Date
△
△
△

OVERALL CIVIC SPACE PLAN
SHEET
LI.5




2 / L1.6 CIVIC SPACE - J

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 100' 200'

NOTE: PRIMITIVE WALKING TRAILS TO BE FIELD LOCATED.



OPEN FIELD



TRAIL HEAD



MULTI-PURPOSE FIELD




1 / L1.6 KEY MAP N.T.S

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE 12.18.23

Date: December 18, 2023

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|---|---|
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| △ | |

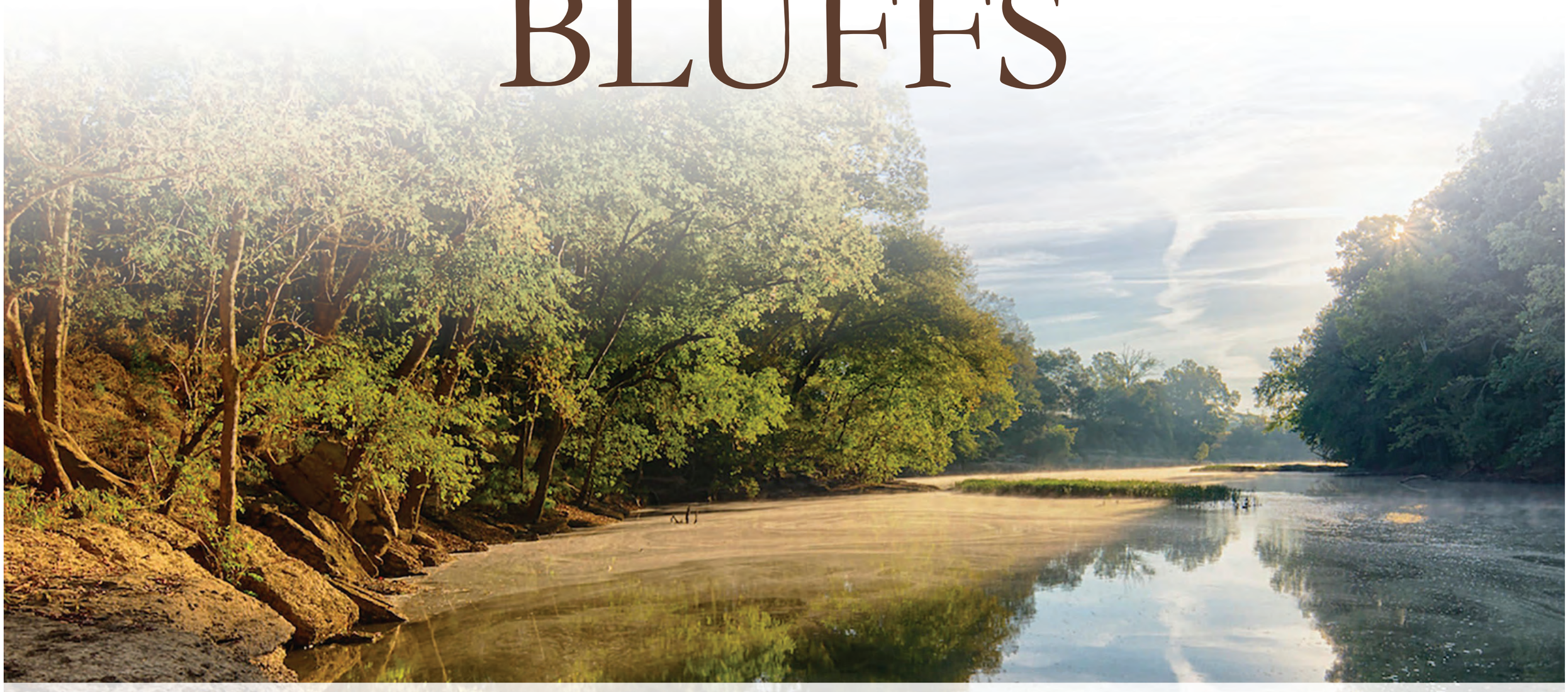
OVERALL CIVIC SPACE PLAN

SHEET L1.6

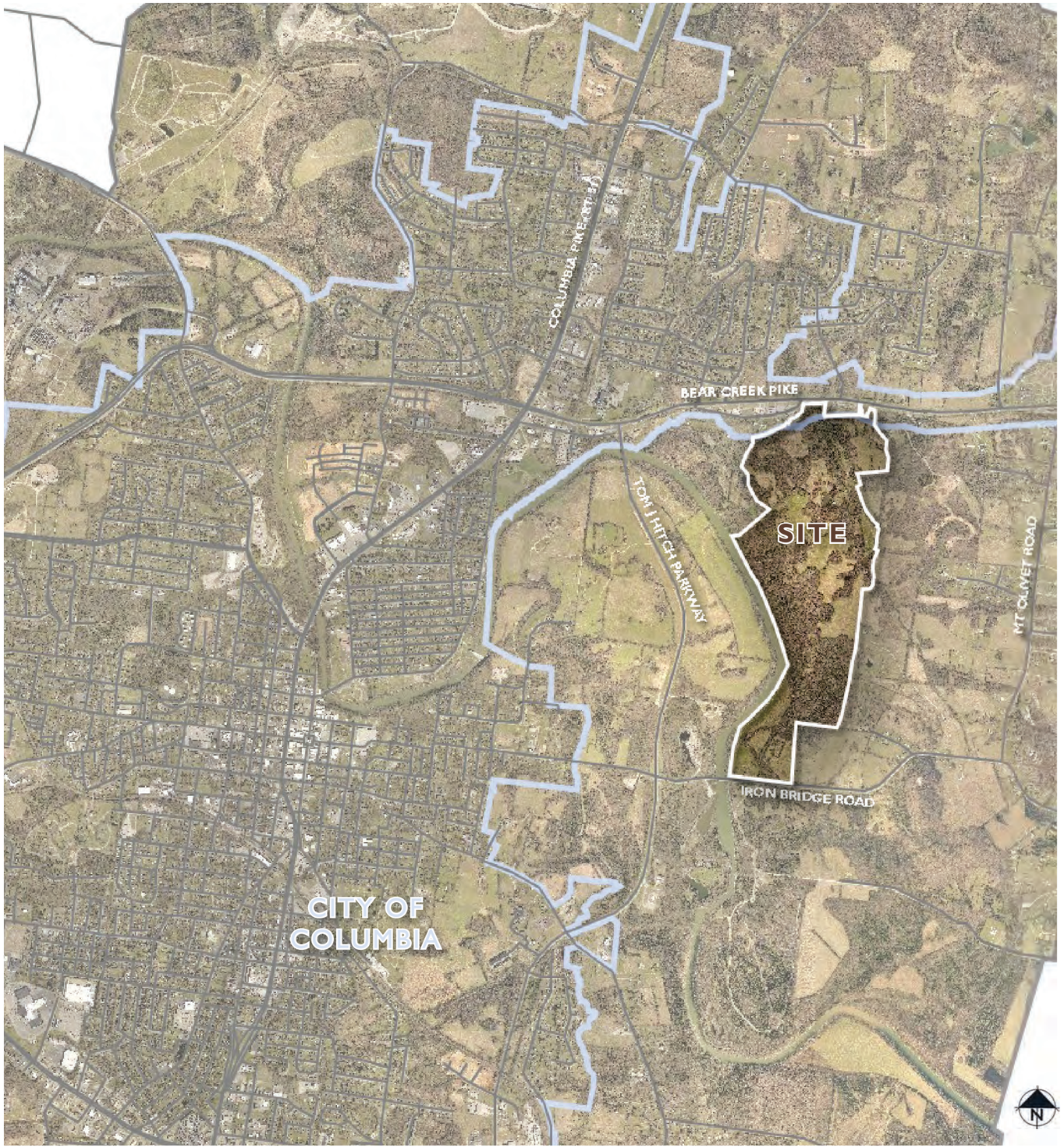
# COLUMBIA

*City of Columbia, Tennessee*

# BLUFFS



## Architectural Review Team Submittal




# COLUMBIA BLUFFS ARCHITECTURE

**DEVELOPER**
JIM HARVEY
KOLTER LAND
14025 RIVEREDGE DRIVE, SUITE 175
TAMPA, FL 33637

**ENGINEER**
JIM HARRISON
CIVIL SITE DESIGN GROUP
2305 KLINE AVENUE, SUITE 300
NASHVILLE, TN 37211

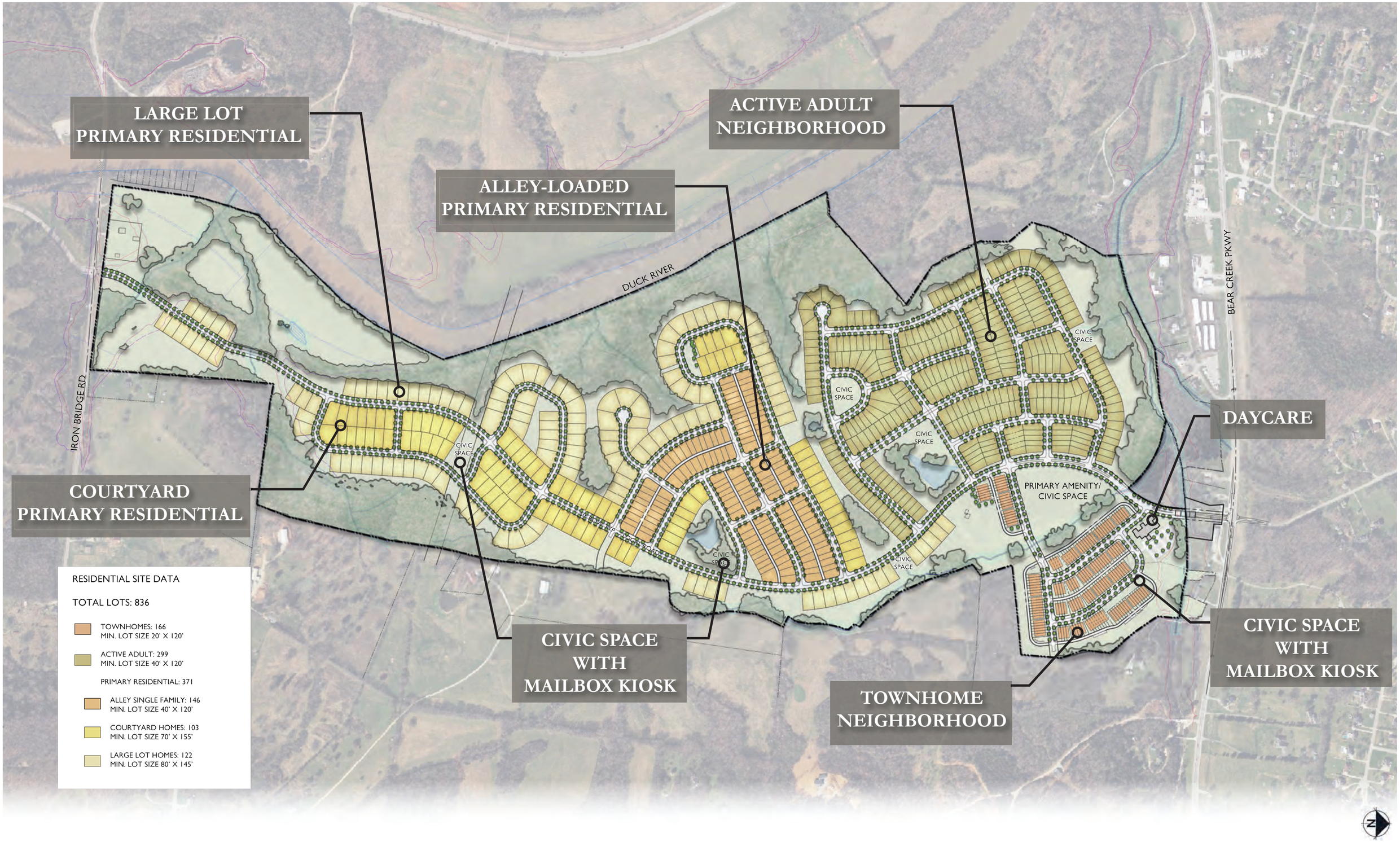
**LANDSCAPE ARCHITECT**
GREG GAMBLE
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37069

**TABLE OF CONTENTS:**

2. DEVELOPMENT TEAM
3. DEVELOPMENT PLAN
4. ARCHITECTURAL DESIGN GUIDELINES
5. FACADE VARIETY
6. ACTIVE ADULT NEIGHBORHOOD
8. COURTYARD AND LARGE LOT HOMES
11. ALLEY-LOADED PRIMARY RESIDENTIAL
13. TOWNHOMES
15. DAYCARE
11. MAIN AMENITY ARCHITECTURE
12. CIVIC SPACE ARCHITECTURE

**SUBMITTED: 12/18/2023**

# DEVELOPMENT TEAM




# MASTER DEVELOPMENT PLAN

| | Single Family & Townhomes | Active Adult Single Family |
|---|---|---|
| **Building Height and Massing** | • Primarily a mix of 1-story and 2-story, with a maximum of 3-story<br>• Attached garages encouraged | |
| **Building Separation** | • Single Family: 10' minimum<br>• Townhomes: 15' minimum | • Single Family: 10' minimum |
| **Street Facades** | • Maximize frontage and orientation onto residential streets<br>• Porches should orient to residential streets<br>• Entries visible from residential streets | • Maximize frontage and orientation onto residential streets<br>• Porches should orient to residential streets<br>• Entries visible from residential streets |
| **Building Entries** | • Porches minimum 6' deep and 6' wide | |
| **Roof Forms** | • Roofs may vary in style, but should be designed to create unity to the full community<br>• All roof forms to be reviewed and approved by the master developer | • Roofs may vary in style, but should be designed to create unity to the full community<br>• All roof forms to be reviewed and approved by the master developer |
| **Roof Detail** | • All roofs should create eaves for shadow and rain protection<br>• Where used, gutters should be expressed as positive elements adding desirable detail | • All roofs should create eaves for shadow and rain protection<br>• Where used, gutters should be expressed as positive elements adding desirable detail |
| **Parking** | • Garage-parked<br>• Each garage parking space shall be a minimum of 10' x 20'<br>• Garage doors with windows required | • Garage-parked<br>• Each garage parking space shall be a minimum of 10' x 20'<br>• Garage doors should have windows |

## ARCHITECTURAL GUIDELINE NOTE:

The architectural guidelines and conceptual elevations are intended to convey the architectural quality and design intent. Final elevations and color schemes will be brought back to be approved by the ADRT at final PUD-R Development Plan.

## COMPLIANCE NOTE:

The architectural guidelines as shown in this pattern book represent compliance with the standards set by the Zoning Ordinance except in areas requesting a modification of standards which are requeted to be approved through the PUD-R Preliminary Development Plan process.

**Architectural Building Materials**

In keeping with the upscale project image, the materials used for structures at Columbia Bluffs should be appropriate for the individual building design concepts and shall be consistent with the project theme. Materials shall be selected and used with consideration to building scale, color scheme, mass, and the surrounding environment.

**Roofing Materials**

Permitted:
- Dimensional Asphalt Shingles
- Laminated Shingles
- Copper Finishes
- Standing Seam Metal Roofs

Not Permitted:
- Rolled Asphalt
- Asbestos Cement Shingles
- Brightly Colored Metal Roofing

**Exterior Siding Materials**

Permitted:
- Brick
- Stone
- Natural Wood Accents
- Stucco
- Hardie Plank/Panels
- Cementitious Fiber Siding/Cladding

Not Permitted:
- All Plastics (including vinyl)
- Plywood
- Exposed Concrete Block

**Awnings**

Permitted:
High Quality Heavy Canvas
Illuminated Awnings
Metal Awnings

**Colors**

Permitted:
- Muted
- Natural
- Earth Tones

Conditional Permitted:
- Bright
- Primary Colors (per review and approval of the Master Developer)

Building Requirements:
- Maximum Height (Stories) 3 stories

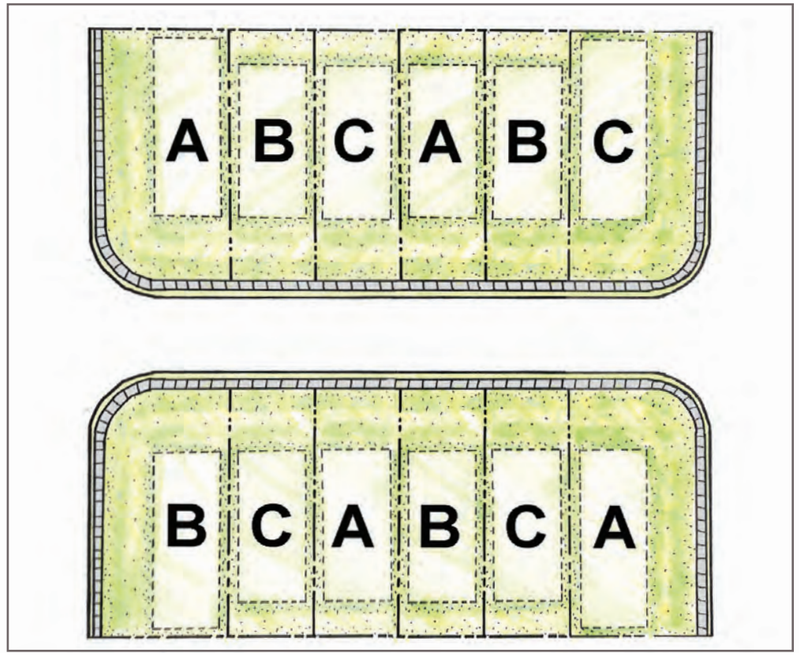








IMAGE OF HOMES REPRESENT AN EXAMPLE OF FACADE VARIETY ALONG SAME STREET. FINAL SELECTION OF MATERIALS AND STYLES TO BE APPROVED AT FMDP.




In order to avoid monotony of architectural design, no approval shall be issued for the construction of a dwelling if it is substantially like any proposed neighboring building for which on approval has already been issued or is being concurrently considered.

- A building shall be considered neighboring if it fronts on the same street as the building under construction or an intersecting street; no building elevation may be repeated across from, adjacent to, or diagonal to a similar building elevation. There shall be a minimum of a 2-lot gap between each similar building elevation (see diagram to above in which A, B, and C represent different elevation styles).
- Vary garage door locations to the front facade of the house when possible. Avoid continuous runs of garages in the same unbroken plain.
- Vary roof orientation, ridge lines, and eave heights between each lot when possible.
- Building facade colors and design elements should vary between each lot with a variation of massing and architectural details on each block.
- Landscaping should vary in composition from building to building when possible.

Final determination of the appropriate elevation pattern and variety is subject to review by the Architectural Design Review Team.

# FACADE VARIETY



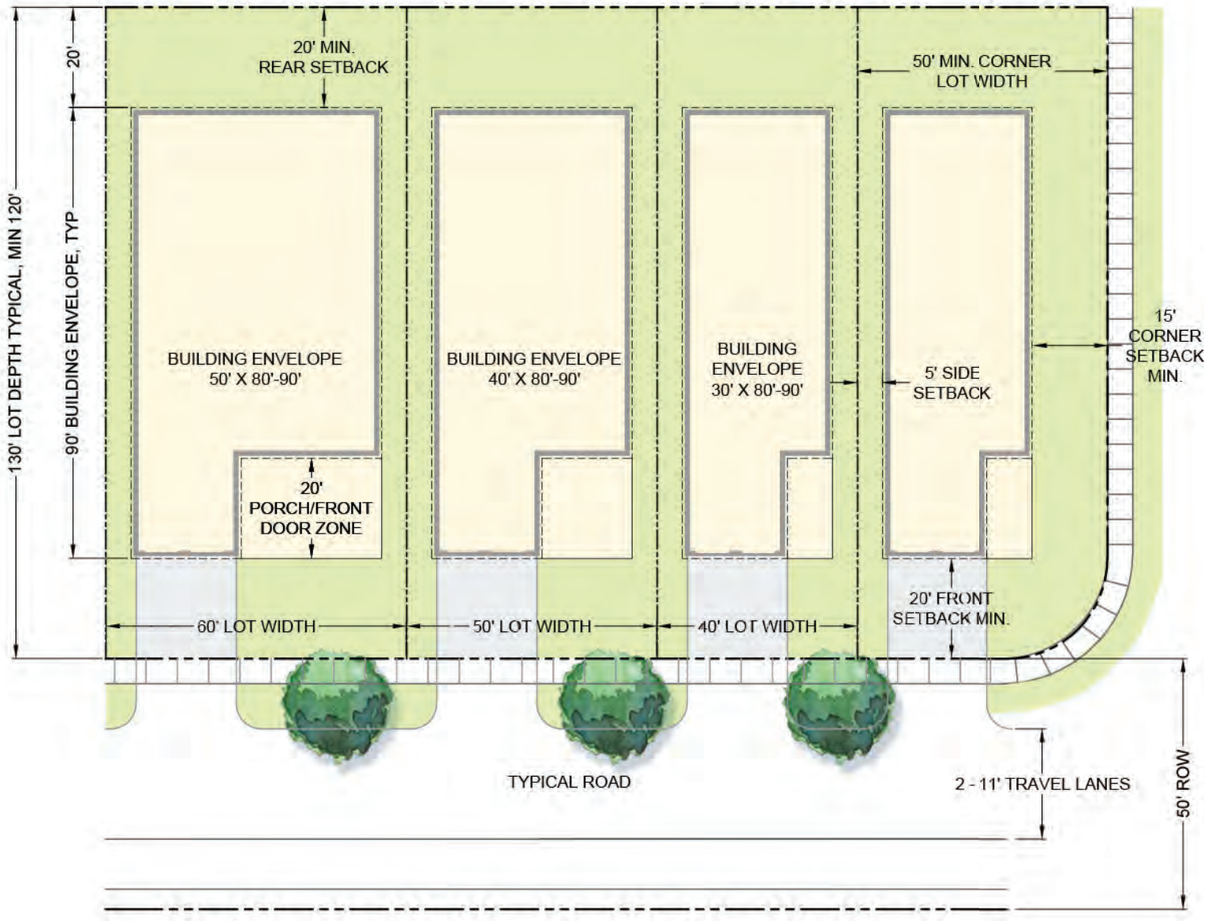






# ACTIVE ADULT SINGLE FAMILY

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL







**LOT RANGE: 40'-60'**
**299 HOMES**

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 20' |
| REAR: | 20' |
| SIDE: | 5' |
| CORNER: | 15' |

ALL LOTS TO HAVE FRONT LOADED GARAGES
- MINIMUM 20' OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.

SITE SETBACKS ARE DUE TO ALL INCLUSIVE MAINTENANCE APPLICATION GOVERNED BY THE PROPOSED HOA, TO BE DEED RESTRICTED.

# ACTIVE ADULT SINGLE FAMILY







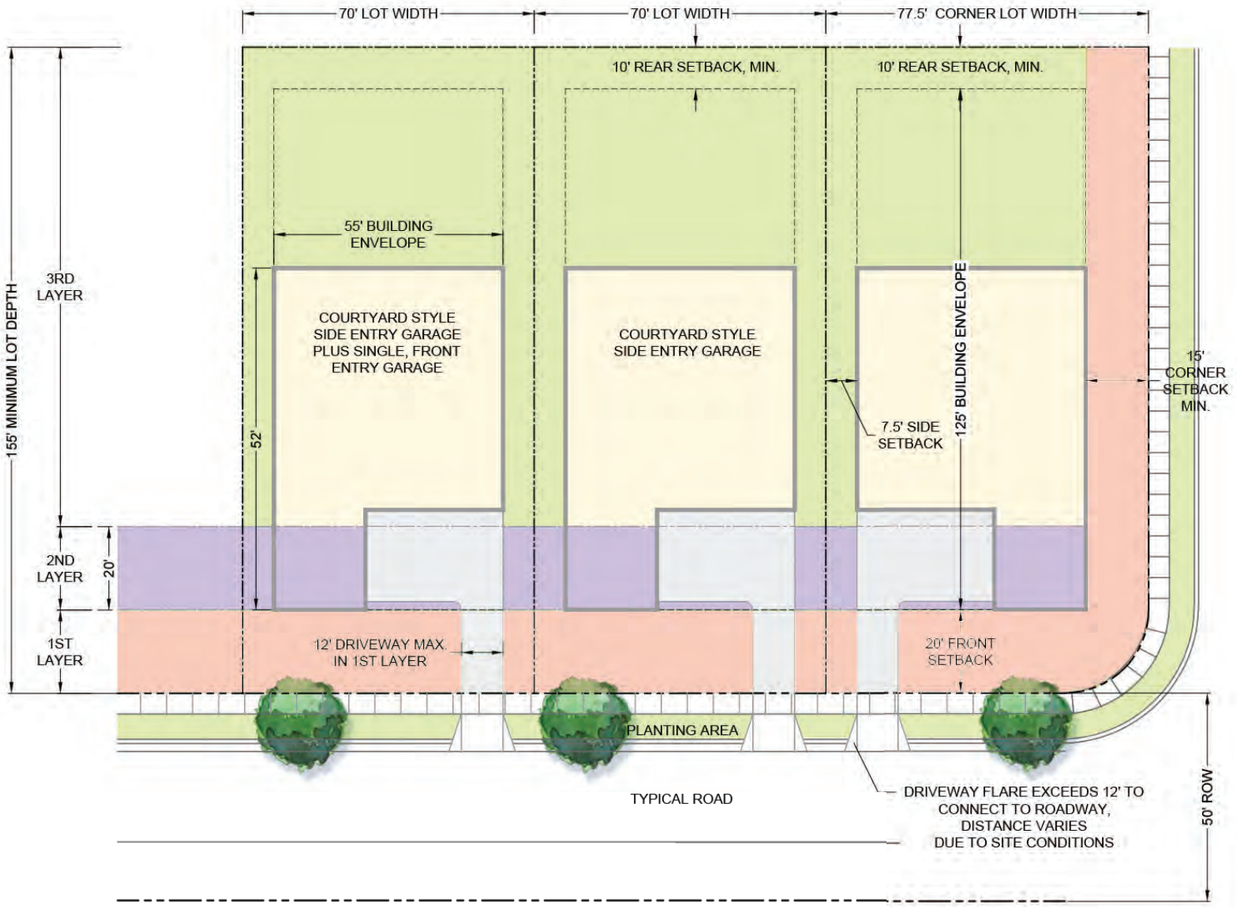






COLOR RENDERING PRESENTS AN
ILLUSTRATIVE DEPICTION OF ARCHITECTURE
AND LANDSCAPE MATERIAL

# COURTYARD HOMES










**LOT: 70' MINIMUM**
**103 HOMES**

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 20' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

ALL LOTS TO HAVE SIDE LOADED GARAGES WITH THE OPTION OF A SINGLE, FRONT-LOADED GARAGE IN THE 3RD LAYER.

- MINIMUM 20' LENGTH OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.

# COURTYARD HOMES







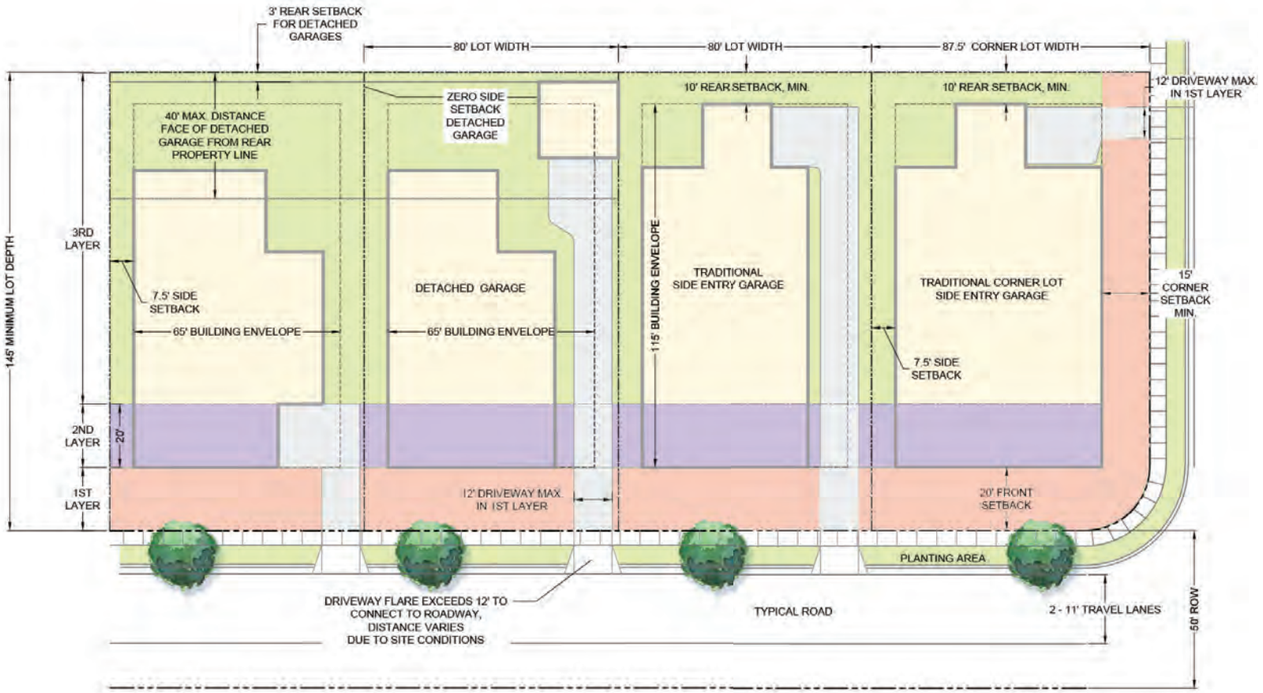






# LARGE LOT HOMES

COLOR RENDERING PRESENTS AN
ILLUSTRATIVE DEPICTION OF ARCHITECTURE
AND LANDSCAPE MATERIAL







**LOTS: 80' MINIMUM**
**122 HOMES**

BUILDING SETBACKS:
- FRONT: 20'
- REAR: 20'
- SIDE: 7.5'
- CORNER: 15'

LOTS WILL HAVE A MIX OF GARAGE LOCATIONS, ATTACHED AND DETACHED
- MINIMUM 20' OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.

# LARGE LOT HOMES







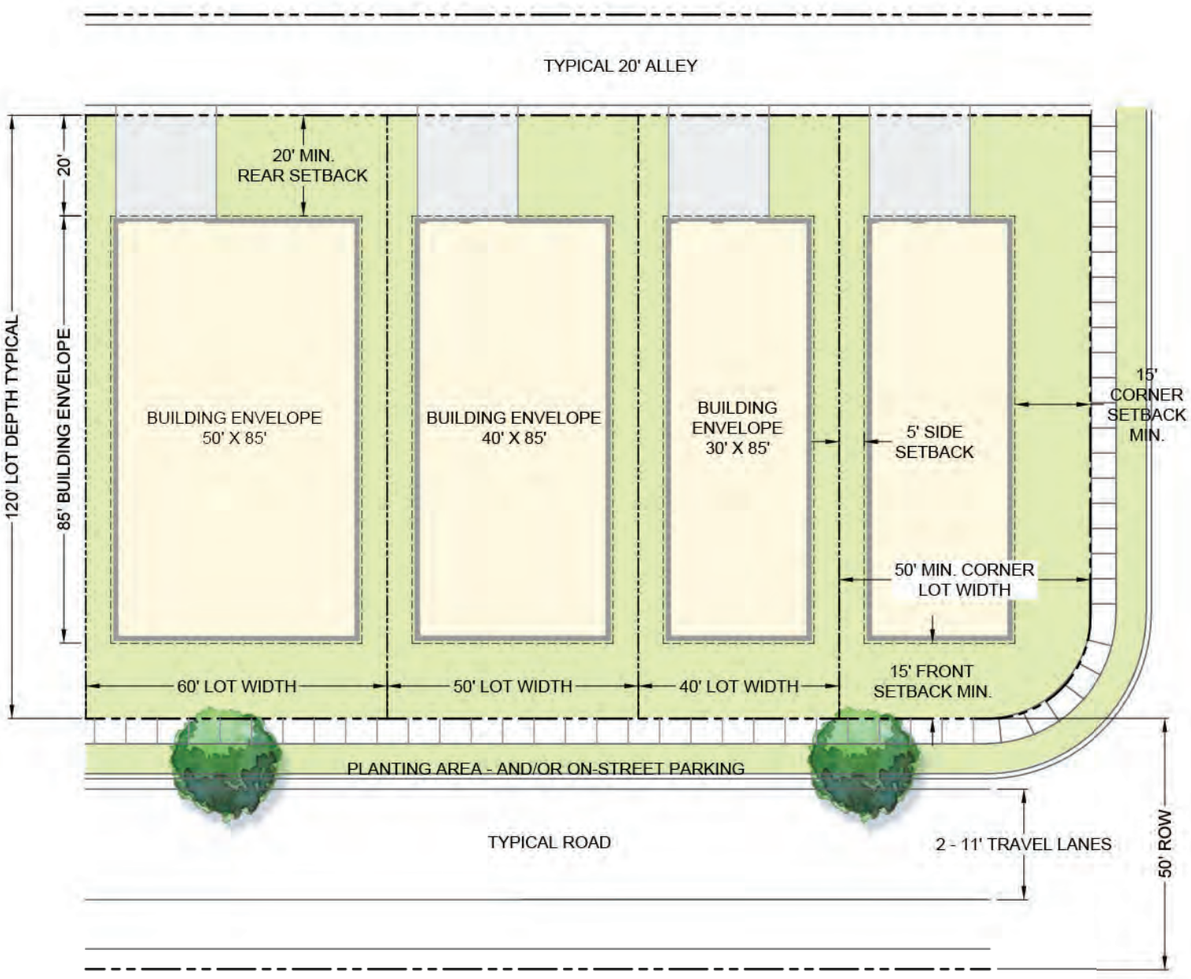


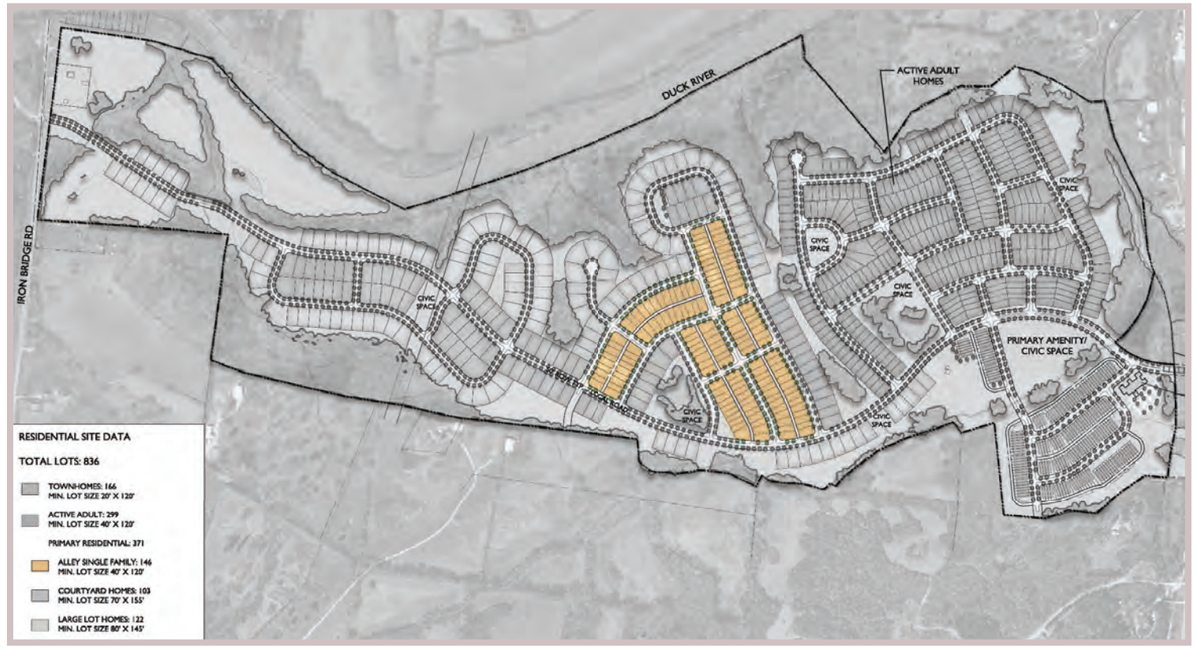




# SINGLE-FAMILY ALLEY LOADED

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL




**LOT RANGE: 40’-60’**
**146 HOMES**

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 15’ |
| REAR: | 20’ |
| SIDE: | 5’ |
| CORNER: | 15’ |

ALL LOTS TO HAVE REAR LOADED GARAGES
- MINIMUM 20’ LENGTH OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10’ X 20’.

# SINGLE-FAMILY ALLEY LOADED

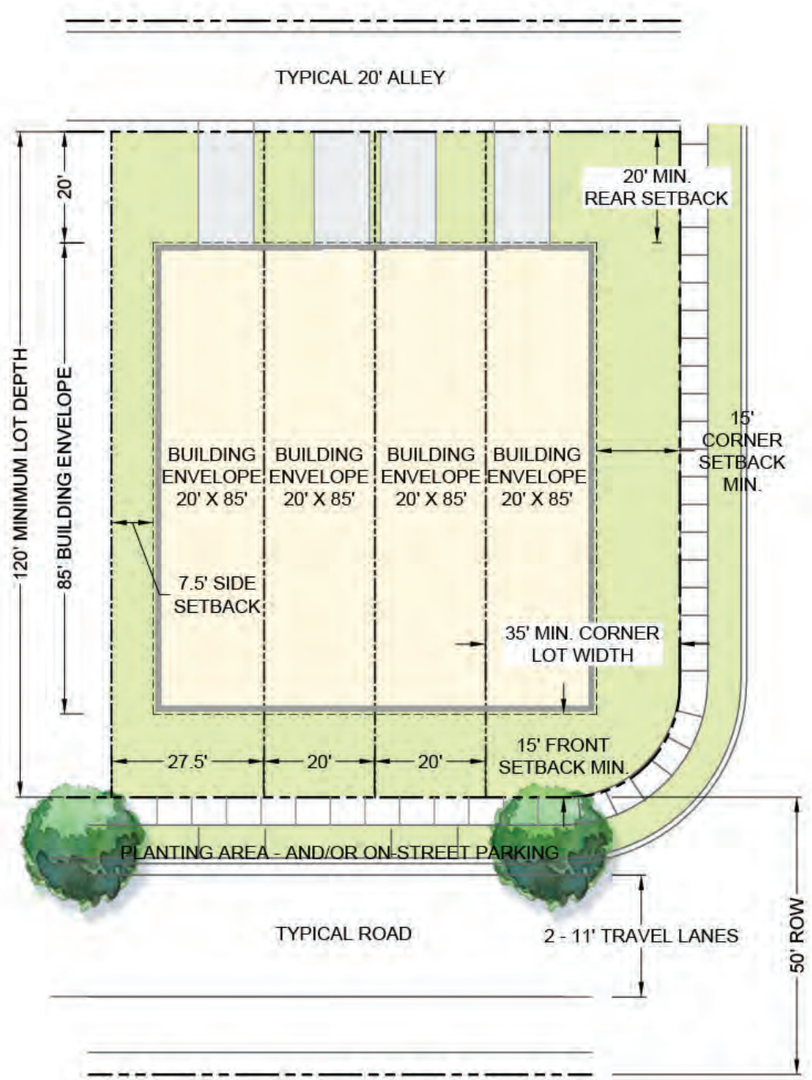






COLOR RENDERING PRESENTS
AN ILLUSTRATIVE DEPICTION OF
ARCHITECTURE AND LANDSCAPE
MATERIAL

# TOWNHOMES







## LOTS: 20' MINIMUM
## 166 HOMES

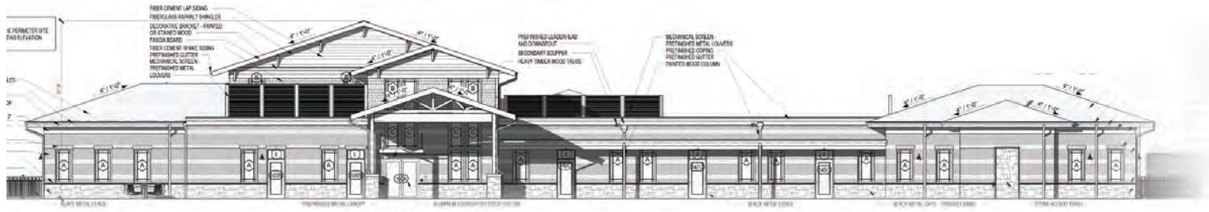
BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 15' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

ALL LOTS TO HAVE REAR LOADED GARAGES
- MINIMUM 20' LENGTH OF DRIVEWAY ON LOT
- EACH GARAGE PARKING SPACE SHALL BE A MINIMUM OF 10' X 20'.TOWNHOME BUILDINGS

WILL CONSIST OF 4, 6, 7, AND 8 UNIT BUILDINGS.

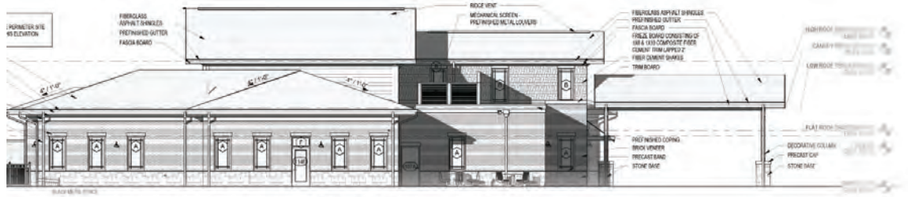
# DAYCARE ELEVATIONS



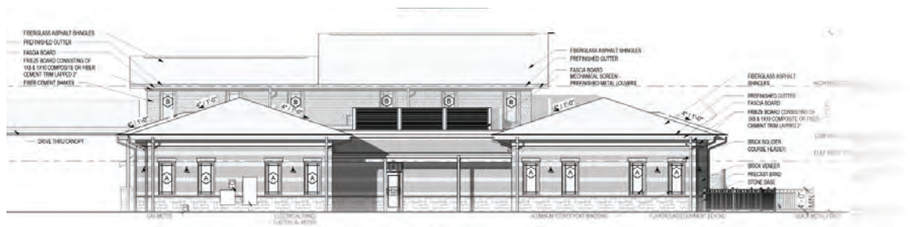

WEST ELEVATION




EAST ELEVATION




SOUTH ELEVATION




NORTH ELEVATION

ELEVATIONS ARE CONCEPTUAL.
FINAL APPROVALS TO BE DETERMINED WITH FMDP.




## DAYCARE

CHILD DAYCARE TO BE APPROXIMATELY 12,000-14,000 SQFT., AND WILL SERVE AS A BENEFIT NOT ONLY TO THE LOCAL NEIGHBORHOOD BUT TO THE COMMUNITY AS WELL.

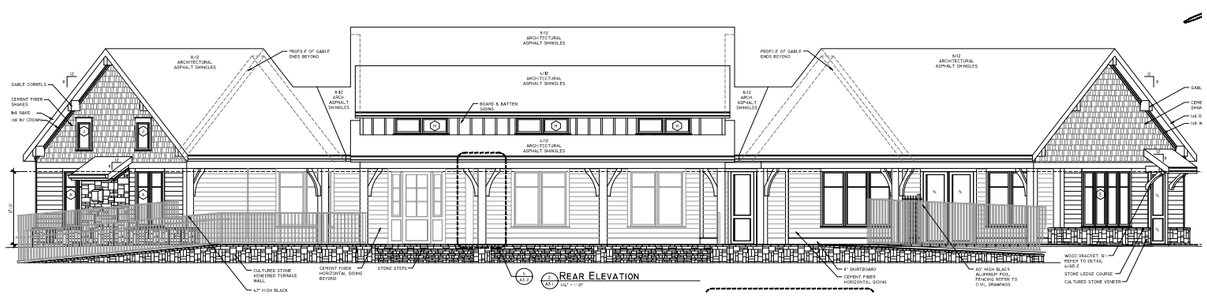
## AMENITY PHOTOGRAPHS

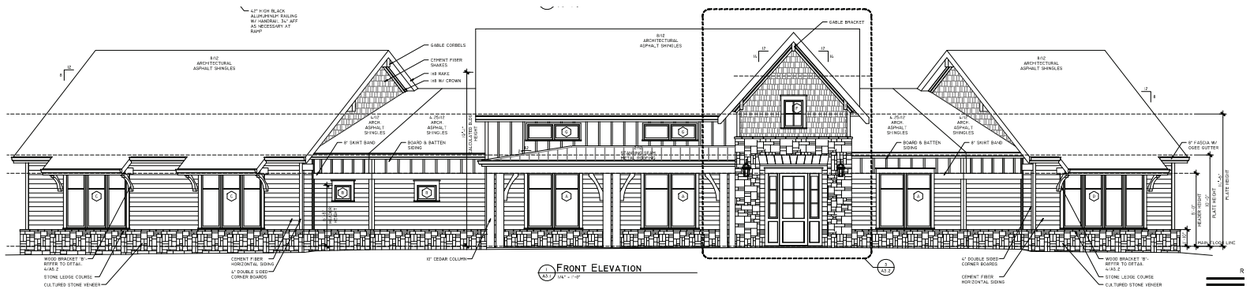




POOL AND CLUBHOUSE FROM SIMILAR KOLTER PROJECT

# AMENITY ELEVATIONS




IMAGES AND ELEVATIONS ARE CONCEPTUAL.
FINAL APPROVALS TO BE DETERMINED WITH FMDP.

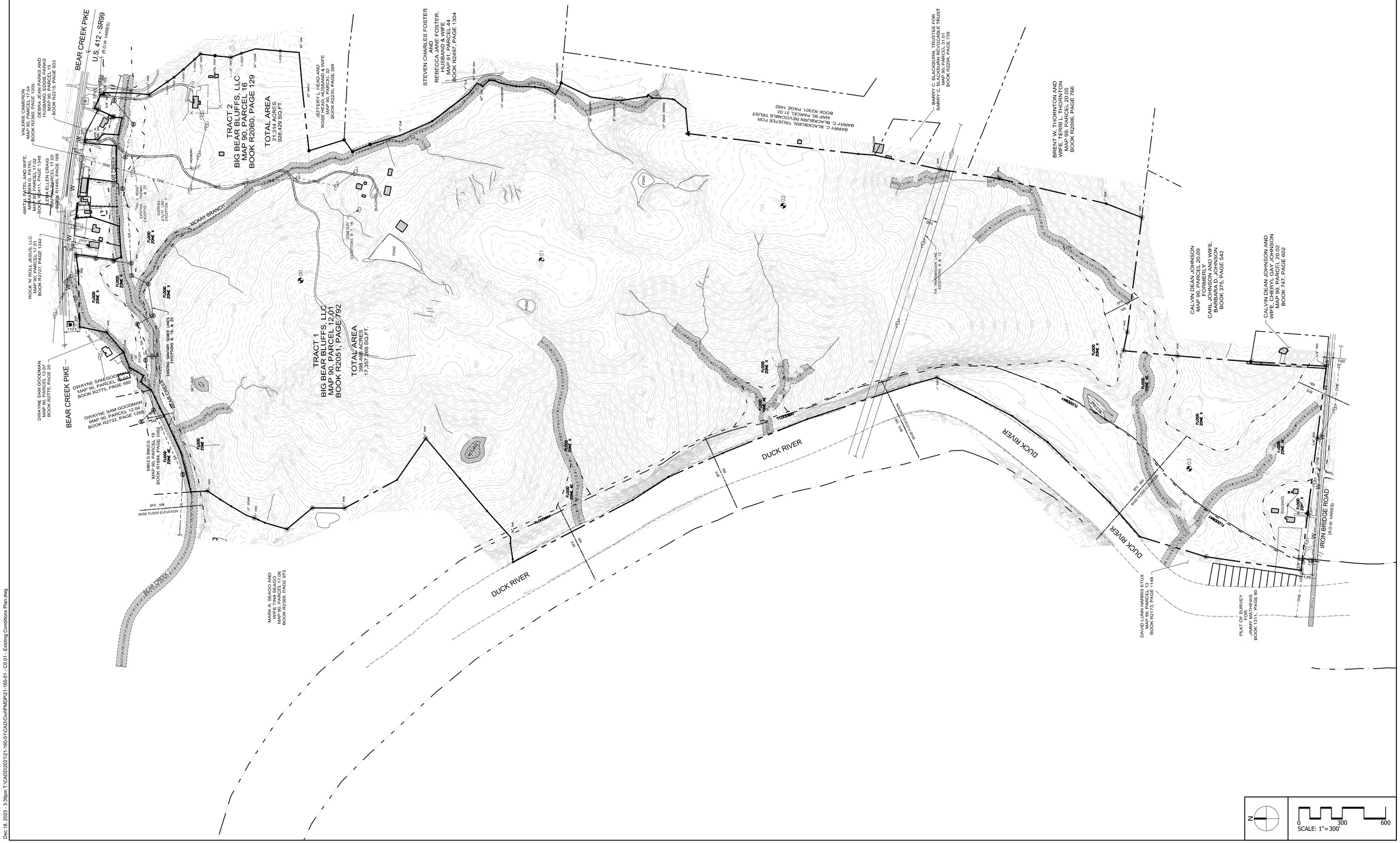




5 CIVIC SPACES ARE PLANNED FOR THIS SITE.

THREE OF THESE SITES WILL HAVE COVERED MAILBOX KIOSKS. COVERED SEATING WILL BE PROVIDED IN MOST PARKS.

IMAGES ARE TO PROVIDE EXAMPLES OF TYPES OF COVERED SEATING AND MAILBOX KIOSKS, BUT COULD BE SUBJECT TO REVISIONS AT FMDP APPROVALS.




CSDG
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615.248.9999
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SEAL

JAMES T. HARRISON
REGISTERED
LANDSCAPE
ARCHITECT
No. 021998
12-18-23
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |

DRAWN BY: TWG
CHECKED BY: TWG

## EXISTING CONDITIONS PLAN

# C0.01

PROJECT NO.: 21-160-01



Dec 18, 2023 - 3:39pm T:\CAD\D\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C0.01 - Existing Conditions Plan.dwg




**PROJECTED TIMELINE*:**

| | |
|---|---|
| PHASE 1 (±139 UNITS) | |
| 2024-2025 | FINAL MASTER PLAN |
| 2025-2026 | BEGIN CONSTRUCTION |
| 2025-2026 | PLATTING |
| 2028-2029 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 2 (±132 UNITS) | |
| 2025-2026 | FINAL MASTER PLAN |
| 2026-2027 | BEGIN CONSTRUCTION |
| 2026-2027 | PLATTING |
| 2029-2030 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 3 (±125 UNITS) | |
| 2026-2027 | FINAL MASTER PLAN |
| 2027-2028 | BEGIN CONSTRUCTION |
| 2027-2028 | PLATTING |
| 2031-2032 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 4 (±151 UNITS) | |
| 2027-2028 | FINAL MASTER PLAN |
| 2028-2029 | BEGIN CONSTRUCTION |
| 2028-2029 | PLATTING |
| 2032-2033 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 5 (±200 UNITS) | |
| 2029-2030 | FINAL MASTER PLAN |
| 2031-2032 | BEGIN CONSTRUCTION |
| 2031-2032 | PLATTING |
| 2033-2034 | VERTICAL CONSTRUCTION COMPLETE |
| PHASE 6 (±132 UNITS) | |
| 2030-2031 | FINAL MASTER PLAN |
| 2032-2033 | BEGIN CONSTRUCTION |
| 2032-2033 | PLATTING |
| 2033-2034 | VERTICAL CONSTRUCTION COMPLETE |

*PROJECTED TIMELINE IS AN ESTIMATE ONLY. TIMING OF ACTUAL COMMENCEMENT OF HORIZONTAL & VERTICAL CONSTRUCTION FOR ALL PHASES WILL BE PREDICATED ON LOCAL AND STATE APPROVALS.*

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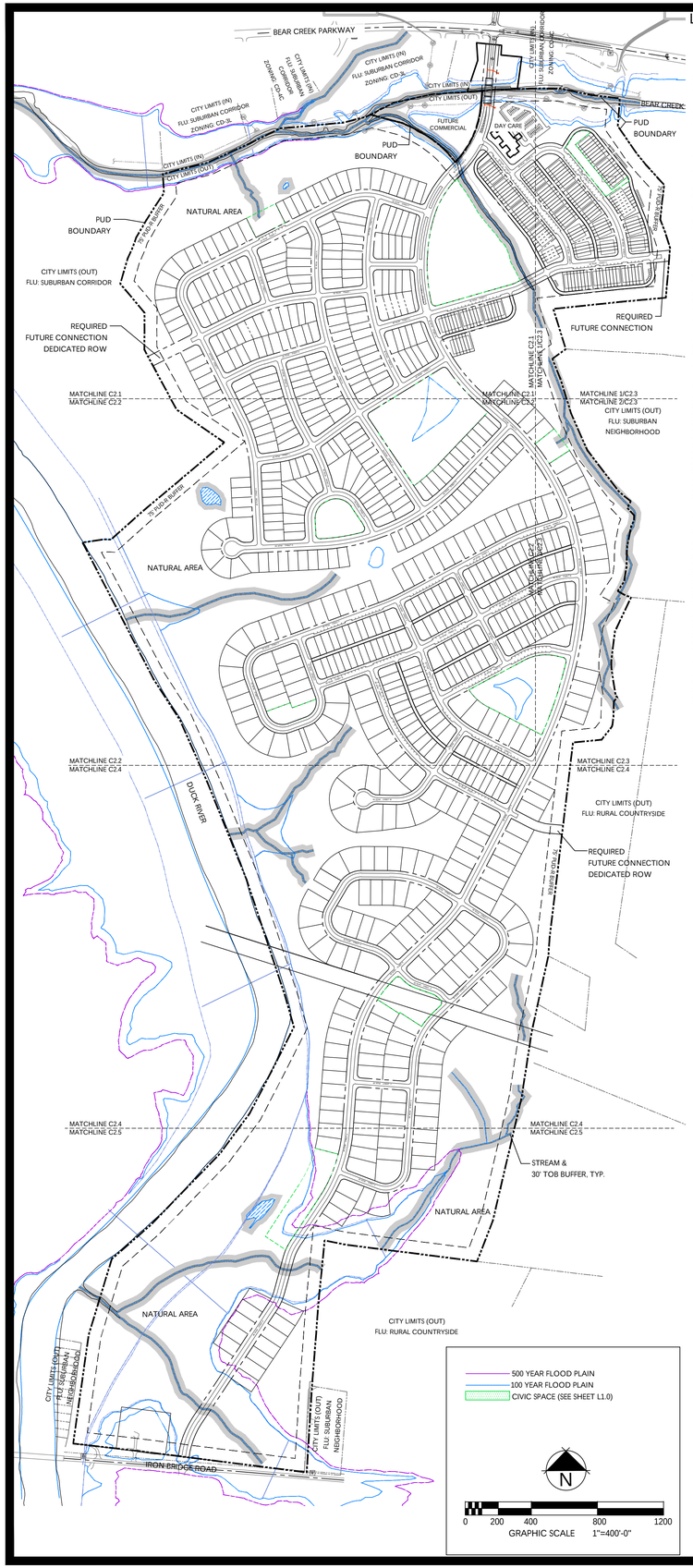
DRAWN BY: TWG
CHECKED BY: TWG

PHASING PLAN

C1.00
PROJECT NO.: 21-160-01



Dec 18, 2023 - 3:39pm T:\CAD\D2023\21-160-01\CAD\Civil\PMDP\21-160-01 - C1.00 - Phasing Plan.dwg




## LEGAL DESCRIPTION OF PROPERTY:

**LEGAL DESCRIPTION FOR ANNEXATION OF 409.92 ACRES TO PUD FOR PART OF MAP 80, PARCEL 12.01 DEED BOOK R2051, PAGE 792 BIG BEAR BLUFFS, LLC**

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY BEAR CREEK PUB, BOOK 'N' ROLL, JESUS, LLC, AS OF RECORD IN DEED BOOK R2727, PAGE 1242 OF THE REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN), AMIT J. PATEL AND WIFE, MINAXIBEN G. PATEL AS OF RECORD IN DEED BOOK R2411, PAGE 1348, ROMCTN; HK BIG BEAR BLUFF 5, LLC BY BOOK 2878, PAGE 991, ROMCTN; ON THE EAST BY JEFFERY L. HEAD AND ROSIE HEAD WIFE & HUSBAND AS OF RECORD IN DEED BOOK R2338, PAGE 388, ROMCTN, STEVEN CHARLES FOSTER AND REBECCA JANE FOSTER, HUSBAND & WIFE AS OF RECORD IN DEED BOOK R2457, PAGE 1334, ROMCTN, BARRY C. BLACKBURN, TRUSTEE FOR BARRY C. BLACKBURN REVOCABLE TRUST AS OF RECORD IN DEED BOOK R2291, PAGE 1492, ROMCTN, BRENT W. THORNTON AND WIFE TERRI L. THORNTON AS OF RECORD IN DEED BOOK R2699, PAGE 768, ROMCTN, CALVIN DEAN JOHNSON FORMERLY CARL JOHNSON AND WIFE, BARBARA D. JOHNSON AS OF RECORD IN DEED BOOK 316, PAGE 543, ROMCTN, AND CALVIN DEAN JOHNSON AND WIFE CHERYL GAY JOHNSON AS OF RECORD IN DEED BOOK R2747, PAGE 902, ROMCTN; ON THE SOUTH BY IRON BRIDGE ROAD; AND ON THE WEST BY JIMMY MATHEWS AS OF RECORD IN DEED BOOK 5311, PAGE 83, DAVID LINN HARRIS ET UX AS OF RECORD IN DEED BOOK R2125, PAGE 1186, ROMCTN, DUCK RIVER, AND MARK A. SEAGO AND WIFE TINA SEAGO AS OF RECORD DEED BOOK R2365, PAGE 573 ROMCTN; AND CONTINUED TO THE NORTH BY MIKE BIKES AS OF RECORD IN DEED BOOK R1884, PAGE 1982, DWAYNE SAM GOODMAN AS OF RECORD IN DEED BOOK R2722, PAGE 1398, AND BE MORE PARTICULARLY DESCRIBED AS FOLLOWS:

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT A ¼" INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL-JESUS, LLC (BK/PG R2727, P.G 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.05 EAST 1,872,944.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 69°31'16" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 31°37'47" E, FOR A DISTANCE OF 55.39 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK 'N' ROLL-JESUS;
THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL-JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFF 5, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 65°53'31" E, 307.68 FEET TO THE TRUE POINT OF BEGINNING;

THENCE, CONTINUING WITH BEAR CREEK, THE FOLLOWING CALLS:

N 66°45'31" E, FOR A DISTANCE OF 55.49 FEET TO A POINT,
N 58°59'09" E, FOR A DISTANCE OF 216.86 FEET TO A POINT;
S 89°57'58" E, FOR A DISTANCE OF 168.90 FEET TO A POINT;
S 78°39'57" E, FOR A DISTANCE OF 117.46 FEET TO A POINT;
S 75°01'12" E, FOR A DISTANCE OF 120.71 FEET TO A POINT;
S 83°05'05" E, FOR A DISTANCE OF 172.20 FEET TO A POINT ALONG THE WEST BOUNDARY OF JEFFERY L. HEAD;

THENCE, WITH THE WEST BOUNDARY OF HEAD, THE FOLLOWING CALLS:

S 0°55'55" W, FOR A DISTANCE OF 40.52 FEET TO AN IRON PIN,
S 04°49'44" W, FOR A DISTANCE OF 127.32 FEET TO A 1 ½" PIPE FOUND;
S 34°32'57" E, FOR A DISTANCE OF 152.97 FEET TO A T-POST;
S 35°01'16" E, FOR A DISTANCE OF 55.17 FEET TO A T-POST;
S 39°23'56" E, FOR A DISTANCE OF 54.10 FEET TO A T-POST;
S 42°05'33" E, FOR A DISTANCE OF 106.39 FEET TO A T-POST;
S 42°31'26" E, FOR A DISTANCE OF 55.23 FEET TO AN 1-1/2" PIPE FOUND;
S 7°39'55" W, FOR A DISTANCE OF 161.11 FEET TO A 3" METAL POST;
S 8°45'07" W, FOR A DISTANCE OF 116.19 FEET TO AN 1-1/2" PIPE FOUND;
S 21°41'47" E, FOR A DISTANCE OF 78.14 FEET TO A T-POST;
S 13°31'01" E, FOR A DISTANCE OF 102.59 FEET TO A 24" CEDAR;
S 4°57'22" W, FOR A DISTANCE OF 172.64 FEET TO A T-POST;
S 4°32'31" W, FOR A DISTANCE OF 120.65 FEET TO 26" OAK;
S 84°48'25" W, FOR A DISTANCE OF 270.35 FEET TO 30" MAPLE;
S 84°05'39" W, FOR A DISTANCE OF 414.11 FEET TO A FENCE POST;
S 12°15'08" E, FOR A DISTANCE OF 254.98 FEET TO A 6"ROTTED HACKBERRY FENCE POST TO THE SOUTHWEST CORNER OF HEAD;

THENCE, WITH THE WEST BOUNDARY OF FOSTER, THE FOLLOWING CALLS:

S 54°11'15" W, FOR A DISTANCE OF 160.25 FEET TO 6" ROTTED HACKBERRY FENCE POST;
S 21°57'18" E, FOR A DISTANCE OF 130.86 FEET TO A CEDAR FENCE POST;
S 17°11'57" E, FOR A DISTANCE OF 231.38 FEET TO A 12" ELM;
S 23°58'57" E, FOR A DISTANCE OF 240.66 FEET TO A T-POST;
S 37°24'05" E, FOR A DISTANCE OF 215.73 FEET TO 14" ELM;
S 50°37'42" E, FOR A DISTANCE OF 91.73 FEET TO 60" TWIN OAK;
S 26°53'39" W, FOR A DISTANCE OF 35.63 FEET TO 60" OAK;
S 40°35'20" W, FOR A DISTANCE OF 8.68 FEET TO A T-POST;
S 40°42'20" E, FOR A DISTANCE OF 62.79 FEET TO A POINT;
S 15°09'17" W, FOR A DISTANCE OF 26.25 FEET TO A POINT;
S 23°53'47" W, FOR A DISTANCE OF 42.69 FEET TO 14" HACKBERRY;
S 11°29'58" W, FOR A DISTANCE OF 117.73 FEET TO A T-POST;
S 2°38'52" W, FOR A DISTANCE OF 136.04 FEET TO ROTTED HACKBERRY;
S 8°12'29" W, FOR A DISTANCE OF 87.66 FEET A POINT;
S 33°58'56" W, FOR A DISTANCE OF 69.64 FEET TO A 30" HACKBERRY;
S 67°19'48" E, FOR A DISTANCE OF 54.74 FEET TO A 24" HACKBERRY;
S 79°11'17" E, FOR A DISTANCE OF 34.53 FEET TO 12" CEDAR POST AT THE SOUTHWEST CORNER OF FOSTER;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN, THE FOLLOWING CALLS:

S 25°13'16" W, FOR A DISTANCE OF 235.44 FEET TO A 35" HACKBERRY;
S 7°39'46" W, FOR A DISTANCE OF 177.84 FEET TO A 8" DOGWOOD;
S 6°15'28" W, FOR A DISTANCE OF 43.40 FEET TO A 24" HACKBERRY FLAGGED;
S 5°53'22" E, FOR A DISTANCE OF 172.27 FEET TO A T-POST;
S 55°43'36" E, FOR A DISTANCE OF 13.02 FEET TO 8" FENCE POST;
S 39°13'12" E, FOR A DISTANCE OF 34.16 FEET TO A POINT;
S 71°13'16" W, FOR A DISTANCE OF 95.50 FEET TO A 12" OSAGE;
S 7°58'27" W, FOR A DISTANCE OF 43.94 FEET TO A 8" ROTTED TREE;
S 15°41'05" W, FOR A DISTANCE OF 13.75 FEET TO A 6" TREE USED AS FENCE POST;
S 38°17'07" W, FOR A DISTANCE OF 130.36 FEET TO A 14" ROTTEN CEDAR;
S 84°35'04" W, FOR A DISTANCE OF 172.39 FEET TO FENCE CORNER PKT FOUND;
S 8°49'35" W, FOR A DISTANCE OF 1187.84 FEET TO A POINT;
S 4°39'46" W, FOR A DISTANCE OF 112.89 FEET TO A 24" CEDAR;
S 4°23'22" W, FOR A DISTANCE OF 466.96 FEET TO A 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN AND CONTINUING TO THORNTON, THE FOLLOWING CALLS:

S 8°47'49" W, FOR A DISTANCE OF 411.13 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY THORNTON, THE FOLLOWING CALLS:

S 1°39'41" W, FOR A DISTANCE OF 759.59 FEET TO 1" PIPE FOUND;
S 3°16'05" W, FOR A DISTANCE OF 265.50 FEET TO 1" PIPE FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

N 82°44'49" W, FOR A DISTANCE OF 660.97 FEET TO 1" PIPE FOUND;
N 78°47'22" W, FOR A DISTANCE OF 130.34 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

S 9°32'34" W, FOR A DISTANCE OF 375.75 FEET TO 1" PIPE FOUND;
S 4°37'28" W, FOR A DISTANCE OF 588.55 FEET TO A POINT;
S 3°32'16" W, FOR A DISTANCE OF 523.31 FEET TO 5/8" IRON PIN FOUND AT THE SOUTHWEST CORNER OF THORNTON,

THENCE, WITH THE NORTH BOUNDARY OF IRON BRIDGE ROAD RIGHT-OF-WAY, THE FOLLOWING CALLS:

N 83°45'56" W, FOR A DISTANCE OF 561.39 FEET TO AN 5/8" IRON PIN FOUND;
N 82°46'26" W, FOR A DISTANCE OF 525.65 FEET TO RAILROAD SPIKE PK FOUND;
N 83°22'15" W, FOR A DISTANCE OF 398.64 FEET TO 5/8" IRON PIN FOUND AT SOUTHEAST CORNER OF MATTHEWS;

THENCE, WITH THE EAST BOUNDARY OF MATTHEWS, HARRIS AND DUCK RIVER, THE FOLLOWING CALLS:

N 6°56'23" E, FOR A DISTANCE OF 894.54 FEET TO 1/2" IRON PIN FOUND;
N 1°55'06" E, FOR A DISTANCE OF 476.22 FEET TO A POINT;
N 48°48'57" E, FOR A DISTANCE OF 352.94 FEET TO A POINT;
N 44°09'56" E, FOR A DISTANCE OF 690.76 FEET TO A POINT;
N 26°27'06" E, FOR A DISTANCE OF 396.02 FEET TO A POINT;
N 27°37'22" E, FOR A DISTANCE OF 264.62 FEET TO A POINT;
N 26°51'36" E, FOR A DISTANCE OF 391.46 FEET TO 1" PIPE FOUND;

N 15°43'23" W, FOR A DISTANCE OF 197.42 FEET TO A POINT;
N 18°37'24" W, FOR A DISTANCE OF 744.16 FEET TO A POINT;
N 21°50'04" W, FOR A DISTANCE OF 631.16 FEET TO A POINT;
N 23°44'52" W, FOR A DISTANCE OF 409.10 FEET TO A POINT;
N 32°40'41" W, FOR A DISTANCE OF 286.88 FEET TO A POINT;
N 27°20'09" W, FOR A DISTANCE OF 932.26 FEET TO A POINT,

THENCE, DIRECTING RIGHT AWAY FROM DUCK RIVER TO THE SOUTH AND EAST BOUNDARY OF SEAGO, THE FOLLOWING CALLS:

N 65°09'29" E, FOR A DISTANCE OF 23.99 FEET TO A POINT;
N 61°12'35" E, FOR A DISTANCE OF 136.06 FEET TO A POINT;
N 80°29'25" E, FOR A DISTANCE OF 42.46 FEET TO 60" OAK;
N 48°59'47" E, FOR A DISTANCE OF 244.57 FEET TO A POINT;
N 48°55'39" E, FOR A DISTANCE OF 29. 16 FEET TO 10" HACKBERRY AND 8" CEDAR;
N 49°48'29" E, FOR A DISTANCE OF 397.26 FEET TO 1" PIPE FOUND;
N 55°27'24" W, FOR A DISTANCE OF 259.42 FEET TO A POINT;
N 38°16'29" W, FOR A DISTANCE OF 411.36 FEET TO A 1" PIPE FOUND;
N 67°15'58" E, FOR A DISTANCE OF 223.84 FEET TO AN IRON PIN FOUND;
N 29°56'42" W, FOR A DISTANCE OF 228.86 FEET TO AN IRON PIN FOUND;
N 16°17'40" E, FOR A DISTANCE OF 156. 26 FEET TO A POINT;
N 24°10'55" E, FOR A DISTANCE OF 52.93 FEET TO A POINT;
N 23°28'48" E, FOR A DISTANCE OF 29.14 FEET TO 1" PIPE IRON PIPE;
N 16°40'08" E, FOR A DISTANCE OF 57.72 FEET TO A 12" CEDAR;
N 36°17'58" E, FOR A DISTANCE OF 122.71 FEET TO A POINT;
N 33°10'27" E, FOR A DISTANCE OF 87.99 FEET TO A POINT;
N 33°44'57" E, FOR A DISTANCE OF 136.92 FEET TO 1" PIPE FOUND;
N 37°11'17" W, FOR A DISTANCE OF 118.30 FEET TO A POINT AT THE NORTHEAST CORNER OF SEAGO AND THE CENTER OF BEAR CREEK;

THENCE, ALONG BEAR CREEK AND SOUTHERN BOUNDARY OF MIKES BIKES, THE FOLLOWING CALLS:

N 75°40'45" E, FOR A DISTANCE OF 280.14 FEET TO A POINT;
N 67°23'51" E, FOR A DISTANCE OF 281.90 FEET TO A POINT AT THE SOUTHEAST CORNER OF BIKES;

THENCE, ALONG SOUTH BOUNDARY OF GOODMAN, N 67°42'14" E, 199.86 FEET TO A POINT;

THENCE, CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:

N 64°40'48" E, FOR A DISTANCE OF 395.96 FEET TO A POINT;
N 74°28'41" E, FOR A DISTANCE OF 141.96 FEET TO A POINT;
N 63°11'09" E, FOR A DISTANCE OF 28.87 FEET TO A POINT AT AN INTERSECTION OF MOXAY BRANCH,
CONTINUING ALONG MOXAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:
S 75°17'27" E, FOR A DISTANCE OF 201.23 FEET TO A POINT;
S 85°15'02" E, FOR A DISTANCE OF 74.45 FEET TO A POINT;
S 81°39'47" E, FOR A DISTANCE OF 81.78 FEET TO A POINT;
S 83°39'27" E, FOR A DISTANCE OF 42.65 FEET TO A POINT;
S 63°17'26" E, FOR A DISTANCE OF 86.37 FEET TO A POINT;
S 45°49'08" E, FOR A DISTANCE OF 55.43 FEET TO A POINT;
S 29°18'13" E, FOR A DISTANCE OF 73.91 FEET TO A POINT;

THENCE, LEAVING MOXAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:

NORTHEASTERLY ALONG A CURVE THROUGH A CENTRAL ANGLE OF 30°33'55", AN ARC DISTANCE OF 280.90 FEET TO A POINT OF TANGENCY, SAID CURVE IS CONCAVE NORTHWESTERLY AND HAS A RADIUS OF 526.33 FEET, CHORD BEARING N 24°52'52" E WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT OF TANGENCY;
N 05°51'54" E, 84.94 FEET TO THE POINT OF BEGINNING CONTAINING 409.92 ACRES (17,855,501.50 FT.) AND BEING A PORTION OF THE PROPERTY SHOWN ON TAX MAP 80 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFF 5, LLC BY DEED OF RECORD IN BOOK R2627, PAGE 287 IN THE REGISTER'S OFFICE OF MAURY COUNTY, TENNESSEE.

## ANNEXATION AND REZONING REQUEST:

REQUEST TO ANNEX +/-409.92 ACRES AND REZONE TO PUD-R
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

CONNECT COLUMBIA FINDINGS:

*Annexation should provide for a continuation of orderly, planned development of the City. Lot sizes and development scale should be compatible with surrounding development. If proposed development abuts land that is undeveloped or has low density/intensity, the density and intensity of the proposed development should taper towards the periphery to provide compatibility of the development pattern. Land annexed into the City should follow the transect and Character Area Matrix to provide the most appropriate land uses and zoning for the newly annexed land.*

Response: The proposed Columbia Bluffs subdivision is 2 miles from the downtown core. Density and lot size transitions from higher density/intensity at the north, along the Bear Creek Parkway corridor to the south, where a more rural character is appropriate adjacent to Iron Bridge Rd and the Yanahli Park. The properties along Bear Creek Parkway have been identified as "area of change." With the development along this corridor, residential development in close proximity to downtown and new commercial development along Tom Hitch Parkway is a logical progression of development pattern.

*Connectivity, directly through street, sidewalks, bikeways, greenways, and trails, and indirectly, through a mixture of housing and business types, should be encouraged throughout Columbia..*

Response: In addition to roadway and sidewalk connections, Columbia Bluffs proposes nature trails through out the property. The development will also provide a roadway connection between Bear Creek Parkway and Iron Bridge Road. A variety of housing types are proposed, including an age restricted Active Adult neighborhood.

*Suburban Neighborhood: Future development should emphasize connectivity and housing diversity.*

Response: Columbia Bluffs proposes a variety of housing styles

*Near-term Priorites: HOUSING MIX/TYPES: Promote mastered planned housing opportunities for a "full-life cycle" community to accommodate retirees and young professionals. Review Zoning standards to permit smaller lot and home sizes to encourage such developments.*

## MODIFICATIONS FROM STANDARD PUD-R ZONING REQUEST:

RESIDENTIAL LOT DIAGRAMS: SEE SHEET C2.6

1. ACTIVE ADULT AND PRIMARY ALLEY LOADED HOMES SIDE-SETBACK REDUCED TO 5'.
2. OTHER PRIMARY RESIDENTIAL SIDE-SETBACK REDUCED TO 7.5'.
3. ACTIVE ADULT, COURTYARD, AND LARGE LOT GARAGE LOCATED IN 2ND LAYER
4. ACTIVE ADULT, COURTYARD, AND LARGE LOT ALLOWED DOUBLE CAR GARAGE DOORS, WITH A MAXIMUM WIDTH OF 16'
5. ACTIVE ADULT DRIVEWAYS TO BE 18' IN FIRST LAYER.
6. COURTYARD AND LARGE LOT DRIVEWAY TO BE 12' IN FIRST LAYER.

THOROUGHFARE STANDARDS:

1. UTILIZATION OF MODIFIED ROWS INSTEAD OF 70' URBAN NEIGHBORHOOD ROW.

CIVIC SPACE:

1. ACTIVE ADULT NEIGHBORHOOD TO BE EXCLUDED FROM REQUIRED PLAYGROUND CRITERIA.

ARCHITECTURE:

2. WINDOW SILL HEIGHT REQUIRED TO BE 5' ABOVE AVERAGE GRADE AT FACADE REDUCED TO 3' ABOVE AVERAGE GRADE FOR ACTIVE ADULT HOMES AND COURTYARD HOMES.

## PROJECT DESCRIPTION AND SITE DATA:

REQUEST TO ANNEX AND REZONE THE COLUMBIA BLUFFS PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN.

THE PUD-R PLAN PROPOSES AN ENVIRONMENTALLY SENSITIVE MASTER PLAN FOR A DIVERSE RESIDENTIAL DEVELOPMENT. APPROXIMATELY ONE-THIRD OF THE PROPOSED DEVELOPMENT IS RESERVED FOR ACTIVE ADULT/AGE RESTRICTED SINGLE-FAMILY HOMES. ADDITIONALLY, TOWN HOMES AND A VARIETY OF DETACHED SINGLE-FAMILY HOMES ARE PROPOSED.

IN ADDITION TO THE RESIDENTIAL COMPONENT, THE PUD-R PLANS PROPOSES A DAY CARE FACILITY AND A VARIETY OF NEIGHBORHOOD AMENITIES.

TOTAL SITE AREA: 409.92 ACRES
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

TOTAL AREA OF ROWS/ALLEY EASEMENTS: 62.9 AC; 15% OF GROSS AREA
OPEN SPACE: 199.3 AC; 48% OF GROSS AREA

TOTAL DWELLING UNITS: 836 HOMES
OVERALL SITE DENSITY: 2.04 DUA

| RESIDENTIAL BREAKDOWN | | NON RESIDENTIAL |
|---|---|---|
| ACTIVE ADULT HOMES: | 299 | DAYCARE 12,000 - 14,000 SF |
| TOWNHOMES: | 166 | RECREATION FACILITY LOT - 75,789 SF |
| ALLEY SINGLE-FAMILY: | 146 | |
| COURTYARD HOMES: | 103 | |
| LARGE LOT HOMES: | 122 | |

EXISTING TREE CANOPY COVERAGE: 262.2 ACS; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%; SEE SHEET C2.8

TOTAL OPEN SPACE PROVIDED: 199.3 AC; 48% OF GROSS SITE AREA

OPEN SPACE BREAKDOWN
CIVIC SPACE: 22.8 AC
ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC
ALL OTHER OPEN SPACE: 101.5 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC
CIVIC SPACE PROVIDED: 5.4%; 22.2 AC (SEE SHEET L1.0)

PARKING: SEE LOT DIAGRAMS (C2.6) FOR PROPOSED RESIDENTIAL PARKING;
AND SHEETS L1.0-L1.6 FOR CIVIC SPACE PARKING
RESIDENTIAL: 2 PARKING SPACES PER UNIT
DAYCARE: 1 PER STAFF + 0.5 PER CHILD
CIVIC SPACE: 1 PER 5,000 SF

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

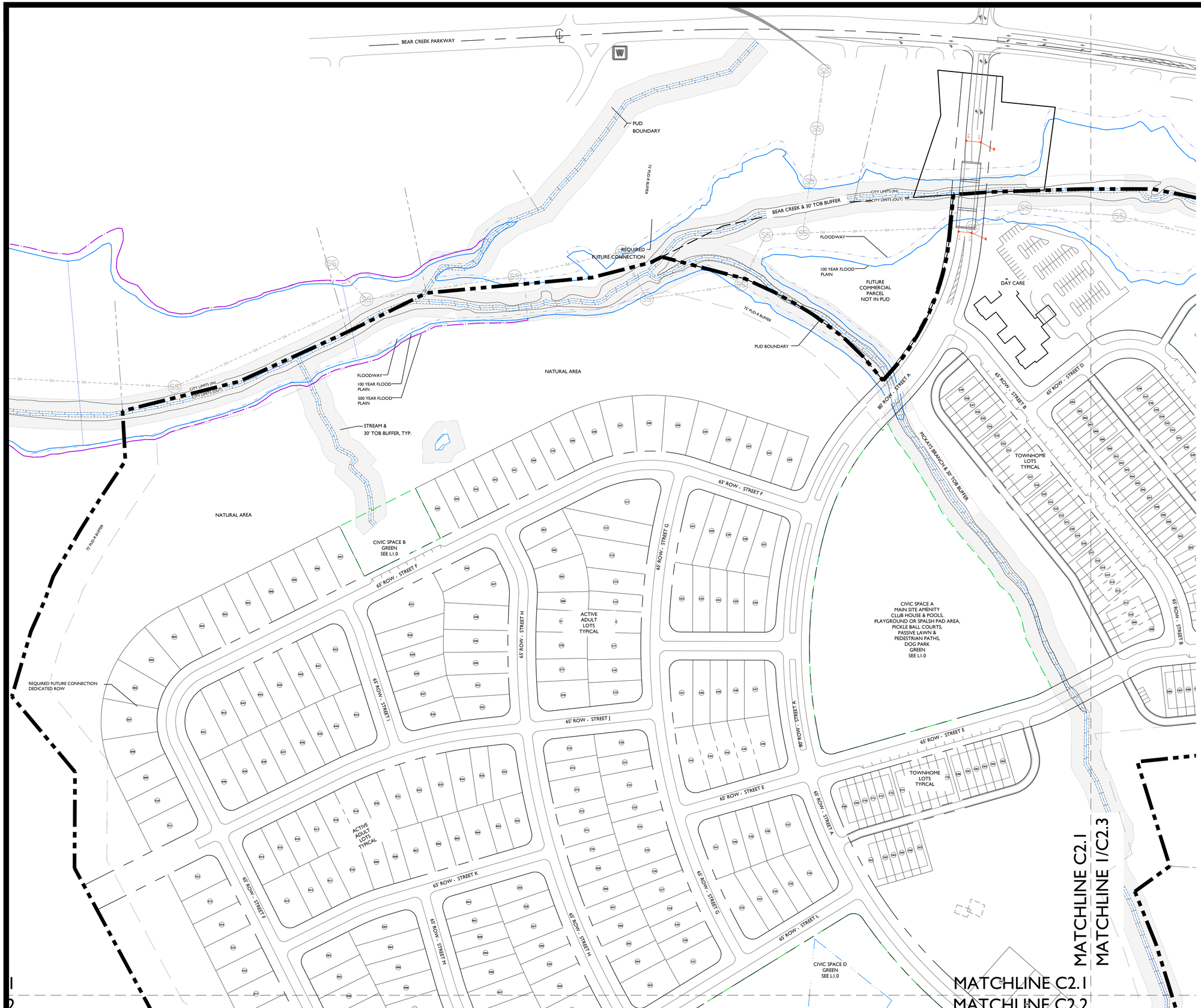
JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT 12.18.23

Date: October 16, 2023

| Revision | Date |
|---|---|
| 1 | December 18, 2023 |
| △ | |
| △ | |

OVERALL PUD-R PMDP

SHEET
C2.0




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED
LANDSCAPE ARCHITECT
12.18.23

Date: October 16, 2023

Revision Date

⚠1 December 18, 2023

△

△

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300

GRAPHIC SCALE 1"=100'-0"

ENLARGED PUD-R PMDP

SHEET

C2.1

MATCHLINE C2.1
MATCHLINE C2.2

MATCHLINE C2.1
MATCHLINE C2.2

75' PUD-R BUFFER

75' PUD-R BUFFER

ACTIVE ADULT LOTS TYPICAL

65' ROW - STREET L

65' ROW - STREET F

65' ROW - STREET H

65' ROW - STREET H

65' ROW - STREET N

CIVIC SPACE G
ACTIVE ADULT AMENITY
COVERED SEATING, PASSIVE LAWN &
PEDESTRIAN PATHS,
DOG PARK,
COMMUNITY GARDEN,
GREEN
SEE L1.0

65' ROW - STREET O

NATURAL AREA

CIVIC SPACE D
MAIL KIOSK
SEATING, PASSIVE LAWN &
PEDESTRIAN PATHS,
GREEN
SEE L1.0

65' ROW - STREET A

NATURAL AREA

ACTIVE ADULT LOTS TYPICAL

60' ROW

60' ROW - STREET P

COURTYARD LOTS TYPICAL

55' ROW - STREET R

65' ROW - STREET Q

MATCHLINE C2.2
MATCHLINE 2/C2.3

FLOODWAY

100 YEAR FLOOD PLAIN

STREAM &
30' TOB BUFFER, TYP.

LARGE LOTS TYPICAL

55' ROW - STREET S

60' ROW - STREET P

ALLEY HOMES TYPICAL

55' ROW - STREET P

55' ROW - STREET P

60' ROW - STREET Q

60' ROW - STREET T

60' ROW - STREET S

ALLEY HOMES TYPICAL

55' ROW - STREET R

65' ROW - STREET C

CIVIC SPACE E
MAIL KIOSK, PASSIVE LAWN &
PEDESTRIAN PATHS,
PLAYGROUND
GREEN
SEE L1.0

NATURAL AREA

DUCK RIVER

NATURAL AREA

CIVIC SPACE H
PASSIVE LAWN &
PEDESTRIAN PATHS,
PLAYGROUND
GREEN
SEE L1.0

NATURAL AREA

LARGE LOTS TYPICAL

COURTYARD LOTS TYPICAL

55' ROW - STREET W

60' ROW - STREET S

MATCHLINE C2.2
MATCHLINE C2.4

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

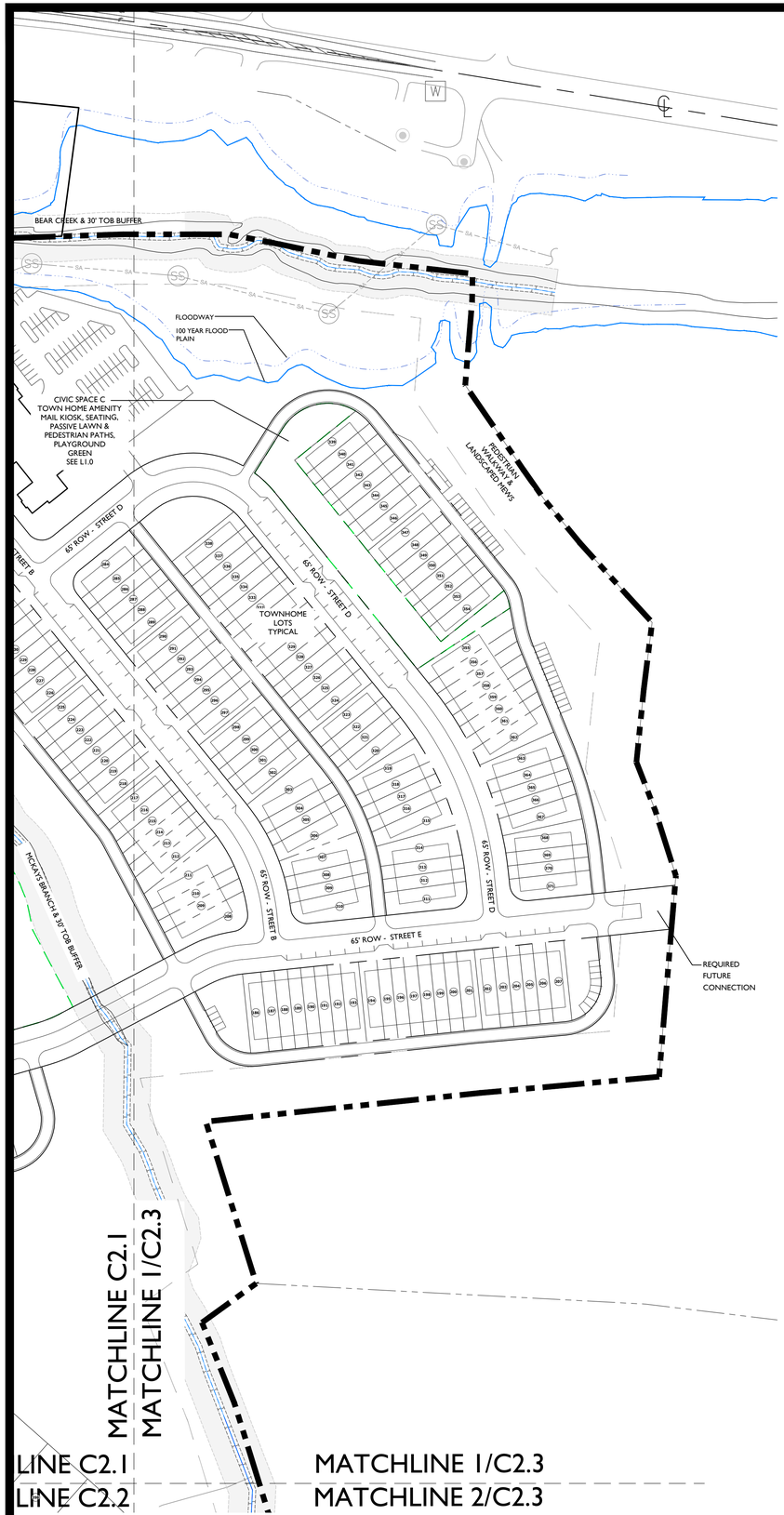
JEFFREY A. ROSS
REGISTERED
LANDSCAPE ARCHITECT
12.18.23

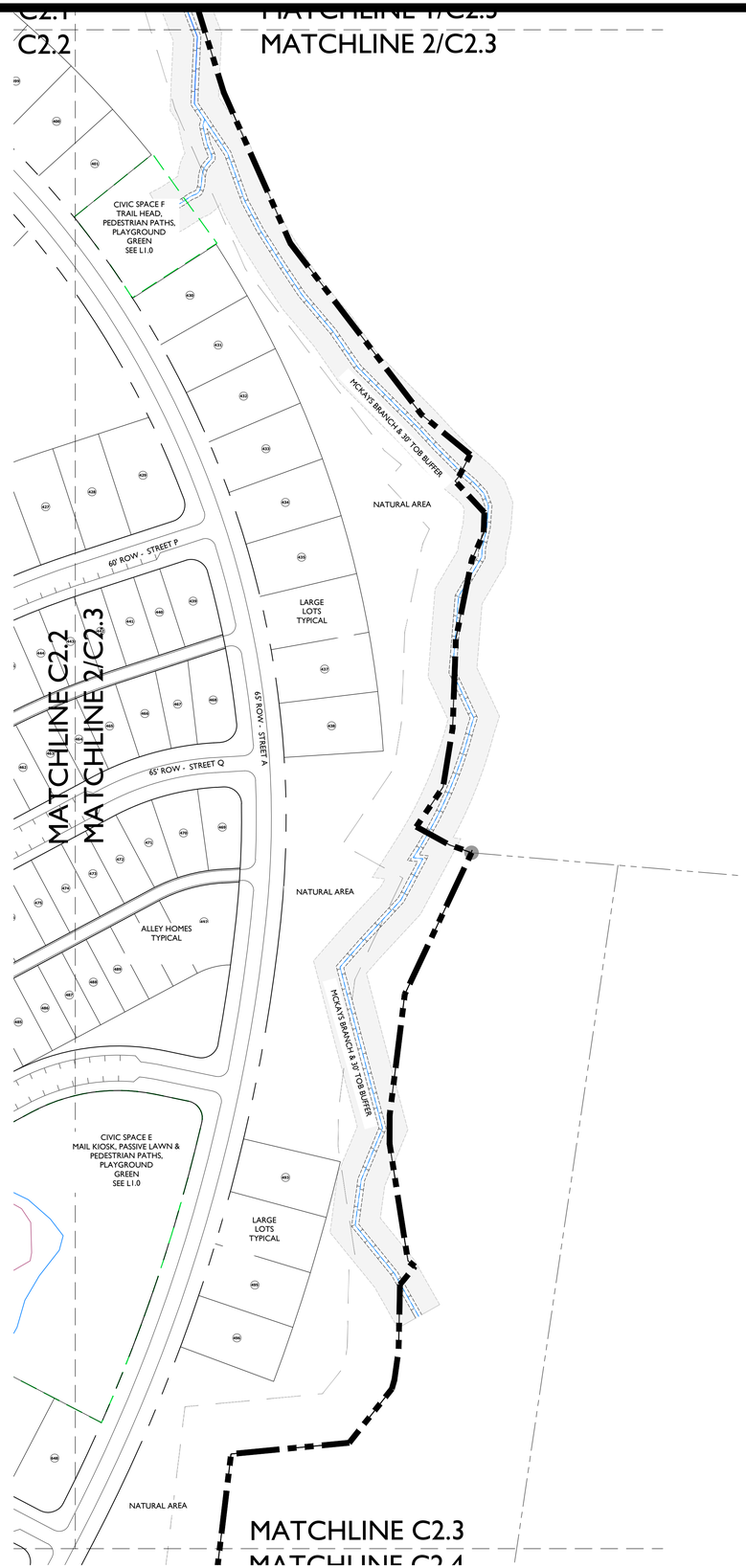
Date: October 16, 2023

| Revision Date |
|---|
| ⚠ December 18, 2023 |
| △ |
| △ |

ENLARGED PUD-R PMDP

SHEET
C2.2




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED LANDSCAPE ARCHITECT
STATE OF TENNESSEE
12.18.23

Date: October 16, 2023

| Revision Date |
|---|
| 1 December 18, 2023 |
| 2 |
| 3 |

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300

GRAPHIC SCALE 1"=100'-0"

ENLARGED
PUD-R PMDP

SHEET
C2.3

MATCHLINE C2.3
MATCHLINE C2.4

NATURAL AREA

75' FLOOD & BUFFER

FLOODWAY

100 YEAR FLOOD PLAIN

DUCK RIVER

55' ROW - STREET W

60' ROW - STREET T

65' ROW - STREET A

LARGE LOTS TYPICAL

COURTYARD LOTS TYPICAL

55' ROW - STREET V

55' ROW - STREET U

OHE

100' TVA LINE AND EASEMENT

55' ROW - STREET X

50' ROW - STREET U

CIVIC SPACE I
MAIL KIOSK, SEATING, PASSIVE LAWN & PEDESTRIAN PATHS, PLAYGROUND
GREEN
SEE L1.0

STREAM & 30' TOB BUFFER, TYP.

55' ROW - STREET Y

MATCHLINE C2.4
MATCHLINE C2.5

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300
GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED
LANDSCAPE ARCHITECT
12.18.23

Date: October 16, 2023

| Revision Date |
|---|
| ⚠ December 18, 2023 |
| △ |
| △ |

ENLARGED PUD-R PMDP

SHEET
C2.4

MATCHLINE C2.4
MATCHLINE C2.5

NATURAL AREA

DUCK RIVER

65' ROW - STREET A

55' ROW - STREET U

COURTYARD LOTS TYPICAL

LARGE LOTS TYPICAL

LARGE LOTS TYPICAL

LARGE LOTS TYPICAL

CIVIC SPACE J
TRAIL HEAD, SEATING, PASSIVE LAWN & PEDESTRIAN PATHS, GREEN
SEE L1.0

STREAM & 30' TOB BUFFER, TYP.

500 YEAR FLOOD PLAIN

FLOODWAY

100 YEAR FLOOD PLAIN

75' PUD-R BUFFER

65' ROW - STREET A

75' PUD-R BUFFER

NATURAL AREA

NATURAL AREA

NATURAL AREA

100 YEAR FLOOD PLAIN

500 YEAR FLOOD PLAIN

RECREATIONAL FACILITIES

OHE

OVERALL CONCEPT DEVELOPMENT PLAN

N

0 50 100 200 300

GRAPHIC SCALE 1"=100'-0"

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED LANDSCAPE ARCHITECT
STATE OF TENNESSEE
No. 329
12.18.23

Date: October 16, 2023

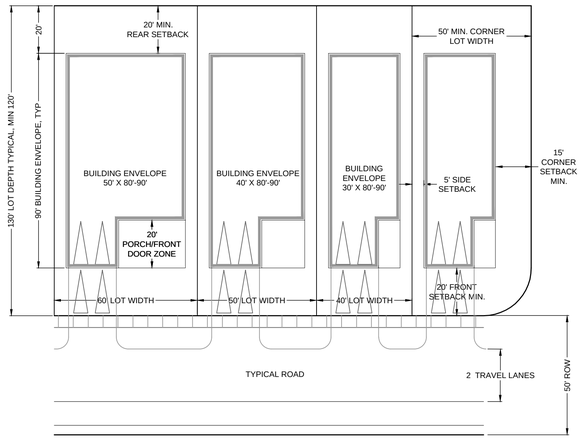
| Revision Date |
| --- |
| ⚠1 December 18, 2023 |
| △ |
| △ |

ENLARGED PUD-R PMDP

SHEET C2.5

ACTIVE ADULT/ AGE RESTRICTED DETACHED SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 40' X 120'; 50' X 120'; 60' X 120'

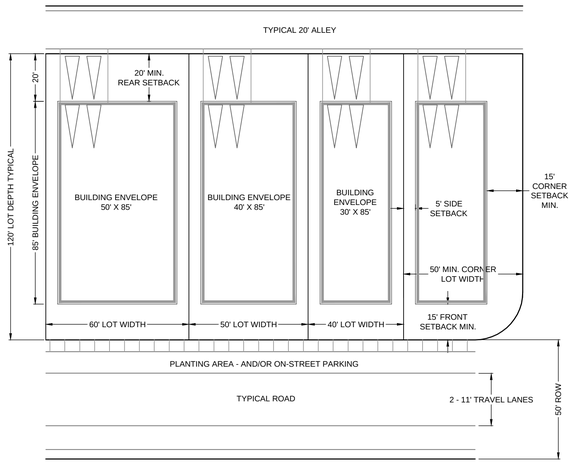
| SETBACKS: | MODIFICATION REQUESTS: | LOT DISTRIBUTION: | TYPICAL ISR: |
|---|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 18' WIDE IN FIRST LAYER<br>WINDOW SILL HEIGHT 3' ABOVE MIN. GRADE AT FACADE | 60' LOTS: 61<br>50' LOTS: 141<br>40' LOTS: 97 | 60% |



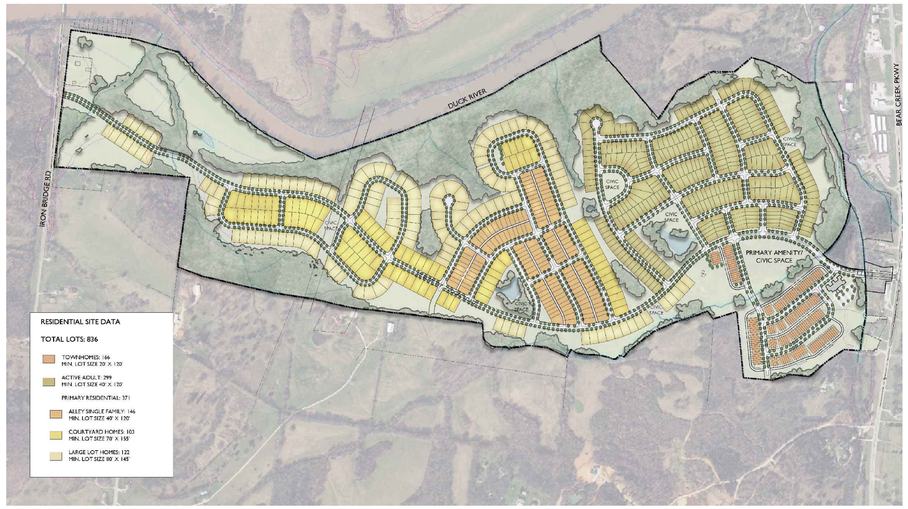

1 C2.6 ACTIVE ADULT LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL - ALLEY LOADED DETACHED SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 40' X 120'; 50' X 120'; 60' X 120'

| SETBACKS: | MODIFICATION REQUESTS: | LOT DISTRIBUTION: | TYPICAL ISR: |
|---|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 5' | 50' LOTS: 68<br>40' LOTS: 78 | 63% |



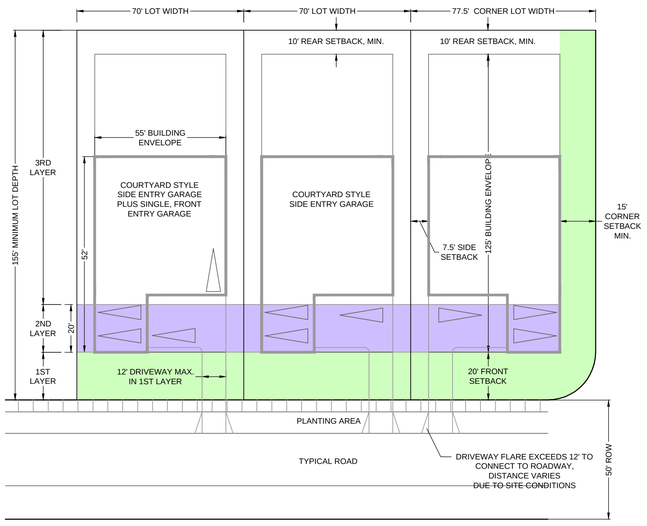

2 C2.6 SINGLE-FAMILY ALLEY LOT DIAGRAM N.T.S




3 C2.6 KEY MAP N.T.S

PRIMARY RESIDENTIAL COURTYARD SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 70' MIN. X 155'

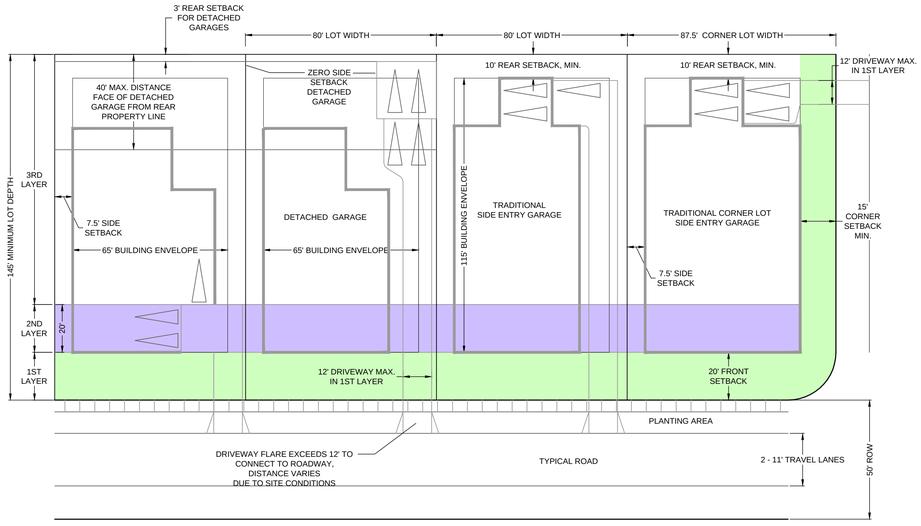
| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 10' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 12' WIDE IN FIRST LAYER<br>WINDOW SILL HEIGHT 3' ABOVE FINISHED GRADE MIN. | 30% |




4 C2.6 COURTYARD HOME LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL LARGE LOT SINGLE-FAMILY HOMES
TYPICAL LOT DIMENSIONS 80' MIN. X 145'

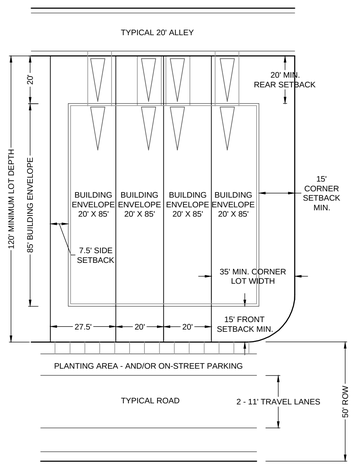
| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 20' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 10' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5'<br>GARAGE LOCATED IN 2ND LAYER<br>DOUBLE CAR GARAGE DOORS ALLOWED; MAXIMUM WIDTH 16'<br>DRIVEWAY TO BE 12' WIDE IN FIRST LAYER | 60% |




5 C2.6 LARGE LOT HOME LOT DIAGRAM N.T.S

PRIMARY RESIDENTIAL ALLEY LOADED TOWN HOMES
TYPICAL INTERIOR LOT DIMENSIONS 20' MIN. X 120'
UNITS PER BUILDING: 4, 6, 7, OR 8

| SETBACKS: | MODIFICATION REQUESTS: | TYPICAL ISR: |
|---|---|---|
| FRONT: 15' MIN.<br>SIDE : 7.5' MIN.<br>CORNER: 15' MIN.<br>REAR: 20' MIN. | REDUCTION IN SIDE SETBACK FROM 10' TO 7.5' | 80% INTERIOR UNITS |




6 C2.6 TOWN HOME LOT DIAGRAM N.T.S

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE 12.18.23

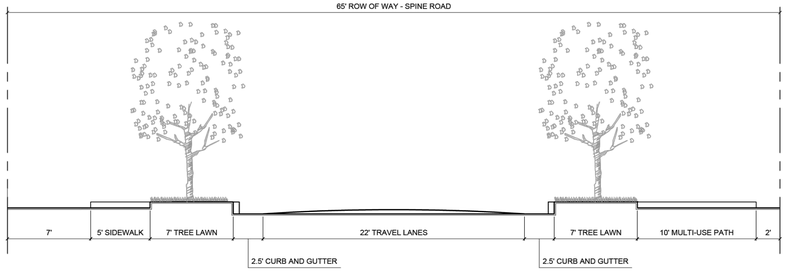
Date: October 16, 2023

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|---|
| 1 December 18, 2023 |
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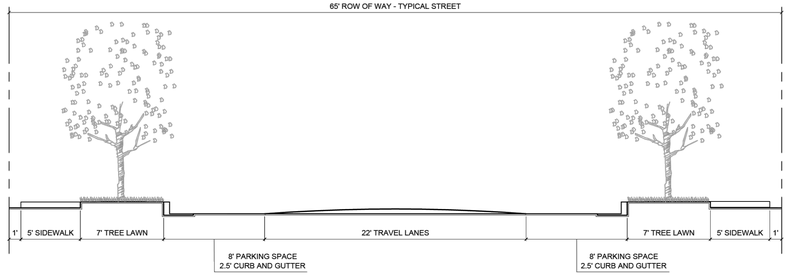
LOT DIAGRAMS

SHEET C2.6

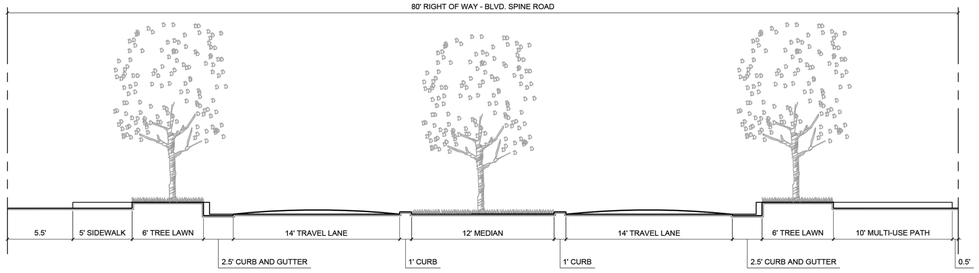
65' ROW OF WAY - SPINE ROAD




65' ROW OF WAY - TYPICAL STREET

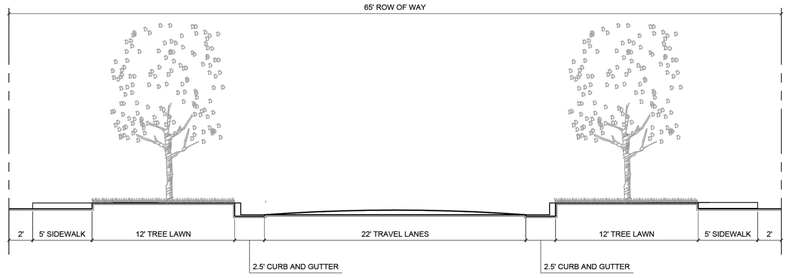



80' RIGHT OF WAY - BLVD. SPINE ROAD

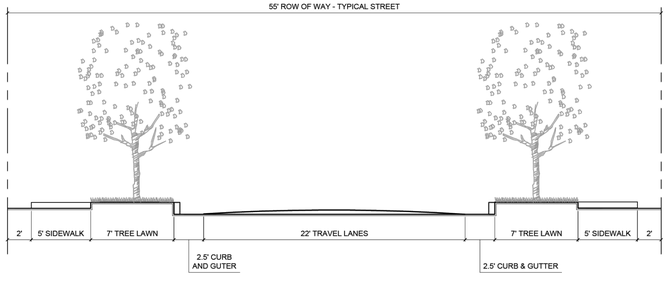



65' ROW - CD4 - NO PARKING

65' ROW OF WAY

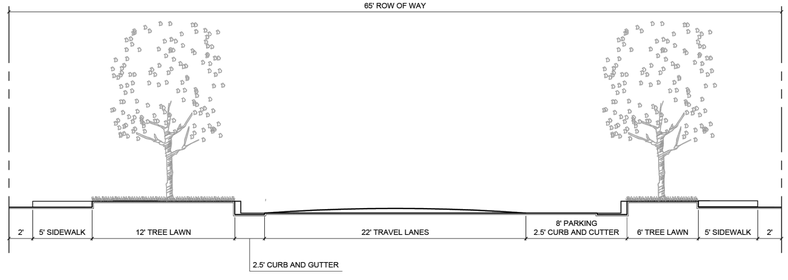



55' ROW OF WAY - TYPICAL STREET

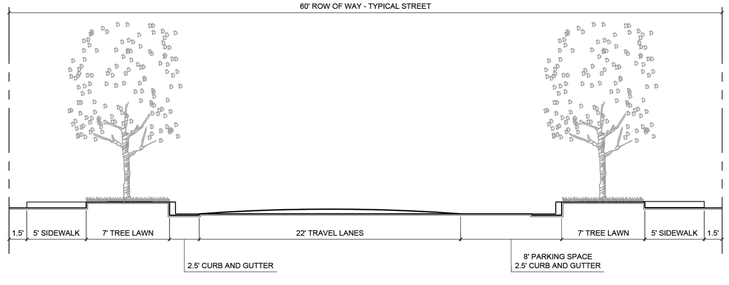



65' ROW - LOCAL CD4
WITH PARKING ONE SIDE

65' ROW OF WAY

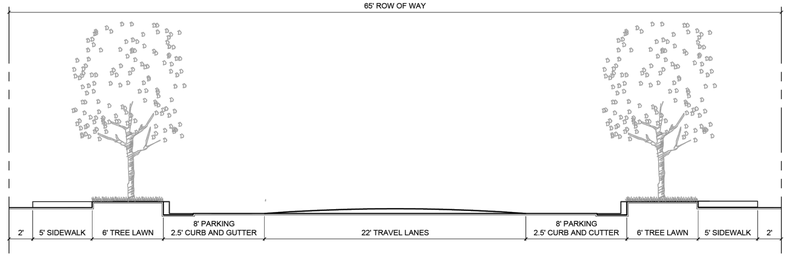



60' ROW OF WAY - TYPICAL STREET




65' ROW - LOCAL CD4
WITH PARKING ONE SIDE

65' ROW OF WAY




GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED
LANDSCAPE
ARCHITECT
12.18.23

Date: December 18, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

LOT DIAGRAMS

SHEET
C2.7




## SITE DATA:

EXISTING TREE CANOPY COVERAGE: 262.2 ACS; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%;

ANTICIPATED PRESERVATION AREAS TO BE DETERMINED WITH FINAL GRADING/STORMWATER.

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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400 Bear Creek Parkway, Columbia, Tennessee

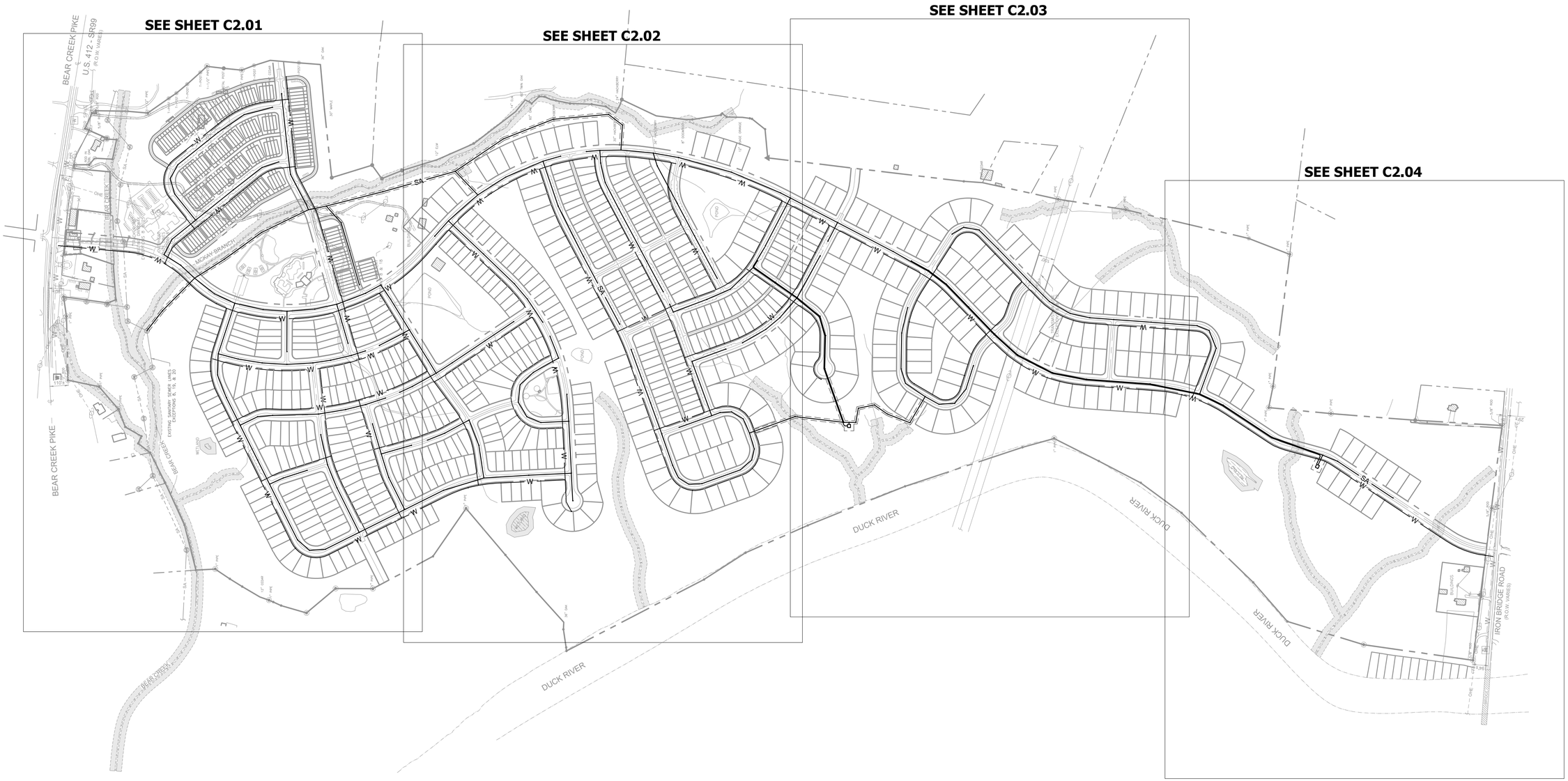
JEFFREY A. ROSS
REGISTERED
LANDSCAPE
ARCHITECT
12.18.23

Date: October 16, 2023

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|---|
| ⚠ December 18, 2023 |
| △ |
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OVERALL PUD-R PMDP

SHEET
C2.8




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Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL




# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

| Rev. | Description | Date |
|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |

DRAWN BY: TWG
CHECKED BY: TWG

## OVERALL UTILITY PLAN

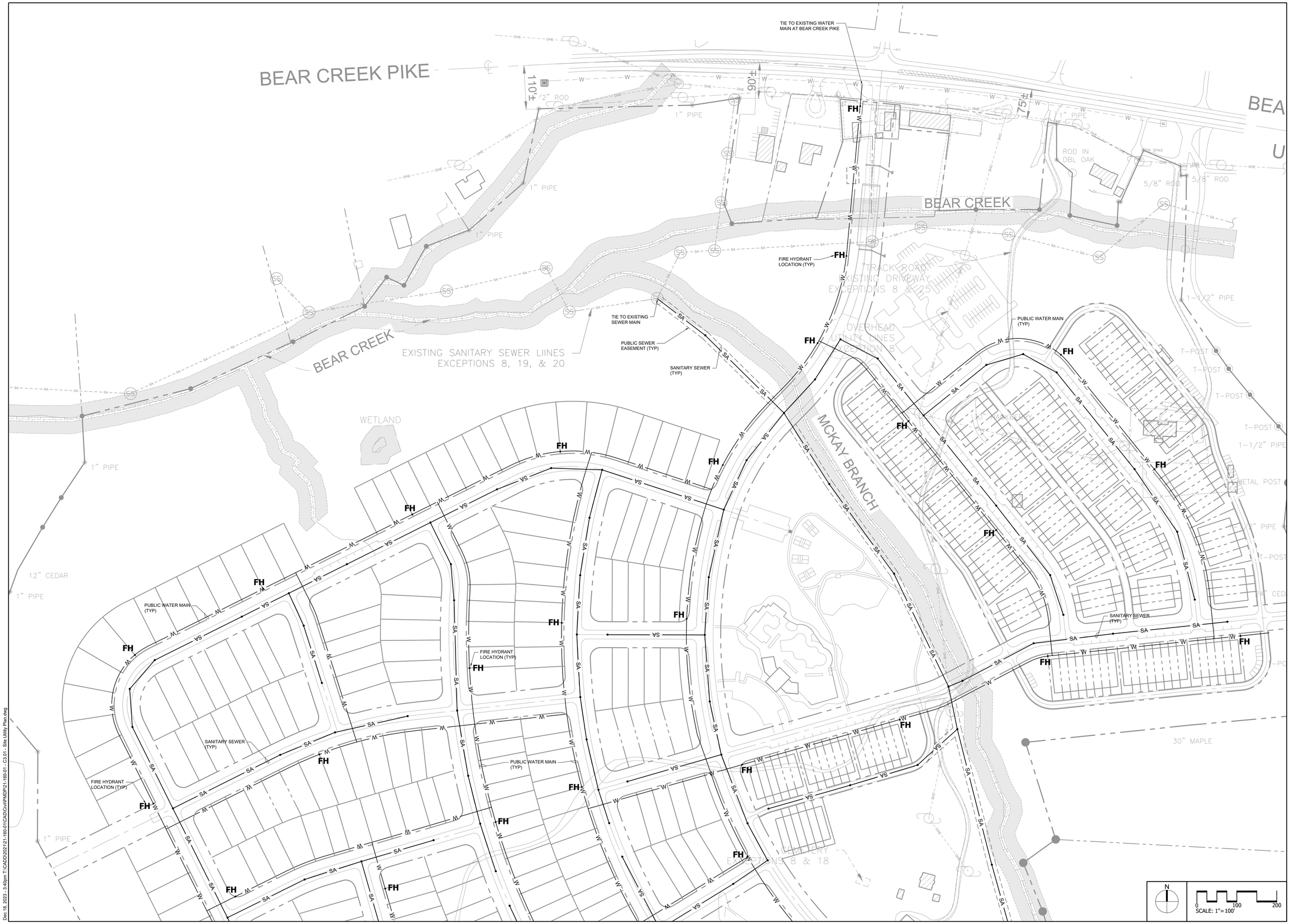
# C3.00

PROJECT NO.: 21-160-01

N

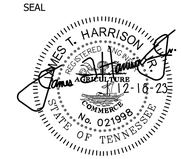
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Dec 18, 2023 - 3:40pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.00 - Overall Utility Plan.dwg




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Landscape Architecture
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Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL




# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

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| 1 | Initial Submittal | 10/16/23 |
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DRAWN BY: TWG
CHECKED BY: TWG

## SITE UTILITY PLAN

# C3.01

PROJECT NO.: 21-160-01



Dec 18, 2023 - 3:40pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.01 - Site Utility Plan.dwg




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615.248.9999
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SEAL

JAMES T. HARRISON IV
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
12-18-23
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

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|---|---|---|
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| 2 | Tech Review Comments | 12/18/23 |

DRAWN BY: TWG
CHECKED BY: TWG

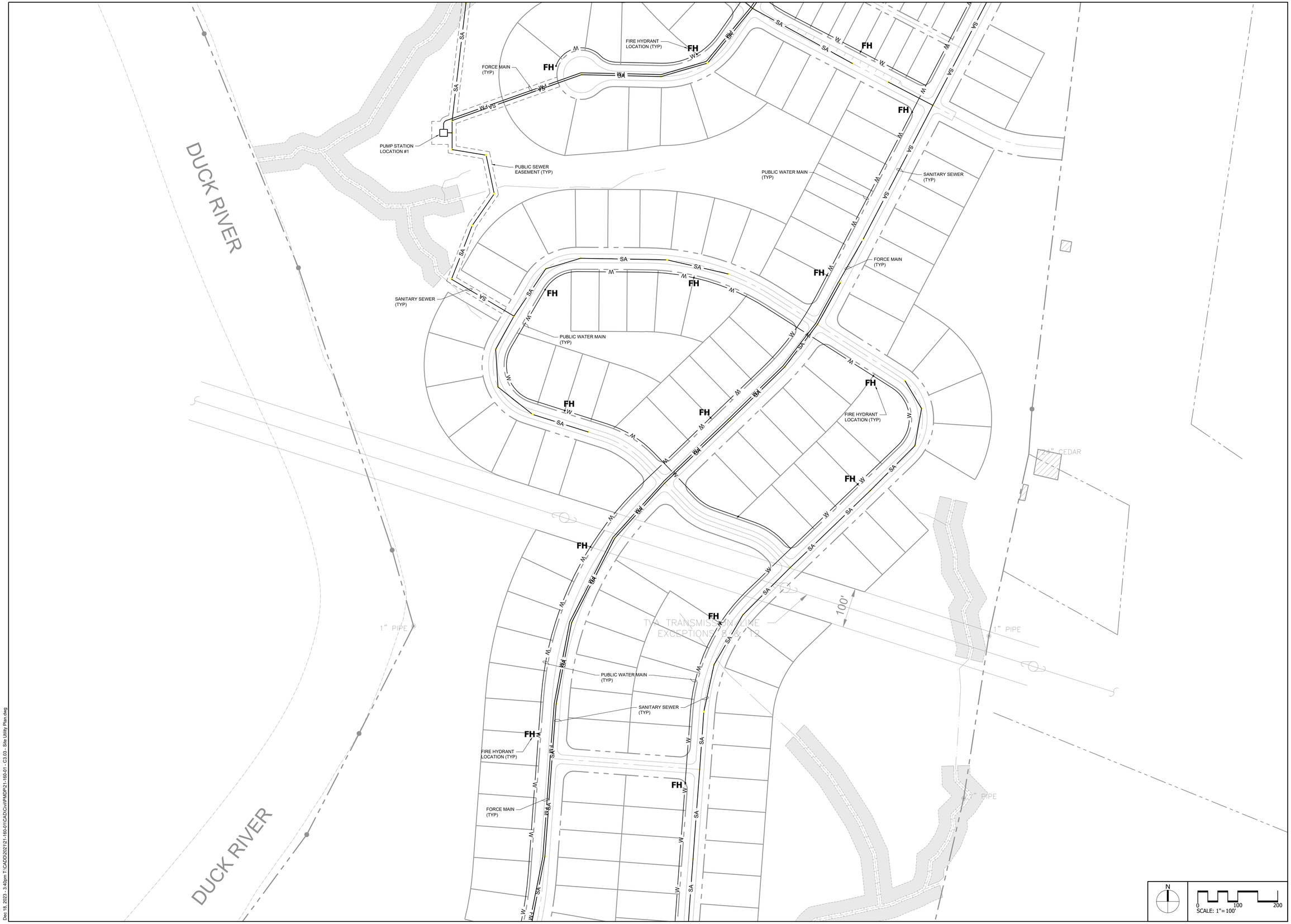
SITE UTILITY PLAN

C3.02

PROJECT NO.: 21-160-01



Dec 18, 2023 - 3:40pm T:\CAD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.02 - Site Utility Plan.dwg




Dec 18, 2023 - 3:40pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.03 - Site Utility Plan.dwg


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SEAL




# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:

INITIAL SUBMITTAL

ISSUE DATE: 12/18/2023

REVISION HISTORY:

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DRAWN BY: TWG
CHECKED BY: TWG

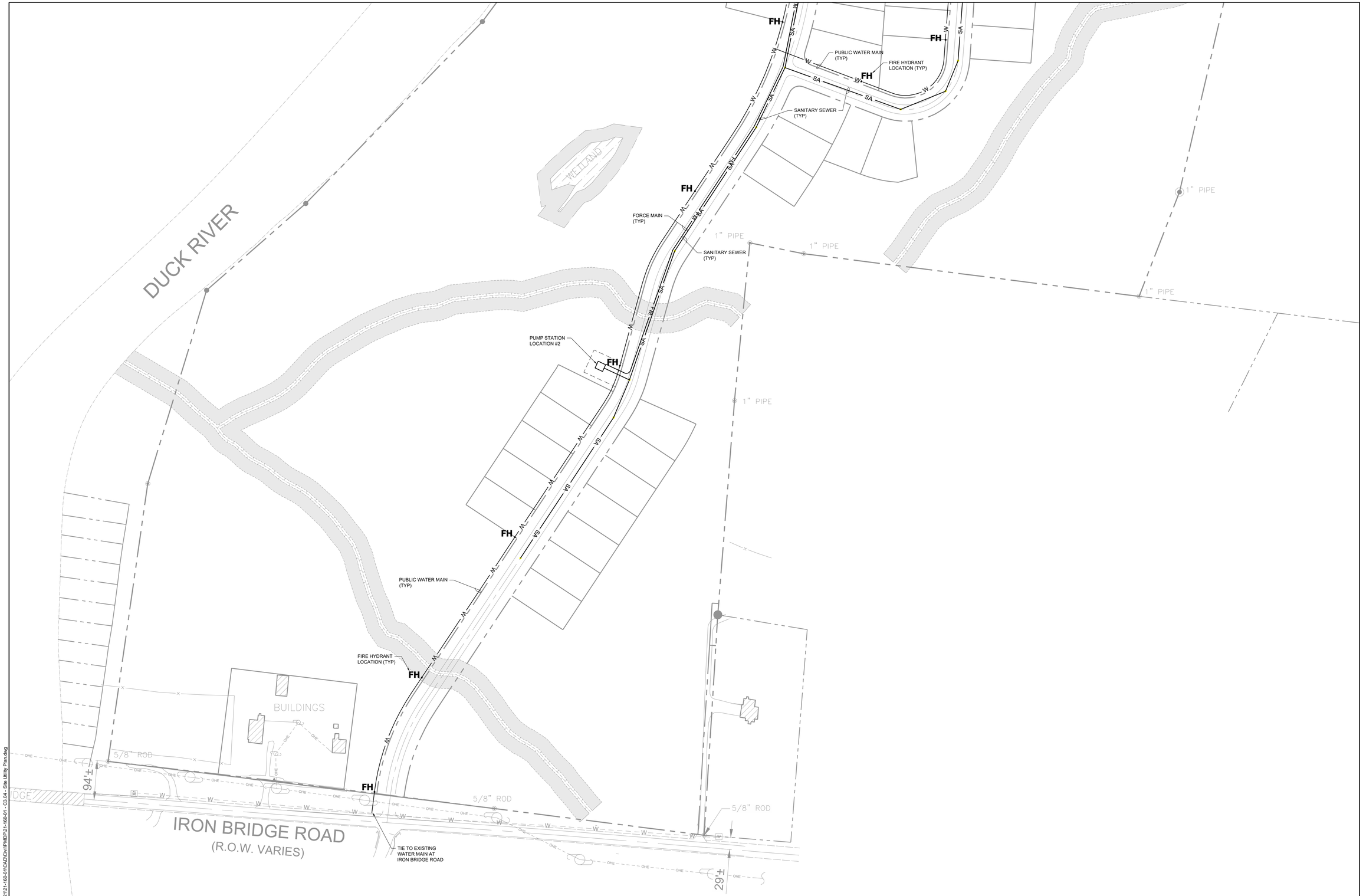
## SITE UTILITY PLAN

N

0 100 200
SCALE: 1"= 100'

C3.03

PROJECT NO.: 21-160-01




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SEAL

JAMES T. HARRISON
REGISTERED
ENGINEER
AGRICULTURE
COMMERCE
12-18-23
No. 021998
STATE OF TENNESSEE

# COLUMBIA BLUFFS
PMDP
Bear Creek Pike
Columbia, Maury County, Tennessee

ISSUE SET:
INITIAL SUBMITTAL
ISSUE DATE: 12/18/2023

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|---|---|---|
| 1 | Initial Submittal | 10/16/23 |
| 2 | Tech Review Comments | 12/18/23 |

DRAWN BY: TWG
CHECKED BY: TWG

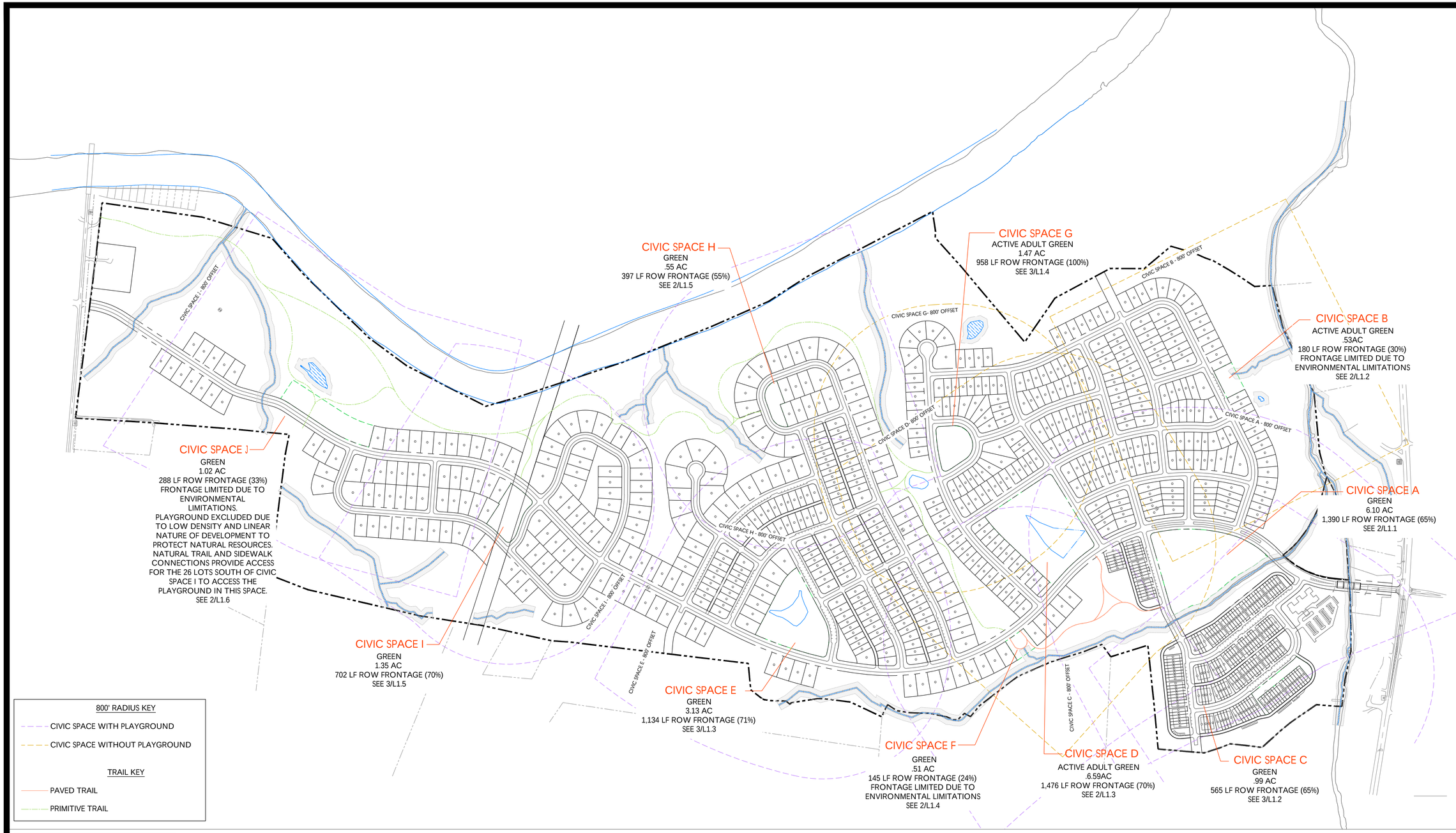
## SITE UTILITY PLAN

# C3.04

PROJECT NO.: 21-160-01

N
0 100 200
SCALE: 1"= 100'

Dec 18, 2023 - 3:40pm T:\CADD\2021\21-160-01\CAD\Civil\PMDP\21-160-01 - C3.04 - Site Utility Plan.dwg




800' RADIUS KEY

- CIVIC SPACE WITH PLAYGROUND
- CIVIC SPACE WITHOUT PLAYGROUND

TRAIL KEY

- PAVED TRAIL
- PRIMITIVE TRAIL

OVERALL CIVIC SPACE PLAN

N

0 300 600 900

GRAPHIC SCALE 1"=300'-0"

TOTAL OPEN SPACE PROVIDED: 199.8 AC; 48.7% OF GROSS SITE AREA

OPEN SPACE BREAKDOWN

CIVIC SPACE: 22.2 AC
ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC
ALL OTHER OPEN SPACE: 102.6 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC
CIVIC SPACE PROVIDED: 5.4%; 22.2 AC (SEE SHEET L1.0)

CIVIC SPACE BREAKDOWN

| KEY | SIZE | PLAYGROUND |
|---|---|---|
| A | 6.10 AC | YES |
| B | .53 AC | NO |
| C | .99 AC | YES |
| D | 6.10 AC | NO |
| E | 3.13 AC | YES |
| F | .51 AC | YES |
| G | 1.47 AC | YES |
| H | .55 AC | YES |
| I | 1.35 AC | YES |
| J | 1.02 AC | NO |

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS
REGISTERED LANDSCAPE ARCHITECT
STATE OF TENNESSEE
12.18.23

Date: December 18, 2023

| Revision Date |
|---|
| △ |
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OVERALL CIVIC SPACE PLAN

SHEET L1.0




1 LI.1 KEY MAP N.T.S

NEIGHBORHOOD CLUBHOUSE





PICKLE BALL COURTS



DOG PARK

WALKING PATHS





POOL



PICKLE BALL COURTS



SWING BENCH




2 LI.1 CIVIC SPACE - A
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 50' 100'

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE PE 12.18.23

Date: December 18, 2023

| Revision Date |
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OVERALL CIVIC SPACE PLAN

SHEET LI.1




1 / LI.2 KEY MAP N.T.S




2 / LI.2 CIVIC SPACE - B

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'

BENCHES



FORMAL PLANTING





FORMAL LAWN



WALKING PATH




3 / LI.2 CIVIC SPACE - C

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'

PLAYGROUND





FORMAL PLANTING

PLAYGROUND



GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS Registered Landscape Architect 12.18.23

Date: December 18, 2023

Revision Date

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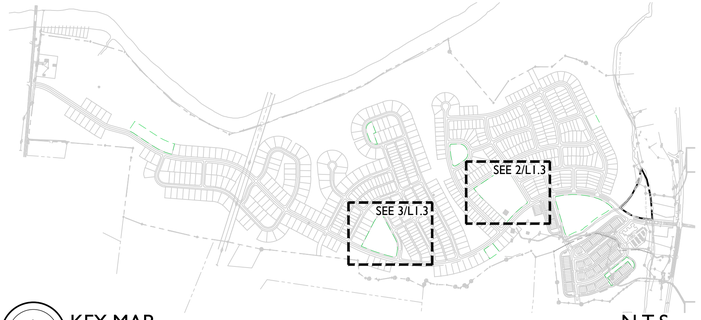
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OVERALL CIVIC SPACE PLAN

SHEET LI.2



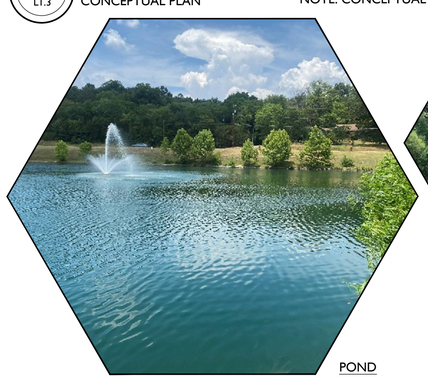

1 / L1.3 KEY MAP N.T.S




2 / L1.3 CIVIC SPACE - D
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 50' 100'


POND


TRAIL HEAD

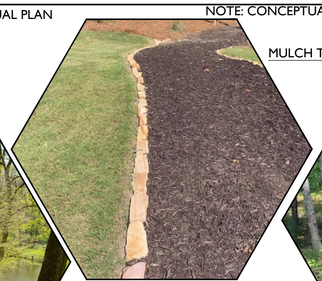

MAIL KIOSK

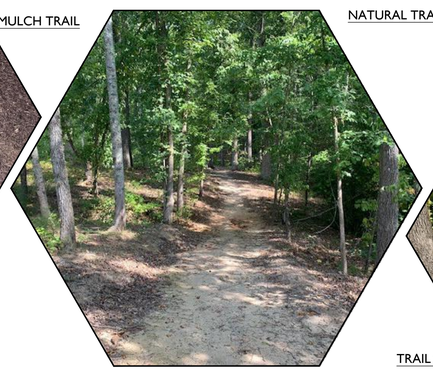
3 / L1.3 CIVIC SPACE - E
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'


NATURAL POND


MULCH TRAIL


NATURAL TRAIL



TRAIL SIGN

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE PE 12.18.23

Date: December 18, 2023

| Revision Date |
|---|
| △ |
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OVERALL CIVIC SPACE PLAN

SHEET L1.3




2 / L1.4 CIVIC SPACE - F

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



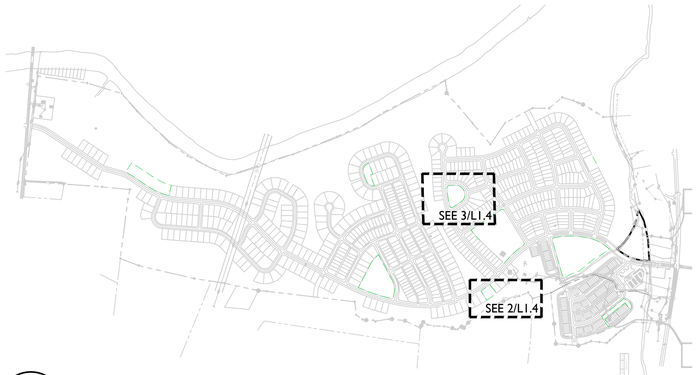
SWINGS



FORMAL PARK



PLAYGROUND




1 / L1.4 KEY MAP N.T.S

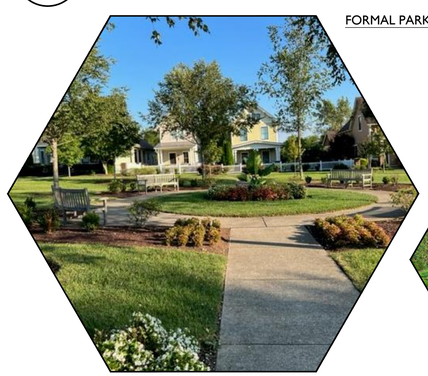



3 / L1.4 CIVIC SPACE - G

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

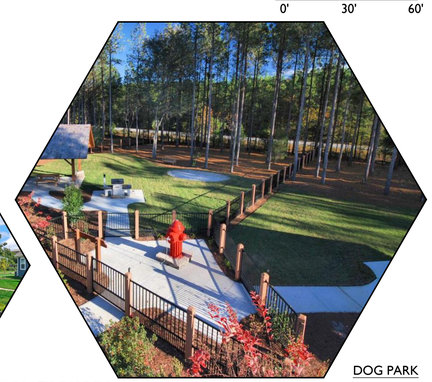
0' 30' 60'



FORMAL PARK



COMMUNITY GARDEN



DOG PARK

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT TENNESSEE 12.18.23

Date: December 18, 2023

Revision Date

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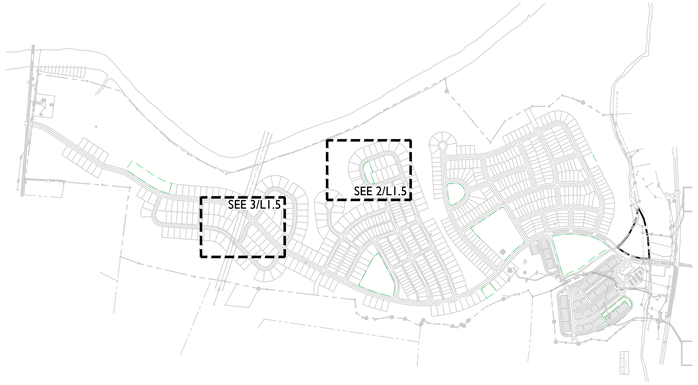
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OVERALL CIVIC SPACE PLAN

SHEET

L1.4




1 / LI.5 KEY MAP N.T.S




2 / LI.5 CIVIC SPACE - H
CONCEPTUAL PLAN
NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.
0' 30' 60'


SWINGS


PLAYGROUND


PLAYGROUND




3 / LI.5 CIVIC SPACE - I
CONCEPTUAL PLAN
NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.
0' 30' 60'


SWINGS


MAIL KIOSK


FORMAL PLANTING

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED PROFESSIONAL ENGINEER PE 12.18.23

Date: December 18, 2023
Revision Date
△
△
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OVERALL CIVIC SPACE PLAN
SHEET
LI.5




2 / L1.6 CIVIC SPACE - J

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 100' 200'

NOTE: PRIMITIVE WALKING TRAILS TO BE FIELD LOCATED.



OPEN FIELD



TRAIL HEAD



MULTI-PURPOSE FIELD




1 / L1.6 KEY MAP N.T.S

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

JEFFREY A. ROSS REGISTERED LANDSCAPE ARCHITECT 12.18.23

Date: December 18, 2023

| Revision Date |
|---|
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OVERALL CIVIC SPACE PLAN

SHEET L1.6

## Property and Master Plan Description

Identifying paths for new development, suburban neighborhood development, through *Connect Columbia*

- **Fostered as part of a practice of managed growth that relies on balancing growth, economic development and community development**
  Columbia Bluffs seeks to be a master planned community with diversity of housing options and civic opportunities.

- **Preservation of historic, cultural and environmental assets**
  Columbia Bluffs seeks to build civic areas around the historic/cultural history of the property and utilize proactive measures to protect the natural environmental systems supporting the Duck River.

- **Connectivity**
  Columbia Bluffs seeks to provide a north-south roadway connection between Iron Bridge and Bear Creek Parkway as well as provide stub road opportunities for future development to the east.

- ***Connect Columbia* Top Priorities: allowing a PUD model that will allow flexibility with more assurance of the final outcome**
  Columbia Bluffs seeks to create a master planned neighborhood with commitments on density, architectural character, quality amenities, and protected open space.

- **Suburban Neighborhood goals: future development emphasizing connectivity and housing diversity, pedestrian friendly**
  Columbia Bluffs seeks to development a master plan with all of these goals.

- ***Connect Columbia* Near-Term Priorities: promote master planned housing opportunities for a "full-life cycle" to accommodate retirees and young professionals and to review zoning standards to permit smaller lot and home sizes to encourage such developments.**
  Columbia Bluffs seeks to create a master planned neighborhood with housing opportunities that range from Active Adult age-restricted living, larger lots/homes to support growing families and generational living opportunities, to smaller lots and town homes for young families.


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# PUD Justification

PUD Zoning is only to be used under certain very specific conditions.

- 2.4.4 – *PUD district may be assigned to an area within a parcel of land over 10 gross acres, only if due to unique site conditions or the necessary and intrinsic uses, size, or form a proposed development* ***cannot under any plan, design, or circumstances conform to one or more of the character districts*** *and standards therefor.*

**Environmental Uniqueness.** The uniqueness of the land and its proximity to the Duck River provides a unique opportunity to master plan the community with greater environmental protection.

The Duck River may be the most significant natural feature in Columbia. It's the protection and preservation of this resource for aquatic species diversity, wildlife, and a clean Columbia is paramount. Open spaces should be identified and preserved with these specific goals in mind. Based on the Zoning Ordinance Primary Use Table 4.3.9.A-1, open spaces are defined based on the use type. While some uses on this chart are similar, they do not seem to capture the breadth of environmental resource protections and would therefore fall under "other open space use not listed under any use category" which is limited to use within a PUD only. The use of the PUD-R for this property ensures the City's oversight and the design team's plans for development are thought about on the front end and not left to speculation. The property should be developed using Conservation Design Concepts where low impact development is proposed and where conservation is the top priority within sensitive land and around environmental features in order to protect them. These conservation areas include floodplains, steep slopes, natural drainage areas, and areas of established tree canopy along the Duck River.

The Zoning Ordinance does not require a Conservation Plan, nor a development strategy to protect a resource as significant as the Duck River. Section 6.2 Preservation of Natural Features states: Development shall preserve the natural features of the site, such as wetlands, unique wildlife habitats, Historic Structures, major trees and scenic views both from and into the site. This regulation is too vague and not specific enough for the subject property.

The applicant has chosen a PUD-R zoning district instead of CD-3 in order to utilize different neighborhood planning strategies than are allowed under a straight CD-3 zoning project. PUD-R allows for utilization of a cluster development strategy. While Columbia Bluffs is seeking an overall development density of less than what is allowed under CD-3, the PUD-R district allows for smaller lots, lesser lot coverage, and greater impervious surface coverage. The PUD-R also allows for the applicant to ask for modifications to the development standards, which if approved, will further the cluster development design implementation.

Additionally, the applicant is seeking to develop an active adult age restricted neighborhood within the master planned community. While there is no provision in CD-3 that would prohibit the development of an age-restricted neighborhood, many of the zoning criteria in CD-3 are not conducive to the typical design standards utilized in active


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adult age restricted developments. Active adult developments utilize smaller lots and lot coverage in order to reduce the exterior landscape maintenance, which is performed by the HOA. The builders associated with these developments have distinct building programs which cater to the specialized needs of their customers. These homes also tend to require accessible access, which could not be achieved without the ability to seek architectural modification including relief from finished floor level and window sill height at the façade.



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# Environmental Protection Strategy

1. **Strategy for Resource Protection utilizing a PUD Planning and Design Approach**

    a. Establish a Limits of Disturbance along the Duck River and its tributaries based upon slopes, natural drainage ways, floodplain areas, and mature tree canopy.
    b. Design new development around open space areas to highlight them as community amenities with pedestrian systems that will connect the entire conservation design open space throughout the community.
    c. Pedestrian circulation and trails are highly encouraged along the river, along stream corridors, and through scenic areas.
    d. The quantity of Open Space preservation should greatly exceed any established base zone district.
    e. New home lots should generally be smaller, clustered areas away from the protected banks of the Duck River.
    f. Document on-site natural resources through a State approved Hydrologist and concurrence reports with local, state, and federal agencies.
    g. Remove debris removal along creek banks to prevent impact to Bear Creek (shoes, clothing, random bottles, containers, fencing, wood)
    h. Use Best Management Practices for Stormwater Pollution Prevention Plans during construction.
    i. Use only one crossing point (< less than approx. 50’ - 60’ feet that spans the creek with no structures within Bear Creek (similar to several crossings visible from US (Highway 412).

2. **Strategy for Protection through Construction**

    Implementation of the Plan requires protective measures. PUD phasing and areas of disturbance should be documented and considered through the PUD process. Protection practices shall include:

    A. Storm water erosion control applications I.E.
        i. Stormwater Detention Areas,
        ii. natural riparian buffers
        iii. silt fencing
        iv. sediment ponds
        v. Check dams


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vi. Ongoing stormwater monitoring of Environmental Controls of water runoff areas and tributaries

B. Compliance with CGP, ARAP and NPDES permitting to address the protections that provide additional oversight to the project.

Throughout the duration of the project, these types of practices within the action areas will ensure environmental compliance with local, state and federal requirements.

**3. Strategy for Protection when construction is completed.**

Once development is completed permanent storm water detention areas and water out fall locations will be cleaned and stabilized in accordance with the local, state, and federal guidelines.

## PUD Standards and the Columbia Bluffs Plans

The Columbia Bluffs Master Plan will address and satisfy the standards for PUD Development as defined in 3.7.1 PUD-R District Standards: **PUD-Residential**: *Specifically, this District is intended for predominantly Residential areas on sites where there are sufficient existing infrastructure, services, and utilities available for a proposed Development. Development in this District:*

***a. Is walkable and provides a diverse mixture of housing choices and Building Types,***
***b. Is necessary to implement and is consistent with the Comprehensive Plan,***
***c. Cannot under any circumstances, plan, or design conform to one or more of the other Districts and standards therefor due to its necessary and intrinsic Uses or size or form,***
***d. Provides an innovative plan and design,***
***e. Is harmonious with and respects the land use, character, and natural or man-made features of both the subject property and Adjacent property,***
***f. Promotes quality and environmentally sensitive planning and design by taking advantage of special site characteristics, locations and land uses,***
***g. Provides Civic Space,***
***h. Is the best use of the site consistent with the goals of protecting and enhancing the natural environment. There are specific Development standards provided for this District, which may be supplemented by additional standards approved as part of the applicable Final Master PUD Development Plan.***

**PUD-R Justification**
Date: December 18, 2023
Project: Columbia Bluffs Preliminary PUD-R Master Development Plan

## Modifications of Standards

The following modifications of standards will be requested by the developer to reduce the development footprint and increase the open space held in preservation. The reduction in ROW width, setbacks, and variations in garage locations will provide for a unique, clustered neighborhood experience.

1. Utilization of street sections with smaller ROW impacts than the 70' ROW Urban Neighborhood Street. In coordination with Staff, the applicant is proposing a variety of street sections based on the development intensity and presence of on-street parking. These street sections range from 55' ROW to 80' ROW. This reduced ROW would yield 7 acres of additional open space.
2. Reduction in side setbacks from 10' to 7.5' on front loaded homes and townhomes provides approximately 6.2 acres of additional land placed into open space. (19,920 sf townhomes + 33,655 sf front load x 2 side yards x 2.5' reduction).
3. Reduction in side setbacks from 10' to 5' on detached alley loaded homes and active adult homes provides approximately 12.3 acres of additional land placed into open space. (445 homes x 120' depth x 2 side yards x 5' reduction = 422,400 SF)
4. Allow garage in 2nd layer on courtyard style homes (garage doors not facing frontage in second layer). The courtyard style home provides façade variety while also allowing side and not front facing garage access.
5. Allow double garage doors with a maximum width of 16' wide, single door with windows
6. Allow primary residential driveways to be 12' instead of 10' across the 1st layer and active adult driveways to be 18' across the 1st layer
7. Allow active adult lots to have a finished floor level lower than 18 inches above finished grade at the façade. This provision will allow lot to achieve greater accessibility access.
8. Reduced window sill height at the façade from 5' minimum above average grade at façade to 3' minimum in the active adult and courtyard style homes. This will allow greater accessibility access in the active adult homes, but also allows for windows along the garage façade in courtyard homes.
9. Cul-de-sacs for Street W and Street O. Street O cannot extend further west or reconnect to the south due to the desire to create minimal impacts to the topography and tree canopy in this area new the Duck River. The extension of the cul-de-sac instead of a continuous centerline curve allows for a tee-style intersection and stop condition, as well as an orderly arrangement of residential blocks. Street W cul-de-sac is also necessary due to the topographic, tree canopy and existing natural drainage conveyances in this location. Connecting this roadway to the south would negatively impact these natural conditions.
10. Thoroughfare enfrontment for Civic Space B, F, and J. These three locations have less than the required 50% thoroughfare enfrontment due to their locations. Civic Spaces B and F serve as "greens" and are placed at the perimeter of the proposed development where natural features are present and preserved. Civic Space F also serves as a trail head for a greenway. Civic Space J is a linear "green" which is located primarily in the


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uplands and adjacent to Road A. This “green” creates the trail head and parking area for the primitive walking trails and other low impact amenities adjacent to and in the flood plain associated with the Duck River. Since no cross streets are proposed going west to wards the Duck River, thoroughfare enforcement is limited to one side. Each of these civic spaces provides at least 33% enfrontment.


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KOLTERLAND

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December 14, 2023

Mr. Glenn Harper, P.E.
City Engineer
City of Columbia, TN
N. Garden Street
Columbia, TN

RE: Columbia Bluffs (Big Bear Bluff Traffic Impact Study) Concurrence letter to TIS Report

Dear Mr. Glenn Harper,

Kolter Land (Developer) would like to submit this concurrence letter to the City of Columbia and is committed to making the off-site improvements and phasing outlined in the TIS dated 10.16.23.

The following is the projected timing and installations of said improvements:

1. Prior to preliminary acceptance of *Phase 1 (& all subsections) or Final Plat of Phase 2* vertical build out, consisting of +/- 142 dwelling units, the **Bear Creek Pike and Mt Olivet Road/School Lane** improvements will be completed.
    a. Please see aerial image describing improvement and location
2. Prior to preliminary acceptance of *Phase 2(& all Subsections) or Final Plat Phase 3* vertical build out, consisting of a total of+/- 142 dwelling units, the **Bear Creek and Tom J Hitch Parkway** improvements will be completed.
    a. Please see aerial image describing improvement and location
3. Prior to preliminary acceptance of *Phase 3(& all subsections) or Final Plat Phase 4* vertical build out, consisting of +/-143 dwelling units, the **Bear Creek Pike and Patterson Drive/Site Access # 1 & Patterson Drive South Bound Left Turn Lane** improvements will be completed.
    a. Please see aerial image describing improvement and location
4. Prior to preliminary acceptance of *Phase 4(& all subsections) or Final Plat of Phase 5*, upon completion of full vertical buildout of Phase's 1-4, *Phase 4,* consisting of +/-143 dwelling units, the **Iron Bridge Road and Site Access # 2** improvements will be completed.
    a. Please see aerial image describing improvement and location
5. Prior to preliminary acceptance of *Phase 5(& all subsections) or Final Plat Phase 6* vertical build out, consisting of +/-144 dwelling units, the **James Campbell BLVD and Tom J Hitch Parkway** improvements will be completed.
    a. Please see aerial image describing improvement and location
6. Prior to preliminary acceptance of *Phase 6*, consisting of +/- 146 dwelling units, **All Recommended Road Improvements** will be completed for all +/-860 dwelling units.
    a. Please see aerial image describing improvement and location

Please see the attached “Columbia Bluffs Aerial Improvement Map” for reference to locations of said improvements.

All improvements will be designed and constructed in accordance to AASHTO, TDOT, and City of Columbia standards. All projected phase unit counts are subject to change based on final engineering design and utility completion required at time of construction documents review.

Please let me know if you should have any questions.

Respectfully,

Digitally signed by Joshua Gibbs
Reason: I am approving this document
Location: KolterLand
Date: 2023.12.18 10:28:00 -06'00'

Joshua Gibbs
Kolter Land Partners, LLC
Vice President
14025 Riveredge Drive, Suite 175
Tampa, FL 33637
(615) 582-3253

December 18, 2023

Paul Keltner, Director
Development Services
City of Columbia, TN

RE: Project# 23-0414; Re-Submittal 400 Bear Creek Parkway – Annexation Request and PUD-R Rezoning

Dear Mr. Keltner,
The accompanying documents and comment responses below are for the resubmittal of the above referenced project. It is our intention to proceed to the January Development Review Committee Meeting, as staff requested an additional DRC opportunity.

Please note that Staff has provided written comments to the applicants in two separate comment letters. The comment responses listed below include all comments from both letters. Due to the combination of the staff comments, numerical order may not be consistent with the original letters.

Included in the submittal are the following:

1. Online/Digital upload of revised PUD-R documents
2. Comment responses to Development Review Committee (below)
3. Revised PUD justification letter

## Staff Comments:

**Fire**

1. Fire hydrants are to be spaced no more than every 500'. There are a few locations that needs attention.
   *Response: Understood, hydrants spaced at no more than 500'.*
2. Alleys are not to be used for access for emergency vehicles. An approved fire apparatus road must be within 150' of all structures. A couple locations that need this corrected.
   *Response: Townhome layout has been adjusted to accommodate this comment.*

**Engineering**

3. Subject to Construction Plans and Traffic Impact Study.
   *Response: Noted.*
4. Provide traffic improvement commitment letter with phasing based on improvement identified in the TIS and an overall diagram of all improvements.

DEVELOPMENT PLANNING | DESIGN | MANAGEMENT
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3020 Stansberry Lane, Suite 201
Franklin, TN 370

*Response: This has been submitted to Engineering and a copy has also been uploaded with this resubmittal.*

5. Provide proposed grading at intervals of not more than 2 feet.
   *Response: Grading provided at 2' intervals.*
6. Overall grading may not support slab on grade foundations. See detail DD-04.
   Response: Development proposed a mix of slab on grade and crawl space foundations to fit development grading.
7. 8% maximum grade on alleys
   *Response: Understood, all alleys under 8%*
8. Whenever a proposed street intersects a street with an equal or greater classification, a tangent (measured from the edge of travelled way, or the right-of-way line when determined by the City Engineer, along the centerline of the intersecting street) shall be provided. See ESS Table 3 Cul-de-sac on Street C & O and C & D: Cul-de-sacs shall be located a minimum distance away from the connected roadway as to provide a right-of-way section a minimum of twenty-five (25) feet in length parallel to the centerline of the street between the intersected street and the expansion of the right-of-way for the cul-de-sac with a width matching the roadway cross-section. See ESS detail SD-15.
   *Response: Please see Sheets C2.0 – C2.6. Tangents have been provided and cul-de-sacs have been adjusted to meet the ESS requirements.*
9. Provide and show lot numbers
   *Response: Lot numbers have been included with resubmittal.*
10. Provide stub to the east roughly 340 ft north of intersection of Street A, U, V
    *Response: A stub road to the east has been provided in this general location.*
11. Provide alley street section. Provide boulevard street section.
    *Response: Based on meetings with Engineering and Planning Staff, the applicant has revised the plan to reflect the CD3, CD4 and Boulevard street sections provided by Engineering Staff. These street sections can be found on Sheet C2.7. Alley Section from ESS has also been included on this sheet.*
12. Alley drainage should be located in the center of the roadway. Inlet spacing generally 150 ft. max. Note alleys will have driveway style aprons when intersecting streets.
    *Response: Understood. Layout plan will be adjusted to reflect the driveway style aprons. Alley drainage centered in road and generally 150' spaced.*
13. Minimum horizontal centerline curvature for alleys is 70 ft.
    *Response: The layout plan has been adjusted and all alley centerlines meet this minimum.*
14. TVA may have restrictions on the proposed amenities within Civic Space I
    *Response: Noted. The applicant will coordinate with TVA prior to final development plan submittal.*
15. Hydrologic analysis and permitting required for bridge over Bear Creek. Preliminary assessment appears to adhere to regulations.
    *Response: Noted*
16. Where a proposed public street intersects an arterial roadway, a minimum of seventy-five (75) feet of right-of-way, two hundred fifty (250) feet in length, shall be provided from the edge of the intersected street's right-of-way.
    *Response: Understood, right-of-way provided to comply.*
17. Note: Drainage channels within a subdivision providing drainage for the following shall be located on a common or open space lot a minimum of ten (10) feet in width within a dedicated public

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drainage easement or public right-of-way. 1. Eight (8) or more lots, either in whole or a portion of; 2. Public infrastructure; or 3. An area equivalent to two (2.0) acres.
*Response: Understood, right-of-way provided to comply*

18. Wetland north of cul-de-sac on Street O appears to be a sinkhole. Additionally, there are other small depressions that will require evaluation. See ESS section 5.4 Storm network is incomplete for the southern portion of the site.
*Response: Understood, depressions will be evaluated with geotechnical assessment. Preliminary storm network completed for full site.*
19. Proposed detention areas appear to be smaller than would be required to satisfy water quality and peak rate of runoff requirements.
*Response: Proposed stormwater areas increased. Final water quality and detention areas will meet requirements.*
20. Overall site geotechnical assessment and geotechnical analysis and recommendation of all closed depressions will be required at final master plan and preliminary plat.
*Response: Noted*
21. ROW stub to the western property (Street F) should be set up in a manner to allow for future retrofit into a tee type intersection.
*Response: The required western property ROW stub has been shifted one block to the south to accommodate grading and utility concerns. This stub is shown as a tee-type intersection.*
22. Provide justification of the usage of all cul-de-sacs. It appears several could be feasibly connected.
*Response: Per the suggestion of staff, two of the cul-de-sacs on the south western side of the property have been combined. There are currently two cul-de-sacs (Street O and W) remaining. Street O cannot extend further to the west or reconnect to the south due to the desire to create minimal impacts to the topography and tree canopy in this area near the Duck River. The extension of the cul-de-sac instead of a continuous centerline curve allows for a tee-style intersection and stop condition, as well as an orderly arrangement of residential blocks. Street W cul-de-sac is also necessary due to the topographic, tree canopy and existing natural drainage conveyances in this location. Connecting this roadway to the south would negatively impact these natural conditions.*
23. Provide ROW dedication 37.5 ft from the centerline of Iron Bridge Rd.
*Response: A line reflecting a 37.5' offset from the centerline of Iron Bridge Road has been added into the layout plan. There is a very small area on the eastern side of the property where ROW will have to be dedicated in order to achieve this offset.*
24. Maximum manmade slope 3:1. A few slopes exceed this maximum.
*Response: Understood, slopes adjusted to meet 3:1*
25. Note: All roadways shall meet geometric requirements of the ESS.
*Response: Noted*.
26. Proposed street sections are not the typical sections for this particular zoning. Urban Neighborhood Street and the 2 Lane Avenue would generally be appropriate. The proposed section and reduction in ROW width also includes reductions or eliminations of elements such as street trees and on street parking.
*Response: The applicant has met with Planning and Engineering Staff to discuss the street sections. Based on the street sections provided by Staff, the applicant has revised to the layout. While the street sections do propose some modifications based on the current Zoning Ordinance, they do provide 6' and 7' grass strips for street trees and on-street parking along the frontage of the alley-loaded homes, where appropriate. Please see the PUD justification letter for additional details on*

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*the gain of open space based on these reductions and additional justifications for the use of these modified street sections.*

27. The appropriate street section for this character district (PUD-R) would be the Urban Neighborhood or Urban Center Street sections. Typically, developments have utilized the Urban Neighborhood Street in residential settings more than the Urban Center Street.
    *Response: The applicant has met with Planning and Engineering Staff to discuss the street sections. Based on the street sections provided by Staff, the applicant has revised to the layout. The applicant is proposing a street section that meets more of the intent of the Urban Neighborhood street in northern section of the site with a higher residential density. In the southern portion of the neighborhood, larger lots and less density are utilizing a smaller street section without on-street parking.*
28. The Zoning Ordinance permits the Urban Neighborhood Street across multiple character districts (CD-3, CD-4, CD-4C, PUD-R, etc.), but we have recognized after having the code adopted for roughly 1.5 years, there are some distinct character and use-case differences between CD3 and CD4+ style developments. Staff is working on revisions to the street sections to accommodate these differences in character. The Planning Commission and City Council may consider these proposals in 2024 as part of a larger revision to the Zoning Ordinance. Generally, the proposed development has portions that are somewhat consistent with CD3 and some more similar to CD4. The Assistant City Engineer (in consultation with other Planning and Engineering staff) has provided a markup that highlights the streets where parking would be recommended and the (draft) revised street sections for those character areas.
    *Response: The applicant has utilized the street sections proposed by Staff, with the exception of the spine road, which has increased by 5' ROW and now includes a multi-use path.*
29. It is the intent and the requirement for throughfare assemblies to have parking on one or both sides in CD4 as well as all more dense/intense character districts. The active adult area, as proposed, does not allow for adequate space between driveways to provide parallel parking. See attached markup.
    *Response: On-Street parking is provided in the townhome area and for the primary residential alley loaded homes. In other locations, the applicant does not feel that on-street parking should be utilized.*

## Planning

1. City Planner Kevin McCarthy, AICP and Planner Austin Brass, AICP will jointly prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process, annexation, the PUD justification, development parcel standards, nonresidential uses, thoroughfare assemblies, civic spaces, or technical comments from other reviewers. Please contact abrass@columbiatn.com with questions about lot configurations, façade standards, PUD-R bulk standards, and the mix of residential types. Please copy both case planners on communications related to this request.
   *Response: Noted.*
2. Due to the size and complexity of this request, the Zoning Administrator requests that this application be reviewed again by the DRC following resubmittal to these comments before advancing to the Planning Commission agenda.

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*Response: Noted. The applicant is anticipating this resubmittal to allow placement on the January DRC agenda for additional review.*

3. Please expand upon the modification of standards listed on page five of the PUD-R justification letter. The list should include **all** requested deviations from the PUD-R standards at 4.3.1-K, as well as other deviations from standards of the ordinance (e.g. use of cul-de-sacs contrary to 5.2.2.E). For each requested deviation, please explain how the customized standard offers a better built environment to residents of the city of Columbia and/or better implements the Suburban Neighborhood future land use classification than the CD-3L or CD-3 character districts. The revised letter should support an explanation that the public purpose of the standards is satisfied "to equivalent or greater degree" by utilizing the proposed alternative (8.5.21.D; p. 452). Items two and three on the list provided with the application are a good template (i.e. explain the gain in open space from the modification).
   *Response: Noted. Please see revised Justification letter provided with this resubmittal.*
4. Please add a projected timeline to phasing plan shown on sheet C1.00. The plan should be sufficiently detailed to provide adjacent property owners of the duration of actual construction activity near their property. The phasing plan should comply with section 8.5.21.F (p. 453). The plan should indicate when Final PUD master plan and subsequent plats are projected (8.5.21.R; p. 461). The phasing plan should indicate if any extension requests are anticipated related to the timing of actual construction under 8.5.21.W (p. 464). The phasing timeline may be provided as a separate document if that is easier to prepare.
   *Response: Understood, phasing timeline provided on C1.0 to comply.*
5. **Advisory**: The applicant has a separate but related application for the upcoming development review cycle. The other application rezones an adjacent parcel to CD-4 for commercial development. It may be advisable to combine these applications into a single large multi-use PUD at resubmittal (this will require review the Architectural Design Review Team).
   *Response: The applicant would prefer to keep the applications as two-separate projects. The applicant understands and requests that the CD-4 Annexation/Rezoning should track with the PUD-R project and it's support and approval would be dependent on the approval of the PUD-R project.*
6. Please expand upon the Environmental Uniqueness section on page two of the PUD-R justification letter. Please elaborate on the "Commitment to Environmental Stewardship" and explain which strategies could not be utilized under a CD-3 zoning.
   *Response: The applicant will continue to work with staff to expand on the environmental strategies.*
7. **Advisory**: Consult with the Assistant City Engineer (Douglas Toney) regarding alternative design for segments of Street A.
   *Response: The applicant has meet with Staff and is utilizing new sections proposed by Staff.*
8. **Advisory**: Please consult with the Director (Mac Reagan: mreagan@columbiatn.com) and Assistant Director (Alex Troje: atroge@columbiatn.com) of the City of Columbia Parks & Recreation department about composition of Civic Spaces (especially LI.6) and potential public access easement/alignment with Parks & Rec goals for level of service in East Columbia. If there are opportunities for public access/public benefit, please identify these in the revised PUD justification letter.
   **Response***: The applicant is meeting with Parks & Recreation Staff in the coming days and will be continuing to coordinate with staff to identify these opportunities.*

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9. Please revise phasing plan to provide construction of Road A connecting Bear Creek Pike and Iron Bridge Road in the first phase.
   *Response: Connection to Iron Bridge Road shown as Phase 3b to match the traffic impact study ('Site access 2 should be constructed and connected to Iron Bridge Road prior to beginning construction for Phase 4, or comparable number of dwelling units.')*
10. Please revise to eliminate the cul-de-sacs in phases 3 and 6 per 5.2.2.E (or request as part of PUD deviations with explanation of equivalent public benefit).
    *Response: Please see revised layout and PUD Justification document. Two cul-de-sacs were eliminated and two remain.*
11. The zoning ordinance contains contradictions related to PUD-R Civic Space types. Table 4.3.1-K (p. 157) indicates Sport fields are not a permitted Civic Space type in PUD-R. Table 5.3.3-B indicates otherwise. Please add this to the requested deviations and accompanying explanation.
    Response: Please see Sheets L1.0-L1.6. The civic space delineations have been revised for clarity and based on discussions with staff. Currently, the only sports fields shown in a Civic Space are the pickleball courts at the main amenity. The applicant believes that this falls under the allowable use category of "active recreation" and does not constitute a stand-alone sports field as a civic space. Since this use is allowed in the "green" civic space type, the applicant is not requested a deviation from standards.
12. 50' right of way shown on PUD does not conform to Thoroughfare assemblies applicable to PUDs in 5.2.2.G-1. This is addressed in justification letter but please explain why it is necessary throughout the development and why the additional open space is a greater benefit than the omitted elements of the Thoroughfare.
    *Response: Street sections have been revised per discussions and additional comments from Staff.*
13. Sheet C2.0 indicates a tree save figure. Please provide a tree preservation plan with recent aerial image as described in 4.3.16.L of the zoning ordinance.
    Response: Existing tree canopy and required preservation is provided on a new Sheet.
14. There appears to be small gaps in the pedestrian shed, please revise.
    Response: Site layout adjustments have been made and now, each lot is within 800' of a civic space.
15. Please revise to show bicycle network and bikeway types utilized (5.2.4.A, p. 322-325).
    *Response: A 10' wide shared multi-use path, consistent with 5.2.4.B is being provided along the spine road. Please see street sections and layout plan.*
16. The parking area serving the daycare is located in the first layer. Please revise.
    *Response: The layout plan has been revised to place the parking in the third layer.*
17. Please provide greater detail on the lot/building site for the daycare site. This appears to be a through-lot which is prohibited by the ordinance (4.3.3).
    *Response: The orientation of the building and parking has been changed to be consistent with code.*
18. Please indicate pedestrian connection with townhomes that enfront a pedestrian path. Please ensure that this connection is with a proposed sidewalk.
    *Response: Townhome layout has changed. A sidewalk connection is provided for the townhomes that enfront the Civic Space.*
19. As reviewed, there has been several waivers requested for setbacks, garage designs, and driveway widths exceeding 10' in first layer. Please coordinate with engineering requiring details of 5' side setbacks and drainage swales.

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*Response: Understood, development proposed slab on grade and crawl space style lots to fit development grading and side yard swales.*

20. Please indicate the impervious coverage for Development Parcel as a whole, the daycare site, and each typical lot/building site.
*Response: Estimates for lots are provided on the lot diagrams in the sheet set. Overall property estimates on found in site data chart.*
21. Please revise pattern book to show conforming interior garage dimensions.
*Response: all garage parking spaces shall conform to minimum required size of 10' x 20' each. Pattern book has been revised to reflect this.*
22. As proposed, the Preliminary Master Plan deviates significantly from the bulk and design standards in Table 4.3.1-K and the development standards of Article 5 of the Zoning Ordinance. The deviations are too numerous and pervasive to list out as a technical review. Please revise mix and dimensions of lots to conform, or propose a specific alternative. We understand that you are proposing a customized set of standards to allow a unique plan of development that can't be accomplished under the prescriptive standards of the ordinance. Please identify each deviation in the revised PUD justification letter with an explanation of how the proposed alternative provides a superior built environment than the character districts of the ordinance. Specifically, the lot widths and driveway prescriptions of the ordinance are calibrated to match the Thoroughfare assemblies in 5.2.2.F and 5.2.2.G-1. The ordinance permits narrower (less than 50' of width at the frontage line) alley-served lots where the throughfare is designed to accommodate on-street parking. In general, narrow lots (less than 65' of width at frontage line) correspond to increased public frontage (sidewalks, plantings, parking) and reduced curb cuts. Please revise the plan based on the comments from Engineering and provide a narrative rationale in the revised PUD justification letter that connects deviations from the standards to unique qualities of the proposal (i.e. reduced environmental impact, demographic targeting, public benefits).
*Response: The applicant has revised the street sections based on the Staff recommendations.*

## Waste Water

23. All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided.

    Note: Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment
    *Response: Noted*

## ATT

1. ATT Plans to serve. Contact AT representative regarding connections to the site.
*Response: Noted.*

## Maury County Schools

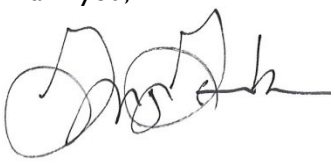
DEVELOPMENT PLANNING
DESIGN
MANAGEMENT

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1. Howell Elementary, Cox Middle School, Central High School. Possible rezone to BCHS 24/25SY for 9th/10 grade. See Attached Capacity Numbers. The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.
   *Response: Noted.*

If there are any questions or additional information needed, please feel free to reach out to me, or Keli Frymire (keli@gdc-tn.com) in my office.

Thank you,



**Gamble Design Collaborative**
Greg Gamble

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, November 7, 2023

**ITEM NO.**
23-0414

**DESCRIPTION:** Annexation request and PUD-R Preliminary Master Development Plan rezoning request for +/-410 acres between Bear Creek and Iron Bridge Road. PUD-R neighborhood to provide a variety of homes including Active Adult/Age restricted area, town homes, and large single-family home lots. PMDP also includes a daycare site and multiple amenities.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

## Fire

1. Fire hydrants are to be spaced no more than every 500'. There are a few locations that needs attention
2. Alleys are not to be used for access for emergency vehicles. An approved fire apparatus road must be within 150' of all structures. A couple locations that need this corrected.

## Engineering

3. Subject to Construction Plans and Traffic Impact Study.
4. Provide traffic improvement commitment letter with phasing based on improvement identified in the TIS and an overall diagram of all improvements.
5. Provide proposed grading at intervals of not more than 2 feet.
6. Overall grading may not support slab on grade foundations. See detail DD-04.
7. 8% maximum grade on alleys
8. Whenever a proposed street intersects a street with an equal or greater classification, a tangent (measured from the edge of travelled way, or the right-of-way line when determined by the City Engineer, along the centerline of the intersecting street) shall be provided. See ESS Table 3.
9. Cul-de-sac on Street C & O and C & D: Cul-de-sacs shall be located a minimum distance away from the connected roadway as to provide a right-of-way section a minimum of twenty-five (25) feet in length parallel to the centerline of the street between the intersected street and the expansion of the right-of-way for the cul-de-sac with a width matching the roadway cross-section. See ESS detail SD-15.
10. Provide and show lot numbers.
11. Provide stub to the east roughly 340 ft north of intersection of Street A, U, V
12. Provide alley street section. Provide boulevard street section.
13. Alley drainage should be located in the center of the roadway. Inlet spacing generally 150 ft. max. Note alleys will have driveway style aprons when intersecting streets.
14. Minimum horizontal centerline curvature for alleys is 70 ft.

15. TVA may have restrictions on the proposed amenities within Civic Space I
16. Hydrologic analysis and permitting required for bridge over Bear Creek. Preliminary assessment appears to adhere to regulations.
17. Where a proposed public street intersects an arterial roadway, a minimum of seventy-five (75) feet of right-of-way, two hundred fifty (250) feet in length, shall be provided from the edge of the intersected street's right-of-way.
18. Note: Drainage channels within a subdivision providing drainage for the following shall be located on a common or open space lot a minimum of ten (10) feet in width within a dedicated public drainage easement or public right-of-way. 1. Eight (8) or more lots, either in whole or a portion of; 2. Public infrastructure; or 3. An area equivalent to two (2.0) acres.
19. Wetland north of cul-de-sac on Street O appears to be a sinkhole. Additionally, there are other small depressions that will require evaluation. See ESS section 5.4 Storm network is incomplete for the southern portion of the site.
20. Proposed detention areas appear to be smaller than would be required to satisfy water quality and peak rate of runoff requirements.
21. Overall site geotechnical assessment and geotechnical analysis and recommendation of all closed depressions will be required at final master plan and preliminary plat.
22. ROW stub to the western property (Street F) should be set up in a manner to allow for future retrofit into a tee type intersection.
23. Provide justification of the usage of all cul-de-sacs. It appears several could be feasibly connected.
24. Provide ROW dedication 37.5 ft from the centerline of Iron Bridge Rd.
25. Maximum manmade slope 3:1. A few slopes exceed this maximum.
26. Note: All roadways shall meet geometric requirements of the ESS.
27. Proposed street sections are not the typical sections for this particular zoning. Urban Neighborhood Street and the 2 Lane Avenue would generally be appropriate. The proposed section and reduction in ROW width also includes reductions or eliminations of elements such as street trees and on street parking.

## Planning

1. City Planner Kevin McCarthy, AICP and Planner Austin Brass, AICP will jointly prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process, annexation, the PUD justification, development parcel standards, nonresidential uses, thoroughfare assemblies, civic spaces, or technical comments from other reviewers. Please contact abrass@columbiatn.com with questions about lot configurations, façade standards, PUD-R bulk standards, and the mix of residential types. Please copy both case planners on communications related to this request.
2. Due to the size and complexity of this request, the Zoning Administrator requests that this application be reviewed again by the DRC following resubmittal to these comments before advancing to the Planning Commission agenda.
3. Please expand upon the modification of standards listed on page five of the PUD-R justification letter. The list should include **all** requested deviations from the PUD-R

standards at 4.3.1-K, as well as other deviations from standards of the ordinance (e.g. use of cul-de-sacs contrary to 5.2.2.E). For each requested deviation, please explain how the customized standard offers a better built environment to residents of the city of Columbia and/or better implements the Suburban Neighborhood future land use classification than the CD-3L or CD-3 character districts. The revised letter should support an explanation that the public purpose of the standards is satisfied "to equivalent or greater degree" by utilizing the proposed alternative (8.5.21.D; p. 452). Items two and three on the list provided with the application are a good template (i.e. explain the gain in open space from the modification).

4. Please add a projected timeline to phasing plan shown on sheet C1.00. The plan should be sufficiently detailed to provide adjacent property owners of the duration of actual construction activity near their property. The phasing plan should comply with section 8.5.21.F (p. 453). The plan should indicate when Final PUD master plan and subsequent plats are projected (8.5.21.R; p. 461). The phasing plan should indicate if any extension requests are anticipated related to the timing of actual construction under 8.5.21.W (p. 464). The phasing timeline may be provided as a separate document if that is easier to prepare.
5. **Advisory**: The applicant has a separate but related application for the upcoming development review cycle. The other application rezones an adjacent parcel to CD-4 for commercial development. It may be advisable to combine these applications into a single large multi-use PUD at resubmittal (this will require review the Architectural Design Review Team).
6. Please expand upon the Environmental Uniqueness section on page two of the PUD-R justification letter. Please elaborate on the “Commitment to Environmental Stewardship” and explain which strategies could not be utilized under a CD-3 zoning.
7. **Advisory**: Consult with the Assistant City Engineer (Douglas Toney) regarding alternative design for segments of Street A.
8. **Advisory**: Please consult with the Director (Mac Reagan: mreagan@columbiatn.com) and Assistant Director (Alex Troje: atroge@columbiatn.com) of the City of Columbia Parks & Recreation department about composition of Civic Spaces (especially LI.6) and potential public access easement/alignment with Parks & Rec goals for level of service in East Columbia. If there are opportunities for public access/public benefit, please identify these in the revised PUD justification letter.
9. Please revise phasing plan to provide construction of Road A connecting Bear Creek Pike and Iron Bridge Road in the first phase.
10. Please revise to eliminate the cul-de-sacs in phases 3 and 6 per 5.2.2.E (or request as part of PUD deviations with explanation of equivalent public benefit).
11. The zoning ordinance contains contradictions related to PUD-R Civic Space types. Table 4.3.1-K (p. 157) indicates Sport fields are not a permitted Civic Space type in PUD-R. Table 5.3.3-B indicates otherwise. Please add this to the requested deviations and accompanying explanation.
12. Road names will require E-911 approval.

13. 50’ right of way shown on PUD does not conform to Thoroughfare assemblies applicable to PUDs in 5.2.2.G-1. This is addressed in justification letter but please explain why it is necessary throughout the development and why the additional open space is a greater benefit than the omitted elements of the Thoroughfare.
14. Sheet C2.0 indicates a tree save figure. Please provide a tree preservation plan with recent aerial image as described in 4.3.16.L of the zoning ordinance.
15. There appears to be small gaps in the pedestrian shed, please revise.
16. Please revise to show bicycle network and bikeway types utilized (5.2.4.A, p. 322-325).
17. The parking area serving the daycare is located in the first layer. Please revise.
18. Please provide greater detail on the lot/building site for the daycare site. This appears to be a through-lot which is prohibited by the ordinance (4.3.3).
19. Please indicate pedestrian connection with townhomes that enfront a pedestrian path. Please ensure that this connection is with a proposed sidewalk.
20. As reviewed, there has been several waivers requested for setbacks, garage designs, and driveway widths exceeding 10' in first layer. Please coordinate with engineering requiring details of 5' side setbacks and drainage swales.
21. Please indicate the impervious coverage for Development Parcel as a whole, the daycare site, and each typical lot/building site.
22. Please revise pattern book to show conforming interior garage dimensions.

## Building

28. No comment.

## Wastewater

29. All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided.

    **Note:** Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.

## ATT

30. ATT Plans to serve. Contact AT representative regarding connections to the site.

## Maury County Schools

31. Howell Elementary, Cox Middle School, Central High School. Possible rezone to BCHS 24/25SY for 9th/10 grade. See Attached Capacity Numbers. The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, November 7, 2023

**ITEM NO.**
23-0414

**DESCRIPTION:** Annexation request and PUD-R Preliminary Master Development Plan rezoning request for +/-410 acres between Bear Creek and Iron Bridge Road. PUD-R neighborhood to provide a variety of homes including Active Adult/Age restricted area, town homes, and large single-family home lots. PMDP also includes a daycare site and multiple amenities.

**COMMENTS: Supplemental Planning and Engineering comments regarding throughfares and lots.**

## Engineering

1. The appropriate street section for this character district (PUD-R) would be the Urban Neighborhood or Urban Center Street sections. Typically, developments have utilized the Urban Neighborhood Street in residential settings more than the Urban Center Street.
2. The Zoning Ordinance permits the Urban Neighborhood Street across multiple character districts (CD-3, CD-4, CD-4C, PUD-R, etc.), but we have recognized after having the code adopted for roughly 1.5 years, there are some distinct character and use-case differences between CD3 and CD4+ style developments. Staff is working on revisions to the street sections to accommodate these differences in character. The Planning Commission and City Council may consider these proposals in 2024 as part of a larger revision to the Zoning Ordinance. Generally, the proposed development has portions that are somewhat consistent with CD3 and some more similar to CD4. The Assistant City Engineer (in consultation with other Planning and Engineering staff) has provided a markup that highlights the streets where parking would be recommended and the (draft) revised street sections for those character areas.
3. It is the intent and the requirement for throughfare assemblies to have parking on one or both sides in CD4 as well as all more dense/intense character districts. The active adult area, as proposed, does not allow for adequate space between driveways to provide parallel parking. See attached markup.

## Planning

4. As proposed, the Preliminary Master Plan deviates significantly from the bulk and design standards in Table 4.3.1-K and the development standards of Article 5 of the Zoning Ordinance. The deviations are too numerous and pervasive to list out as a technical review. Please revise mix and dimensions of lots to conform, or propose a specific alternative. We understand that you are proposing a customized set of standards to allow a unique plan of development that can't be accomplished under the prescriptive standards of the ordinance. Please identify each deviation in the revised PUD justification letter with an explanation of how the proposed

alternative provides a superior built environment than the character districts of the ordinance. Specifically, the lot widths and driveway prescriptions of the ordinance are calibrated to match the Thoroughfare assemblies in 5.2.2.F and 5.2.2.G-1. The ordinance permits narrower (less than 50’ of width at the frontage line) alley-served lots where the throughfare is designed to accommodate on-street parking. In general, narrow lots (less than 65’ of width at frontage line) correspond to increased public frontage (sidewalks, plantings, parking) and reduced curb cuts. Please revise the plan based on the comments from Engineering and provide a narrative rationale in the revised PUD justification letter that connects deviations from the standards to unique qualities of the proposal (i.e. reduced environmental impact, demographic targeting, public benefits).

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, November 7, 2023

**ITEM NO.**
23-0414

**DESCRIPTION:** Annexation request and PUD-R Preliminary Master Development Plan rezoning request for +/-410 acres between Bear Creek and Iron Bridge Road. PUD-R neighborhood to provide a variety of homes including Active Adult/Age restricted area, town homes, and large single-family home lots. PMDP also includes a daycare site and multiple amenities.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

## Fire

1. Fire hydrants are to be spaced no more than every 500'. There are a few locations that needs attention
2. Alleys are not to be used for access for emergency vehicles. An approved fire apparatus road must be within 150' of all structures. A couple locations that need this corrected.

## Engineering

3. Subject to Construction Plans and Traffic Impact Study.
4. Provide traffic improvement commitment letter with phasing based on improvement identified in the TIS and an overall diagram of all improvements.
5. Provide proposed grading at intervals of not more than 2 feet.
6. Overall grading may not support slab on grade foundations. See detail DD-04.
7. 8% maximum grade on alleys
8. Whenever a proposed street intersects a street with an equal or greater classification, a tangent (measured from the edge of travelled way, or the right-of-way line when determined by the City Engineer, along the centerline of the intersecting street) shall be provided. See ESS Table 3.
9. Cul-de-sac on Street C & O and C & D: Cul-de-sacs shall be located a minimum distance away from the connected roadway as to provide a right-of-way section a minimum of twenty-five (25) feet in length parallel to the centerline of the street between the intersected street and the expansion of the right-of-way for the cul-de-sac with a width matching the roadway cross-section. See ESS detail SD-15.
10. Provide and show lot numbers.
11. Provide stub to the east roughly 340 ft north of intersection of Street A, U, V
12. Provide alley street section. Provide boulevard street section.
13. Alley drainage should be located in the center of the roadway. Inlet spacing generally 150 ft. max. Note alleys will have driveway style aprons when intersecting streets.
14. Minimum horizontal centerline curvature for alleys is 70 ft.

15. TVA may have restrictions on the proposed amenities within Civic Space I
16. Hydrologic analysis and permitting required for bridge over Bear Creek. Preliminary assessment appears to adhere to regulations.
17. Where a proposed public street intersects an arterial roadway, a minimum of seventy-five (75) feet of right-of-way, two hundred fifty (250) feet in length, shall be provided from the edge of the intersected street's right-of-way.
18. Note: Drainage channels within a subdivision providing drainage for the following shall be located on a common or open space lot a minimum of ten (10) feet in width within a dedicated public drainage easement or public right-of-way. 1. Eight (8) or more lots, either in whole or a portion of; 2. Public infrastructure; or 3. An area equivalent to two (2.0) acres.
19. Wetland north of cul-de-sac on Street O appears to be a sinkhole. Additionally, there are other small depressions that will require evaluation. See ESS section 5.4 Storm network is incomplete for the southern portion of the site.
20. Proposed detention areas appear to be smaller than would be required to satisfy water quality and peak rate of runoff requirements.
21. Overall site geotechnical assessment and geotechnical analysis and recommendation of all closed depressions will be required at final master plan and preliminary plat.
22. ROW stub to the western property (Street F) should be set up in a manner to allow for future retrofit into a tee type intersection.
23. Provide justification of the usage of all cul-de-sacs. It appears several could be feasibly connected.
24. Provide ROW dedication 37.5 ft from the centerline of Iron Bridge Rd.
25. Maximum manmade slope 3:1. A few slopes exceed this maximum.
26. Note: All roadways shall meet geometric requirements of the ESS.
27. Proposed street sections are not the typical sections for this particular zoning. Urban Neighborhood Street and the 2 Lane Avenue would generally be appropriate. The proposed section and reduction in ROW width also includes reductions or eliminations of elements such as street trees and on street parking.

## Planning

1. City Planner Kevin McCarthy, AICP and Planner Austin Brass, AICP will jointly prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process, annexation, the PUD justification, development parcel standards, nonresidential uses, thoroughfare assemblies, civic spaces, or technical comments from other reviewers. Please contact abrass@columbiatn.com with questions about lot configurations, façade standards, PUD-R bulk standards, and the mix of residential types. Please copy both case planners on communications related to this request.
2. Due to the size and complexity of this request, the Zoning Administrator requests that this application be reviewed again by the DRC following resubmittal to these comments before advancing to the Planning Commission agenda.
3. Please expand upon the modification of standards listed on page five of the PUD-R justification letter. The list should include **all** requested deviations from the PUD-R

standards at 4.3.1-K, as well as other deviations from standards of the ordinance (e.g. use of cul-de-sacs contrary to 5.2.2.E). For each requested deviation, please explain how the customized standard offers a better built environment to residents of the city of Columbia and/or better implements the Suburban Neighborhood future land use classification than the CD-3L or CD-3 character districts. The revised letter should support an explanation that the public purpose of the standards is satisfied "to equivalent or greater degree" by utilizing the proposed alternative (8.5.21.D; p. 452). Items two and three on the list provided with the application are a good template (i.e. explain the gain in open space from the modification).

4. Please add a projected timeline to phasing plan shown on sheet C1.00. The plan should be sufficiently detailed to provide adjacent property owners of the duration of actual construction activity near their property. The phasing plan should comply with section 8.5.21.F (p. 453). The plan should indicate when Final PUD master plan and subsequent plats are projected (8.5.21.R; p. 461). The phasing plan should indicate if any extension requests are anticipated related to the timing of actual construction under 8.5.21.W (p. 464). The phasing timeline may be provided as a separate document if that is easier to prepare.
5. **Advisory**: The applicant has a separate but related application for the upcoming development review cycle. The other application rezones an adjacent parcel to CD-4 for commercial development. It may be advisable to combine these applications into a single large multi-use PUD at resubmittal (this will require review the Architectural Design Review Team).
6. Please expand upon the Environmental Uniqueness section on page two of the PUD-R justification letter. Please elaborate on the “Commitment to Environmental Stewardship” and explain which strategies could not be utilized under a CD-3 zoning.
7. **Advisory**: Consult with the Assistant City Engineer (Douglas Toney) regarding alternative design for segments of Street A.
8. **Advisory**: Please consult with the Director (Mac Reagan: mreagan@columbiatn.com) and Assistant Director (Alex Troje: atroge@columbiatn.com) of the City of Columbia Parks & Recreation department about composition of Civic Spaces (especially LI.6) and potential public access easement/alignment with Parks & Rec goals for level of service in East Columbia. If there are opportunities for public access/public benefit, please identify these in the revised PUD justification letter.
9. Please revise phasing plan to provide construction of Road A connecting Bear Creek Pike and Iron Bridge Road in the first phase.
10. Please revise to eliminate the cul-de-sacs in phases 3 and 6 per 5.2.2.E (or request as part of PUD deviations with explanation of equivalent public benefit).
11. The zoning ordinance contains contradictions related to PUD-R Civic Space types. Table 4.3.1-K (p. 157) indicates Sport fields are not a permitted Civic Space type in PUD-R. Table 5.3.3-B indicates otherwise. Please add this to the requested deviations and accompanying explanation.
12. Road names will require E-911 approval.

13. 50’ right of way shown on PUD does not conform to Thoroughfare assemblies applicable to PUDs in 5.2.2.G-1. This is addressed in justification letter but please explain why it is necessary throughout the development and why the additional open space is a greater benefit than the omitted elements of the Thoroughfare.
14. Sheet C2.0 indicates a tree save figure. Please provide a tree preservation plan with recent aerial image as described in 4.3.16.L of the zoning ordinance.
15. There appears to be small gaps in the pedestrian shed, please revise.
16. Please revise to show bicycle network and bikeway types utilized (5.2.4.A, p. 322-325).
17. The parking area serving the daycare is located in the first layer. Please revise.
18. Please provide greater detail on the lot/building site for the daycare site. This appears to be a through-lot which is prohibited by the ordinance (4.3.3).
19. Please indicate pedestrian connection with townhomes that enfront a pedestrian path. Please ensure that this connection is with a proposed sidewalk.
20. As reviewed, there has been several waivers requested for setbacks, garage designs, and driveway widths exceeding 10' in first layer. Please coordinate with engineering requiring details of 5' side setbacks and drainage swales.
21. Please indicate the impervious coverage for Development Parcel as a whole, the daycare site, and each typical lot/building site.
22. Please revise pattern book to show conforming interior garage dimensions.

## Building

28. No comment.

## Wastewater

29. All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided.

    **Note:** Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.

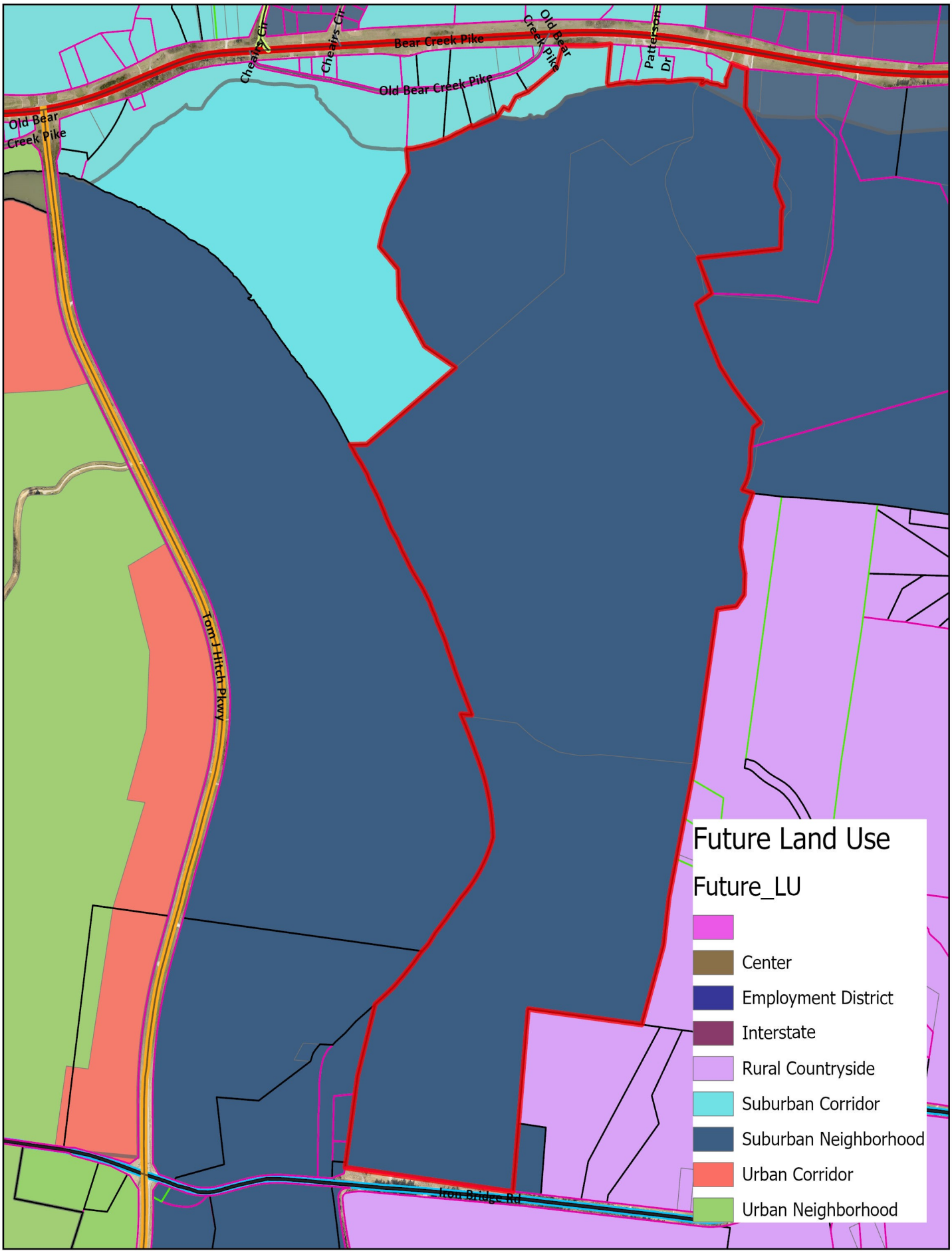
## ATT

30. ATT Plans to serve. Contact AT representative regarding connections to the site.

## Maury County Schools

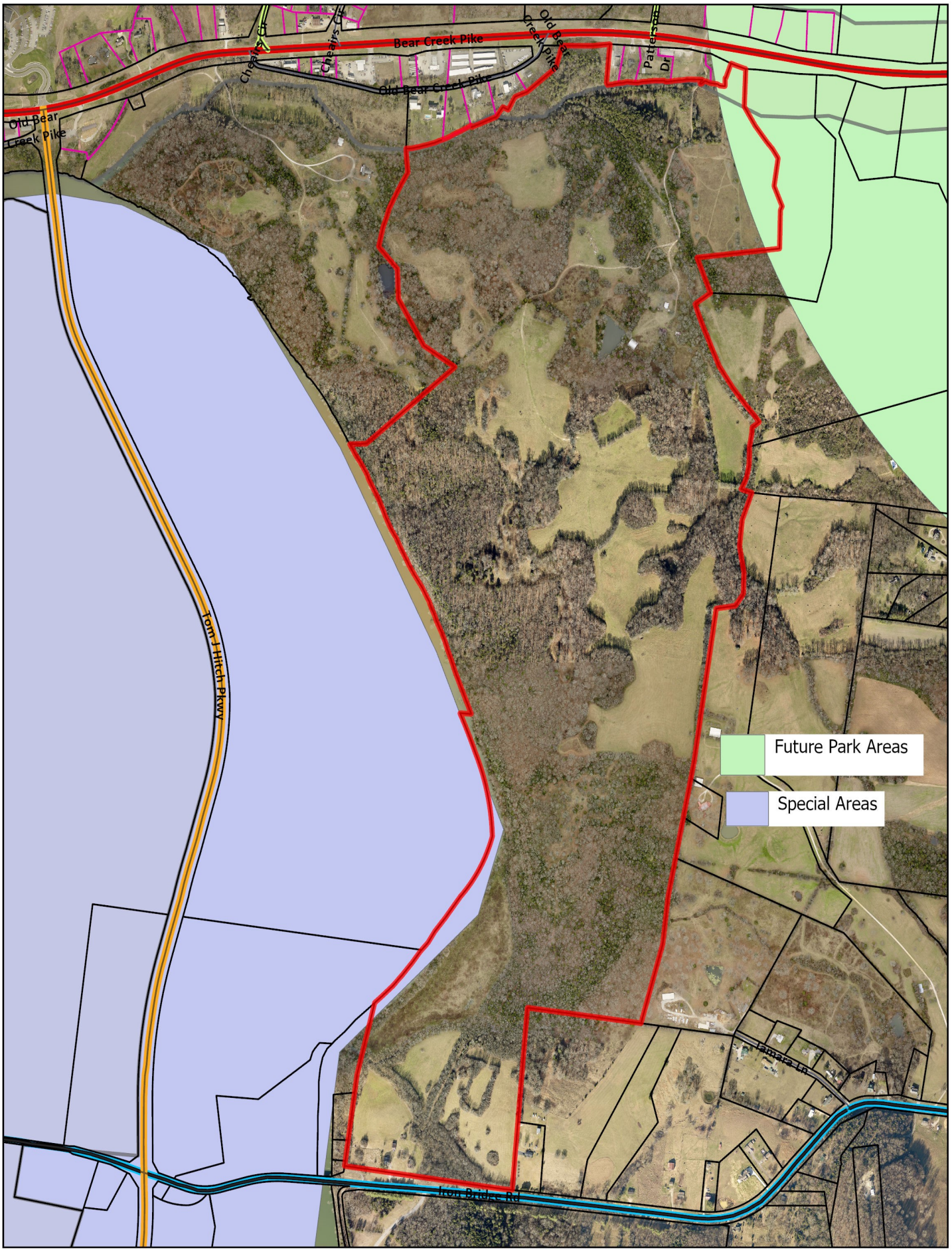
31. Howell Elementary, Cox Middle School, Central High School. Possible rezone to BCHS 24/25SY for 9th/10 grade. See Attached Capacity Numbers. The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.




23-0414
Tax Map 90 Parcel 12.01
Bear Creek Pike/Iron Bridge Rd.

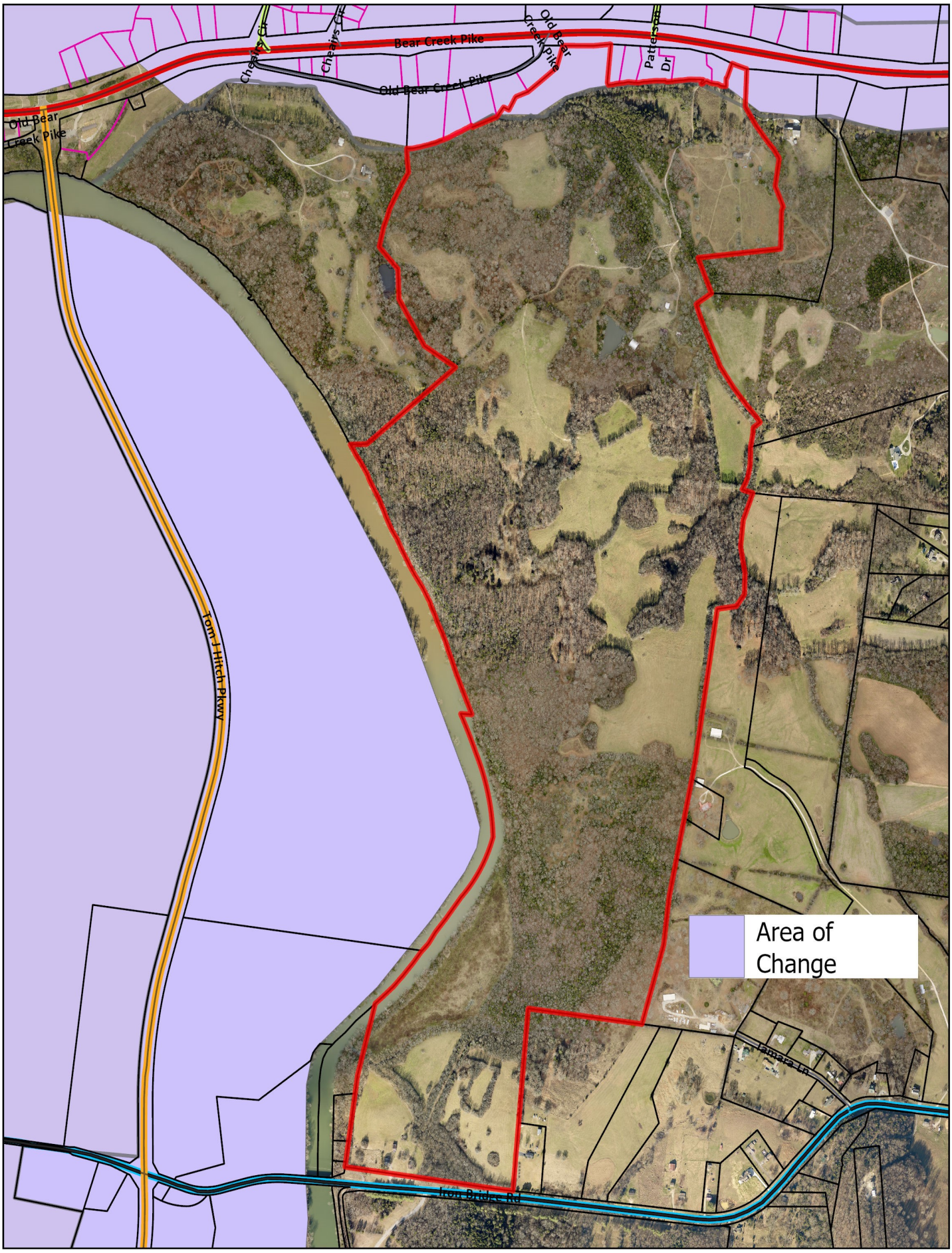
CITY OF COLUMBIA TENNESSEE
DEVELOPMENT SERVICES
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
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CITY OF COLUMBIA TENNESSEE

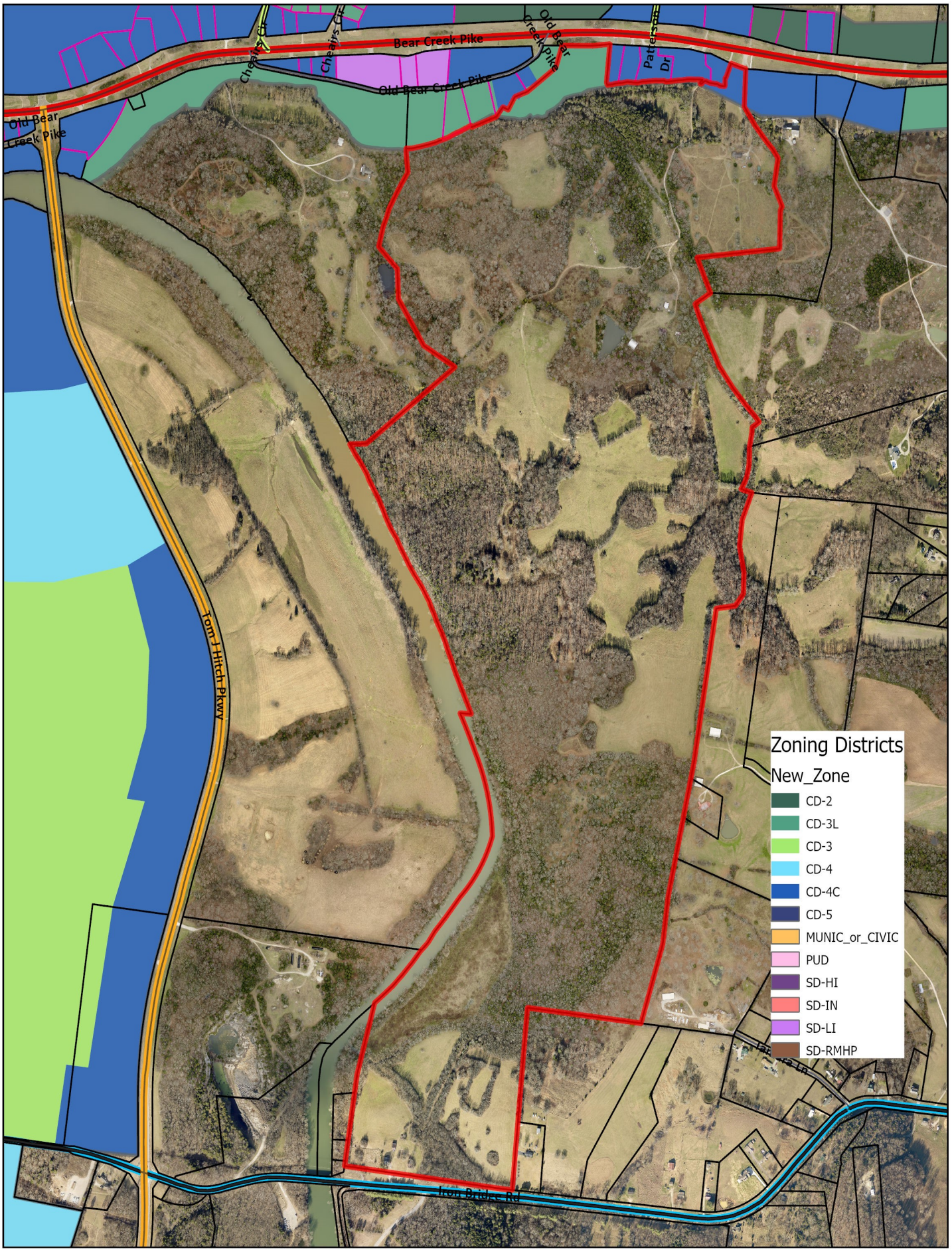
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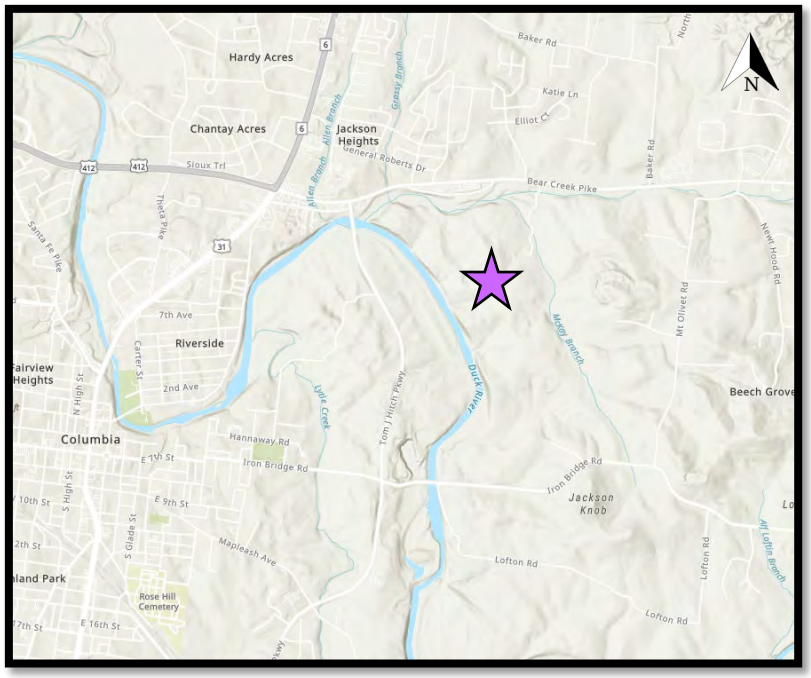
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# COLUMBIA BLUFFS

## Traffic Impact Study

10/16/2023




Vicinity Map
(Not to Scale)

400 BEAR CREEK PIKE
COLUMBIA, TENNESSEE

Prepared For:
**KOLTER GROUP ACQUISITIONS LLC**

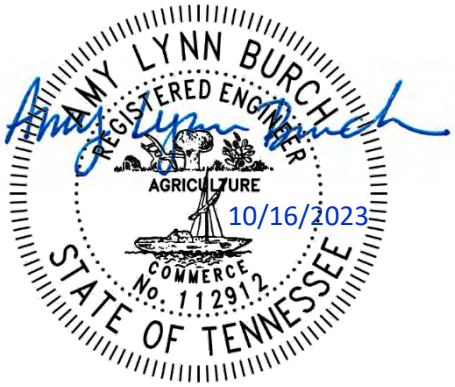

BURCH TRANSPORTATION

1114 17th Ave S, Suite 103 ● Nashville, TN 37212
(615) 258-8551 ● www.burchtransportation.com

# COLUMBIA BLUFFS
# TRAFFIC IMPACT STUDY

PREPARED FOR:

KOLTER GROUP ACQUISITIONS LLC




PREPARED BY:

BURCH TRANSPORTATION, LLC

BURCH TRANSPORTATION

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# 1. Executive Summary

*A TIS for the site (previously named "Big Bear Bluff Master Plan") was submitted 3/21/2022 and revised 4/18/2022. The previous development plan included a total of 810 single-family lots, 300 townhomes, and 300 multifamily units.*

The Columbia Bluffs development is proposed to be located between Bear Creek Pike and Iron Bridge Road, east of the Duck River in Columbia, TN. A total of 860 dwelling units (472 single-family lots, 188 townhome units, and 200 active adult units) and a 14,000 square-foot day care center are proposed for the 412-acre property. The property is currently undeveloped farmland that is proposed to be annexed as a planned unit development (PUD). Primary vehicular site access will be located on Bear Creek Pike aligned with Patterson Drive. Secondary vehicular site access will be located on Iron Bridge Road. A development of this size will be constructed over several phases. For the purposes of this traffic study, two development scenarios were analyzed. Per the developer, Kolter Group Acquisitions LLC, Phases 1-3 are expected to be completed in approximately eight years, which corresponds to a 2031 horizon year. The Full Buildout (Phases 1-6) is expected to be completed in approximately eleven years, which corresponds to a 2034 horizon year. The new roadway connection to Iron Bridge Road to the south is not planned to be constructed until after Phase 3.

The analyses presented in this report indicate that the proposed development will generate new vehicular traffic to the study area. Following Full Buildout of the Columbia Bluffs development, the project is expected to generate approximately 7,324 daily trips, 658 AM peak hour trips, and 768 PM peak hour trips. Phases 1-3 of the development will include approximately 50% of the total number of dwelling units and will include the day care center. Phases 1-3 are expected to generate approximately 4,149 daily trips, 399 AM peak hour trips, and 475 PM peak hour trips.

Based on the analyses presented in this study and review of the study area and proposed development information, the following is recommended in order to accommodate the proposed development and provide for efficient traffic operations and safety:

**Recommendations Associated with Phases 1-3 Scenario**

The initial phases of development will require off-site improvements and as well as improvements to accommodate the primary access onto Bear Creek Pike. The following improvements should be coordinated with the City and could be phased in during construction of Phases 1, 2, and 3 of the development.

<u>#1 Nashville Highway (US 31) and Bear Creek Pike/US 43</u>

Laneage and traffic signal improvements are expected to be completed by the City/TDOT at the intersection of Nashville Highway (US 31) and Bear Creek Pike/US 43. These anticipated improvements were assumed to include the addition of a westbound left turn lane and a southbound left turn lane through restriping and modifying the existing median on Nashville Highway. The provision of dual left turn lanes requires protected only left turn signal phasing for the southbound approach. Additional signal timing adjustments and coordination may be needed for the intersection following the initial phases of development for Columbia Bluffs. Additionally, lead/lag protected only left turn signal phasing is recommended for the eastbound and westbound approaches of Bear Creek Pike.

No other improvements are recommended for the intersection.

#2 Bear Creek Pike and Tom J Hitch Parkway

- Construct a northbound right turn lane on Tom J Hitch Parkway with approximately 100 feet of storage and 60 feet of taper. The northbound right turn lane could be constructed using the existing shoulder and should not extend beyond the start of the bridge over Duck River.
- Restripe the northbound approach to provide one left turn lane and one through lane, plus the recommended right turn lane.
- Modify the traffic signal design to provide a northbound right turn overlap during the westbound left turn phase.
- Optimize and coordinate the signal timing along Bear Creek Pike.

#3 Bear Creek Pike and Patterson Drive/Site Access 1

- Site Access 1 should be constructed and aligned with Patterson Drive at Bear Creek Pike.
- Site Access 1 should be designed to include width for one entering lane and two exiting lanes, which should be a northbound left turn lane and a northbound shared through/right turn lane.
- An eastbound right turn deceleration lane should be constructed for Bear Creek Drive at Site Access 1 to accommodate the project traffic. The eastbound right turn lane should be designed so that the widening and taper does not begin until east of the guardrail over Bear Creek and includes approximately 180 feet of storage and 160 feet of bay taper, or as approved by the City and TDOT.
- A westbound right turn deceleration lane is recommended for Bear Creek Pike at Patterson Drive. The westbound right turn lane should be designed to include approximately 160 feet of storage and 180 feet of bay taper or as approved by the City and TDOT.
- A westbound left turn deceleration lane is recommended for Bear Creek Pike at Site Access 1 to accommodate the project traffic. The westbound left turn lane should be designed to include approximately 225 feet of storage, 180 feet of bay taper, and 270 feet of approach taper assuming the widening is centered on the roadway.
- Install a traffic signal at the intersection of Bear Creek Pike and Patterson Drive/Site Access 1. Signal warrant analyses indicate a traffic signal will be warranted by the traffic volumes generated by the project site prior to completion of Phase 2 (or comparable number of dwelling units) or prior to completion of Phase 1 if Phase 1 includes completion of the day care center. The signal design should include protected/permissive left turn signal phasing for the northbound and westbound approaches and permissive left turn signal phasing for the southbound and eastbound approaches.
- Optimize and coordinate the signal timing along Bear Creek Pike.
- Widen the north leg of Patterson Drive to provide a southbound left turn lane. The widening of Patterson Drive and the construction of Site Access 1 should be designed and constructed such that the northbound and southbound through movements are aligned and the left turn movements can operate concurrently. The southbound left turn lane should include approximately 75 feet of storage.

#4 Bear Creek Pike and Mt Olivet Road/School Access

- Restripe the southbound approach to a shared left turn/through lane and a right turn only lane.
- Modify the traffic signal design for the northbound approach to provide protected/permissive left turn signal phasing.
- Modify the traffic signal design for the southbound approach to provide a right turn overlap during the eastbound left turn phase.

- Optimize and coordinate the signal timing along Bear Creek Pike.

#5 Tom J Hitch Parkway and Iron Bridge Road

The signalized intersection of Tom J Hitch Parkway and Iron Bridge Road is expected to continue to operate acceptably under the future projected conditions.

No improvements are expected to be needed or recommended for the intersection of Tom J Hitch Parkway and Iron Bridge Road.

#6 Iron Bridge Road and Mt Olivet Road

The critical turning movements are expected to continue to operate acceptably at the one-way stop-controlled intersection of Iron Bridge Road and Mt Olivet Road under the future projected conditions.

No improvements are expected to be needed or recommended for the intersection of Iron Bridge Road and Mt Olivet Road.

#7 James Campbell Boulevard and Tom J Hitch Parkway

Tom J Hitch Parkway terminates to the south at James Campbell Boulevard. The T-intersection currently has stop-control for the southbound approach of Tom J Hitch Parkway. The intersection experiences heavy eastbound left turns and the reciprocal southbound right turns during peak hours. The southbound left turn movement currently operates at LOS F during the AM and PM peak hours and is expected to deteriorate with higher levels of delay under the 2031 Background and 2034 Future Projected Conditions with Phases 1-3. According to the City's *Connect Columbia Transportation Plan* adopted in 2018, the intersection is identified to be signalized in the near term (10-year horizon). Preliminary signal warrant analyses indicate the intersection's traffic volumes will meet signal warrants in the near future. The following intersection improvements are recommended to be constructed prior the completion of Phase 3, or comparable number of dwelling units:

- Install a traffic signal at the intersection of James Campbell Boulevard and Tom J Hitch Parkway.
- The traffic signal design should include protected/permissive left turn signal phasing for the eastbound approach and a southbound right turn overlap.

**Recommendations Associated with Full Buildout (Phases 1-6) Scenario**

As outlined above, the initial phases of development for the Columbia Bluffs project will require fairly significant improvements at many of the study intersections in order to accommodate the project's traffic plus the background traffic growth expected even without the development project's construction. In addition to the recommended improvements associated with Phases 1-3 of the development, the following is recommended for the Full Buildout Scenario:

#8 Iron Bridge Road and Site Access 2

- Site Access 2 should be constructed and connected to Iron Bridge Road prior to beginning construction for Phase 4, or comparable number of dwelling units.
- Site Access 2 should be aligned with the Maury County Yanahli Park Access on Iron Bridge Road.
- At a minimum, Site Access 2 should be designed to include width for one entering lane and one exiting lane.

- Stop-control should be provided for the southbound approach of Site Access 2 at Iron Bridge Road.
- The Site Access 2 should be designed and constructed to allow for sufficient intersection sight distance, clear of any obstructions such as vegetation, landscaping, hardscaping, signs, and fencing within the departure sight triangles.
- An eastbound left turn deceleration lane is recommended for Iron Bridge Road at Site Access 2 to accommodate the project traffic. The eastbound left turn lane should be designed to include approximately 160 feet of storage, 180 feet of bay taper, and 270 feet of approach taper assuming the widening is centered on the roadway, or as approved by the City.

**Additional Planned Improvements**

According to the City's *Connect Columbia Transportation Plan*, significant roadway improvements have been identified for some of the intersections and roadways in the study area. However, it is important to note that the improvements are not considered to be committed projects until funding has been allocated.

- In the near term, Bear Creek Pike between Nashville Highway and Tom J Hitch Parkway is planned to be widened from 3 lanes to 5 lanes and access management along the segment.
- In the midterm, Iron Bridge Road is planned to be reconstructed to improve the substandard roadway geometry between Fairview Drive and Tom J Hitch Parkway, which would include replacing the bridge/box culvert over Lytle Creek, which currently narrows the roadway to one lane at a sag vertical crest in the roadway.
- In the long-term, Bear Creek Pike is planned to be widened to four lanes between Tom J Hitch Parkway and east of Baker Road. It should be noted that the deceleration lanes recommended for Bear Creek Pike at Site Access 1/Patterson Drive as part of the initial phases of the Columbia Bluffs development will contribute towards this long-term improvement identified along Bear Creek Pike.

<u>#2 Bear Creek Pike and Tom J Hitch Parkway</u>

With the planned widening of Bear Creek Pike between Nashville Highway and Tom J Hitch Parkway, the following improvements should be made:

- Reassign the northbound laneage for Tom J Hitch Parkway to provide one left turn lane, one shared left turn/through lane, and one right turn lane.
- Modify the traffic signal to provide split signal phasing for the northbound and southbound approaches.

Based on the analyses presented in this report, no further improvements are recommended in association with the proposed Columbia Bluffs development in Columbia, TN. The recommended and future laneage at the study intersections is presented in Figure 9. Conceptual layouts of the recommended improvements are presented in Figures 10A-10D.

The analyses presented in this TIS evaluated two future buildout scenarios in order to determine when specific roadway improvements will need to be made. The above recommendations are presented in terms of residential phases of development as currently anticipated by Kolter; however, it is recognized that the actual construction of dwelling units for a development this size often does not occur as initially planned. Therefore, based on the analyses, the recommended improvements above were associated with

unit count occupancy to identify trigger points for when each should be constructed by the developer or others. The Table in Appendix K presents the phasing for the recommended improvements by dwelling unit count.

# 2. Introduction

The Columbia Bluffs development is proposed to be located at 400 Bear Creek Pike in Columbia, TN. The property is proposed to be annexed into the City of Columbia as a Planned Unit Development (PUD). The property is approximately 412 acres and is currently described as undeveloped, rural farmland. The project site is bound on the north by Bear Creek Pike, on the south by Iron Bridge Road, on the west by Duck River, and on the east by rural farmland and residential land uses.

According to the concept plan prepared by Gamble Design Collaborative, the project's developer Kolter Group Acquisitions LLC proposes approximately 860 total dwelling units (472 single-family lots, 188 townhome units, and 200 active adult units) and a 14,000 square-foot day care center. The development will be internally connected by a street network. Primary vehicular access (Site Access 1) will be provided at the northern end of the property onto Bear Creek Pike at its existing intersection with Patterson Drive. Secondary vehicular access (Site Access 2) will be provided at the southern end of the property onto Iron Bridge Road at its existing intersection with Maury County's Yanahli Park Entrance.

The project will be constructed over several phases and approximately eleven (11) years. Table 1 below presents the anticipated phasing buildout for the Columbia Bluffs development. Phases 1-3 are expected to be completed by 2031, and Phases 4-6 are expected to be completed by 2034. The day care center is expected to be built in the beginning of Phase 4; conservatively, the day care center was included in Phases 1-3 as it will be complete before full buildout. This phasing plan is an estimate for the purpose of preparing a traffic study for the development plan. The phasing and unit count is subject to change based on the market demand and actual construction schedules.

*Table 1: Development Program and Phasing Estimate*

| Phase | Estimated Completion | Density by Land Use & Phase (Dwelling Units) | | | |
|---|---|---|---|---|---|
| | | Single Family | Townhome | Active Adult | Total Units |
| 1 | 2028 | 78 | 31 | 33 | 142 |
| 2 | 2029 | 78 | 31 | 33 | 142 |
| 3 | 2031 | 79 | 31 | 33 | 143 |
| 4 | 2032 | 79 | 31 | 33 | 143 |
| 5 | 2033 | 79 | 31 | 34 | 144 |
| 6 | 2034 | 79 | 33 | 34 | 146 |
| **Total** | **2034** | **472** | **188** | **200** | **860** |

Note: Phasing is presented above for planning purposes and is subject to change.

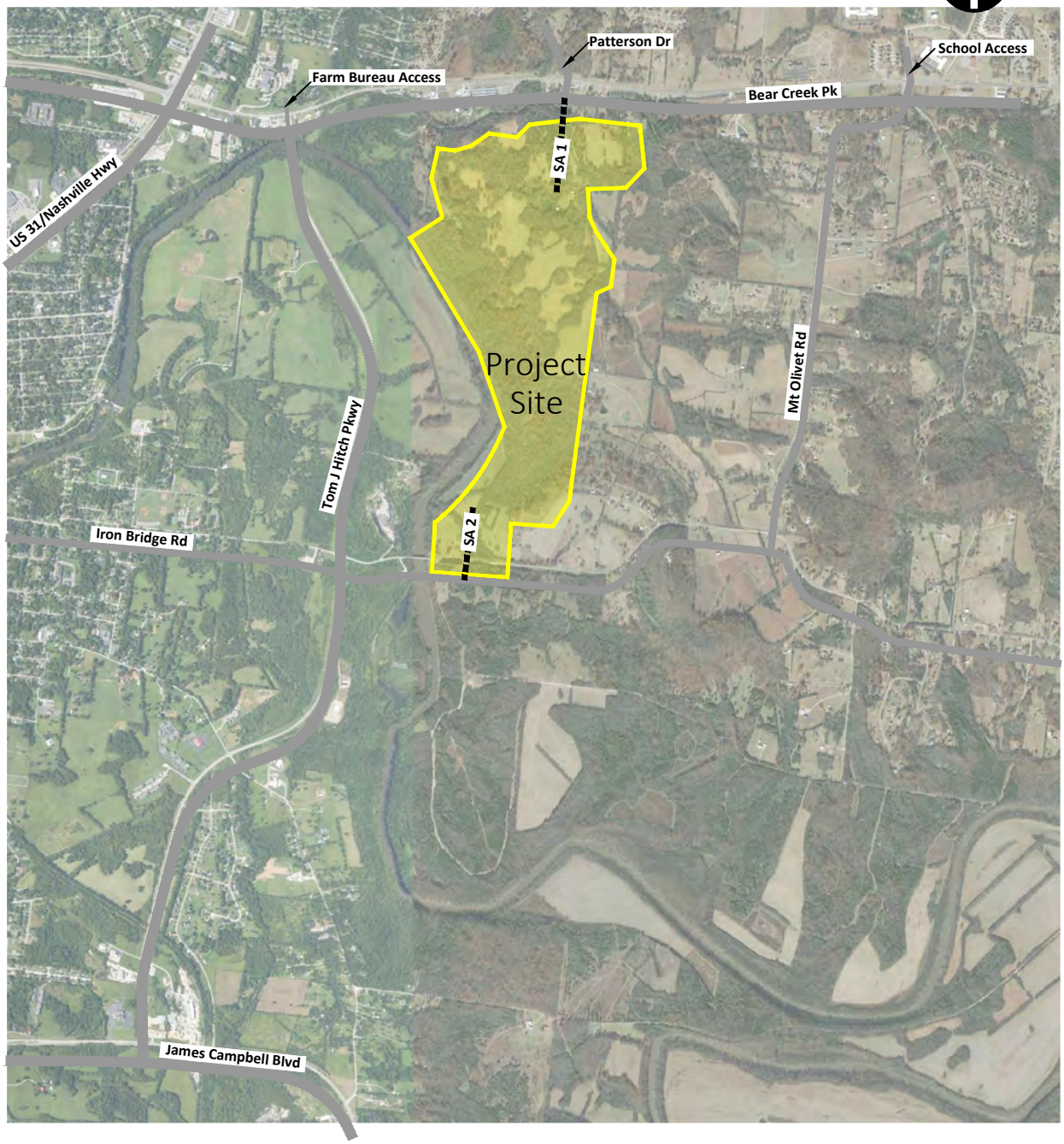
According to Kolter Group Acquisitions LLC, the construction and phasing will begin at the north end of the project site and work towards the south. The connection to Iron Bridge Road is not planned to be constructed until the beginning of Phase 4. Therefore, the following two (2) development scenarios were evaluated in this traffic impact study (TIS):

- 2031 Future Projected (Phases 1-3) plus the daycare without connection to Iron Bridge Road
- 2034 Future Projected (Full Buildout of Phases 1-6) with connection to Iron Bridge Road

The project site location is presented in Figure 1. The site plan concept is included in Appendix A for reference. However, it should be noted that the current site plan is a concept. The intention of this traffic impact study (TIS) is to identify the amount of traffic expected to be generated by the proposed development and evaluate its impact on the surrounding roadways and intersections. The TIS will also

identify appropriate improvements necessary to accommodate the project's vehicular traffic. At the outset of preparing this TIS, Burch Transportation coordinated the scope with the City of Columbia and its third-party traffic engineer. The executed MOU for the TIS is included in Appendix B.

Figure 1: Project Site Location




(Not to Scale)

# 3. Existing Conditions

The project site is served by Bear Creek Pike, Tom J Hitch Parkway, Nashville Highway (US 31S), Iron Bridge Road, Patterson Drive, and Mt Olivet Road. The following provides a description of the roadways and intersections within the study area and the existing traffic data.

## 3.1 Roadway Descriptions



***Looking East on Bear Creek Pike***
***East of Cheairs Circle***

**Bear Creek Pike** is categorized as a principal arterial according to the Tennessee Department of Transportation's (TDOT) Functional Classification System. The land uses along Bear Creek Pike near the project site are a mix of residential, light commercial, and institutional. Adjacent to the project site, Bear Creek Pike is a two-lane highway that generally travels in an east/west direction. West of the project site, Bear Creek Pike includes a 3-lane section with one lane in each direction and a center two-way left turn lane. Bear Creek Pike provides connection to Interstate 65 to the east and the Nashville Highway (US 31 S) to the west. Bear Creek Pike has 12-foot lanes and 10-foot paved shoulders with edgeline rumble strips. The posted speed limit on Bear Creek Pike in the vicinity of the project site is 45 mph.



***Looking North on Tom J Hitch Parkway***
***North of Iron Bridge Road***

**Tom J Hitch Parkway** is categorized as a major collector according to TDOT's Functional Classification System. Tom J Hitch Parkway provides connection to Bear Creek Parkway to the north and James Campbell Boulevard to the south. The land uses along Tom J Hitch Parkway are primarily residential and institutional uses. Tom J Hitch Parkway includes one 12-foot travel lane in each direction with 6-foot paved shoulders. The posted speed limit on Tom J Hitch Parkway is 50 mph. Tom J Hitch Parkway crosses over the Duck River approximately 250 feet south of Bear Creek Pike.

**Nashville Highway (US 31S)** is categorized as a principal arterial by TDOT. The land uses along Nashville Highway are a mix of commercial and industrial/manufacturing uses. Nashville Highway generally travels in a north/south direction, providing connection between the City of Columbia to the south and the City of Spring Hill to the north. Nashville Highway includes two travel lanes in each direction with a median. Turn lanes are generally provided at intersections. The posted speed limit on Nashville Highway is 45 mph in the study area.




***Looking North on Nashville Highway***
***North of Bear Creek Pike***

**Iron Bridge Road** is categorized as a major collector by TDOT. The land uses along Iron Bridge Road are a mix of residential and agricultural uses. Iron Bridge Road generally travels in an east/west direction, providing connection between downtown Columbia to the west and Marshall County to the east. Iron Bridge Road crosses the Duck River just west of the project site. Iron Bridge Road includes one travel lane in each direction. The posted speed limit on Iron Bridge Road is 45 mph in the study area and adjacent to the project site.



***Looking West on Iron Bridge Road***
***West of Mt Olivet Road***

**Patterson Drive** is not categorized by TDOT; and therefore, considered a local roadway. The land uses along Patterson Drive are residential. Patterson Drive generally travels in a north/south direction, connecting a neighborhood to Bear Creek Pike. Patterson Drive includes one travel lane in each direction and no shoulders. Patterson Drive has centerline pavement markings. The posted speed limit on Patterson Drive is 25 mph just north of Bear Creek Pike and then changes to 35 mph further north. There are no sidewalks along Patterson Drive.



***Looking North on Patterson Drive***
***North of Bear Creek Pike***

**Mt Olivet Road** is not categorized by TDOT; and therefore, considered a local roadway. The land uses along Mt Olivet Road are primarily large-lot residential. Mt Olivet Road generally travels in a north/south direction, providing connection between Bear Creek Pike to the north and Iron Bridge Road to the south. Mt Olivet Road crosses over Bear Creek approximately 200 feet south of the Bear Creek Pike. Mt Olivet Road includes one travel lane in each direction and no shoulders. Mt Olivet Road has centerline and edgeline pavement markings. The posted speed limit on Mt Olivet Road is 45 mph.



***Looking North on Mt Olivet Road North of Iron Bridge Road***

## 3.2 Intersection Descriptions

The following seven (7) intersections were studied in this analysis:

- Nashville Highway and Bear Creek Pike (Signal)
- Bear Creek Pike and Tom J Hitch Parkway (Signal)
- Bear Creek Pike and Patterson Drive (One-Way Stop)
- Bear Creek Pike and Mt Olivet Road (Signal)
- Tom J Hitch Parkway and Iron Bridge Road (Signal)
- Iron Bridge Road and Mt Olivet Road (One-Way Stop)
- James Campbell Boulevard and Tom J Hitch Parkway (One-Way Stop)

The intersection of **Nashville Highway/US 43 and Bear Creek Pike** is signalized with four approaches. The northbound approach of Nashville Highway includes one left turn lane with approximately 200 feet of storage, two through lanes, and one channelized right turn lane with approximately 600 feet of storage and with yield control. The southbound approach of Nashville Highway includes one left turn lane with approximately 165 feet of storage, two through lanes, and one channelized right turn lane with approximately 540 feet of storage and with yield-control. The westbound approach of Bear Creek Pike includes one left turn lane with approximately 375 feet of storage, one through lane, and one shared through/right turn lane with right turn channelization and yield-control. The eastbound approach of US 43 includes two left turn lanes with approximately 250 feet of storage, one through lane, and one shared through/right turn lane with right turn channelization and free flow. Split signal phasing is provided for the eastbound and westbound approaches. Protected/permissive left turn signal phasing is provided for the northbound and southbound approaches. Pedestrian crosswalks and signals are not provided at the intersection. Sidewalk and curb ramps are not provided at the intersection. According to the City, a study and design is underway to improve operation and safety at the intersection; however, details of the improvements are not available. For the background and projected analyses, it was assumed that a second left turn lane would be constructed within the existing medians for the southbound and westbound approaches, a westbound right turn lane would be constructed, as well as signal modification to accommodate the additional laneage.

The intersection of **Bear Creek Pike and Tom J Hitch Parkway/Farm Bureau Access** is signalized with four approaches. The eastbound approach of Bear Creek Pike includes one left turn lane with approximately 130 feet of storage and one shared through/right turn lane. The westbound approach of Bear Creek Pike includes one left turn lane with approximately 150 feet of dedicated storage within the center two-way left turn lane, one through lane, and one right turn lane with approximately 90 feet of storage. The northbound approach of Tom J Hitch Parkway includes one left turn lane with approximately 95 feet of storage and one shared through/right turn lane. The southbound approach of the Farm Bureau Access includes one left turn lane with approximately 60 feet of storage, one through lane, and one right turn lane with approximately 60 feet of storage. Protected/permissive left turn signal phasing is provided for all approaches. Pedestrian crosswalks and signals are not provided at the intersection. Sidewalk and curb ramps are not provided at the intersection.

The intersection of **Bear Creek Pike and Patterson Drive** is unsignalized with three approaches. The eastbound approach of Bear Creek Pike includes one left turn deceleration lane with approximately 200 feet of storage and one through lane. The westbound approach of Bear Creek Pike includes one shared through/right turn lane. The southbound approach of Patterson Drive is stop-controlled and includes one shared lane for left turn and right turn movements. The primary access for the project site (Site Access 1) is planned to align with Patterson Drive and will form the fourth leg of the intersection. No pedestrian facilities are provided for the intersection.

The intersection of **Bear Creek Pike and Mt Olivet Road/School Access** is signalized with four approaches. The eastbound approach of Bear Creek Pike includes one left turn lane with approximately 250 feet of storage and one shared through/right turn lane. The westbound approach of Bear Creek Pike includes one left turn lane with approximately 180 feet of storage and one shared through/right turn lane. The northbound approach of Mt Olivet Road includes one left turn lane with approximately 65 feet of storage and one shared through/right turn lane. The north leg of the intersection is formed by the School Access, which provides access to Howell Elementary School and E A Cox Middle School. The southbound approach of the School Access includes one left turn lane and one shared through/right turn lane. Protected/permissive left turn signal phasing is provided for the eastbound and westbound approaches of Bear Creek Pike. Permissive signal phasing is provided for the northbound and southbound approaches. Pedestrian crosswalks and signals are not provided at the intersection.

The intersection of **Tom J Hitch Parkway and Iron Bridge Road** is a signalized intersection with four approaches. The northbound approach of Tom J Hitch Parkway includes one left turn lane with approximately 105 feet of storage, one through lane, and one right turn lane with approximately 145 feet of storage. The southbound approach of Tom J Hitch Parkway includes a left turn lane with approximately 205 feet of storage, one through lane, and one right turn lane with approximately 120 feet of storage. The eastbound approach of Iron Bridge Road includes one left turn lane with approximately 120 feet of storage and one shared through/right turn lane. The westbound approach of Iron Bridge Road includes one left turn lane with approximately 140 feet of storage and one shared through/right turn lane. Protected/permissive left turn signal phasing is provided for the northbound and southbound approaches of Tom J Hitch Parkway. Permissive signal phasing is provided for the eastbound and westbound approaches of Iron Bridge Road. Pedestrian crosswalks and signals are not provided at the intersection.

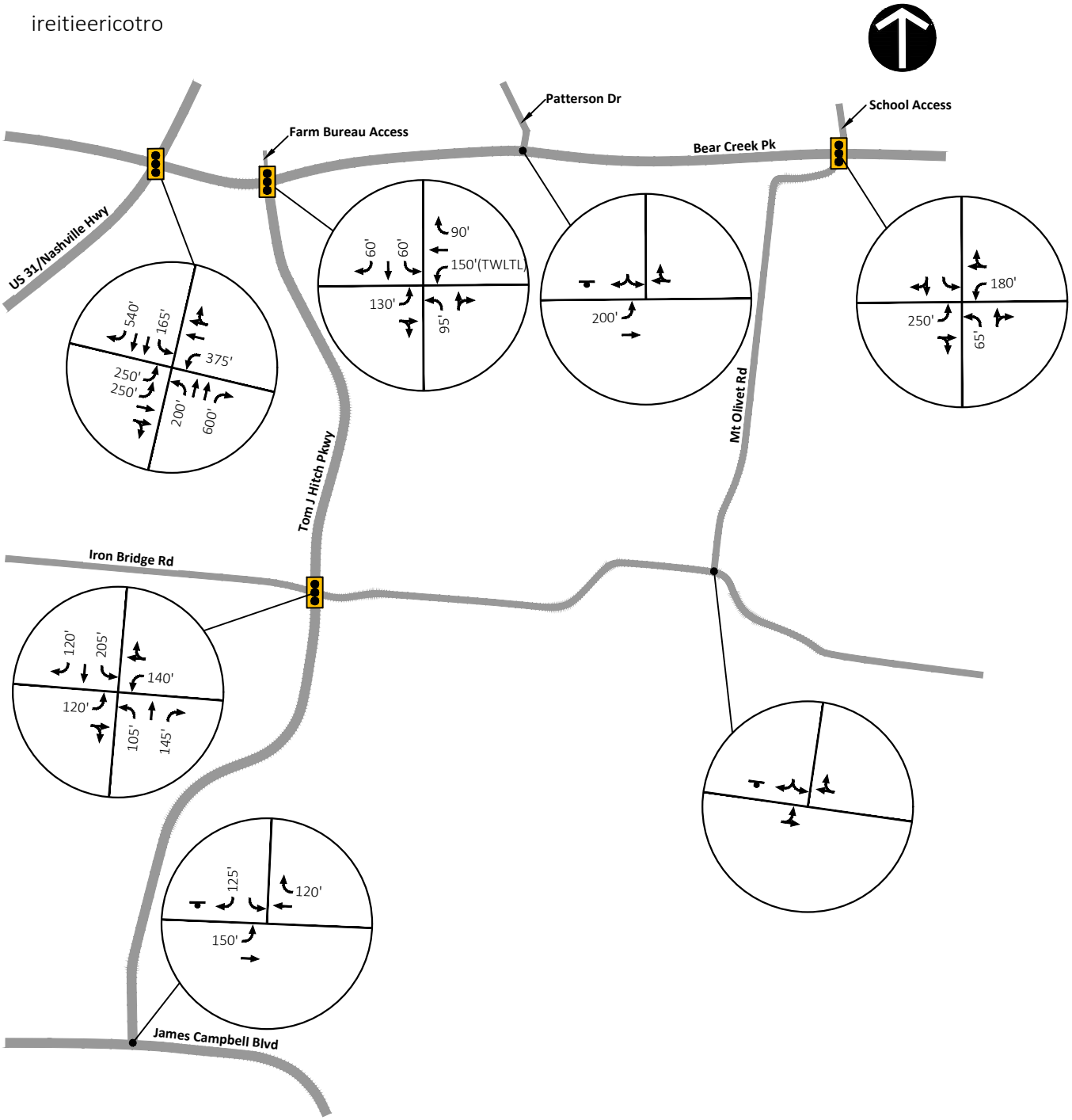
The intersection of **Iron Bridge Road and Mt Olivet Road** is unsignalized with three approaches. The eastbound approach of Iron Bridge Road includes one shared lane for left turn and through movements. The westbound approach of Iron Bridge Road includes one shared lane for through and right turn

movements. The southbound approach of Mt Olivet Road is stop-controlled and includes one shared lane for left turn and right turn movements. No pedestrian facilities are provided for the intersection.

The intersection of **James Campbell Boulevard and Tom J Hitch Parkway** is unsignalized with three approaches. The eastbound approach of James Campbell Boulevard includes one left turn deceleration lane with approximately 150 feet of storage and one through lane. The westbound approach of James Campbell Boulevard includes one through lane and one right turn deceleration lane with 120 feet of storage. The southbound approach of Tom J Hitch Parkway is stop-controlled and includes one left turn lane and one right turn lane with 125 feet of storage. No pedestrian facilities are provided for the intersection.

Figure 2 presents the intersection laneage and traffic control for the existing conditions.

ireitieericotro




Legend:

→ Existing Laneage

XXX' Storage Length (feet)

TWLTL Two-way Left-Turn Lane

Stcotro

ri

ottoSce

## 3.3 Existing Traffic Volumes

*As previously mentioned, a TIS for the site (previously named "Big Bear Bluff Master Plan") was submitted on 4/18/2022. A comparison of the turning movement count data from the original 2022 TIS to the data from the 2023 Dollar General TIS (provided by the City of Columbia) showed comparable traffic data, with the exception of the new Farm Bureau bank driveway movements. Per prior coordination with the City, this TIS utilizes the existing traffic data from the original 2022 TIS, with the addition of the bank traffic volumes from the 2023 Dollar General TIS, as the 2023 existing traffic volumes.*

Existing traffic data for the study area roadways were obtained from the Tennessee Department of Transportation (TDOT). The 2022 Annual Average Daily Traffic (AADT) for the study area roadways are presented in Figure 3. The data represents 2022 AADT (vehicles per day) at the count stations. A historical comparison of 2019, 2020, and 2021 data shows that the 2021 daily traffic volumes on the study area roadways had just about returned to pre-pandemic levels. The TDOT count station data is included in Appendix C.

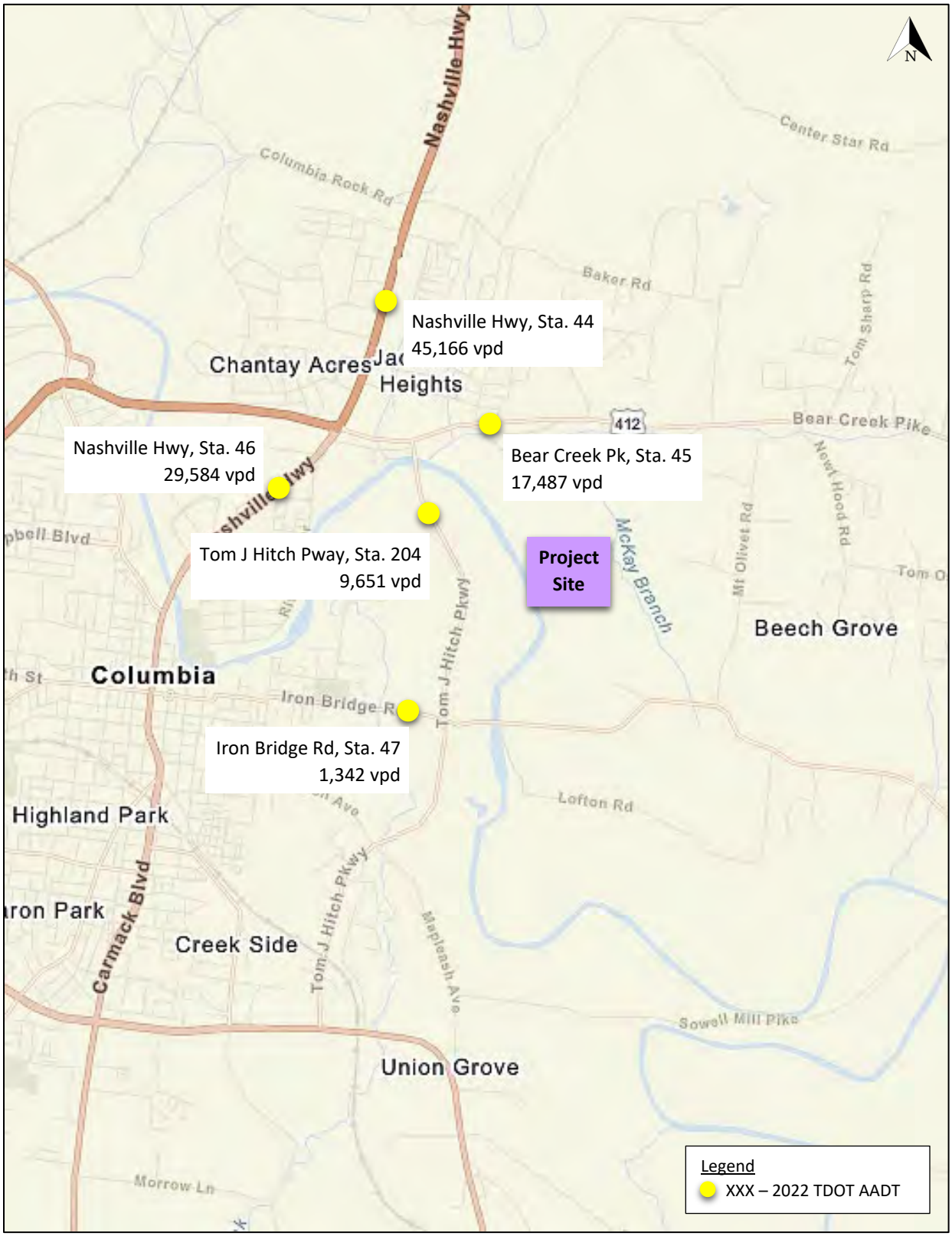
Turning movement count data conducted for the study intersections in May 2021 by Marr Traffic were obtained from a TIS prepared by Ragan-Smith for the same project site. Although the AADT comparison appears to show that traffic volumes in the study area have normalized, a peak hour comparison of the traffic data collected on Bear Creek Pike and Tom J Hitch Parkway in 2021 indicates that the AM peak hour traffic was approximately 7%-8% less than the 2019 data prior to the COVID-19 Pandemic. Therefore a 1.08 factor was applied to the 2021 turning movement counts for the AM peak hour. The same comparison for the PM peak hour traffic showed that the 2021 data was higher than the 2019 PM peak hour traffic. Therefore, no factor was applied to the PM peak hour turning movements at the study intersections. Due to the distance and intersecting driveways and intersections between the study intersections, the turning movement counts were not balanced between intersections.

Since the turning movement count data was collected in May 2021, the Farm Bureau Insurance office access was relocated. The new, relocated driveway forms the fourth leg of the intersection of Bear Creek Pike and Tom J Hitch Parkway. The intersection of Bear Creek Pike and Tom J Hitch Parkway/Farm Bureau Access was analyzed in the Dollar General Traffic Impact Study prepared by Fischbach Transportation Group in March 2023, and the turning movement counts for this study were collected in February 2023. The AM and PM peak hour traffic turning into and out of the relocated access provided in the Dollar General TIS is utilized in this TIS as current 2023 data and is carried through the roadway network.

In addition, the intersection of Tom J Hitch Parkway and Iron Bridge Road has been signalized since the turning movement count data was collected at the intersection in May 2021. Therefore, new turning movement counts were collected at the signalized intersection on Tuesday, August 22, 2023, while Maury County Schools were in session.

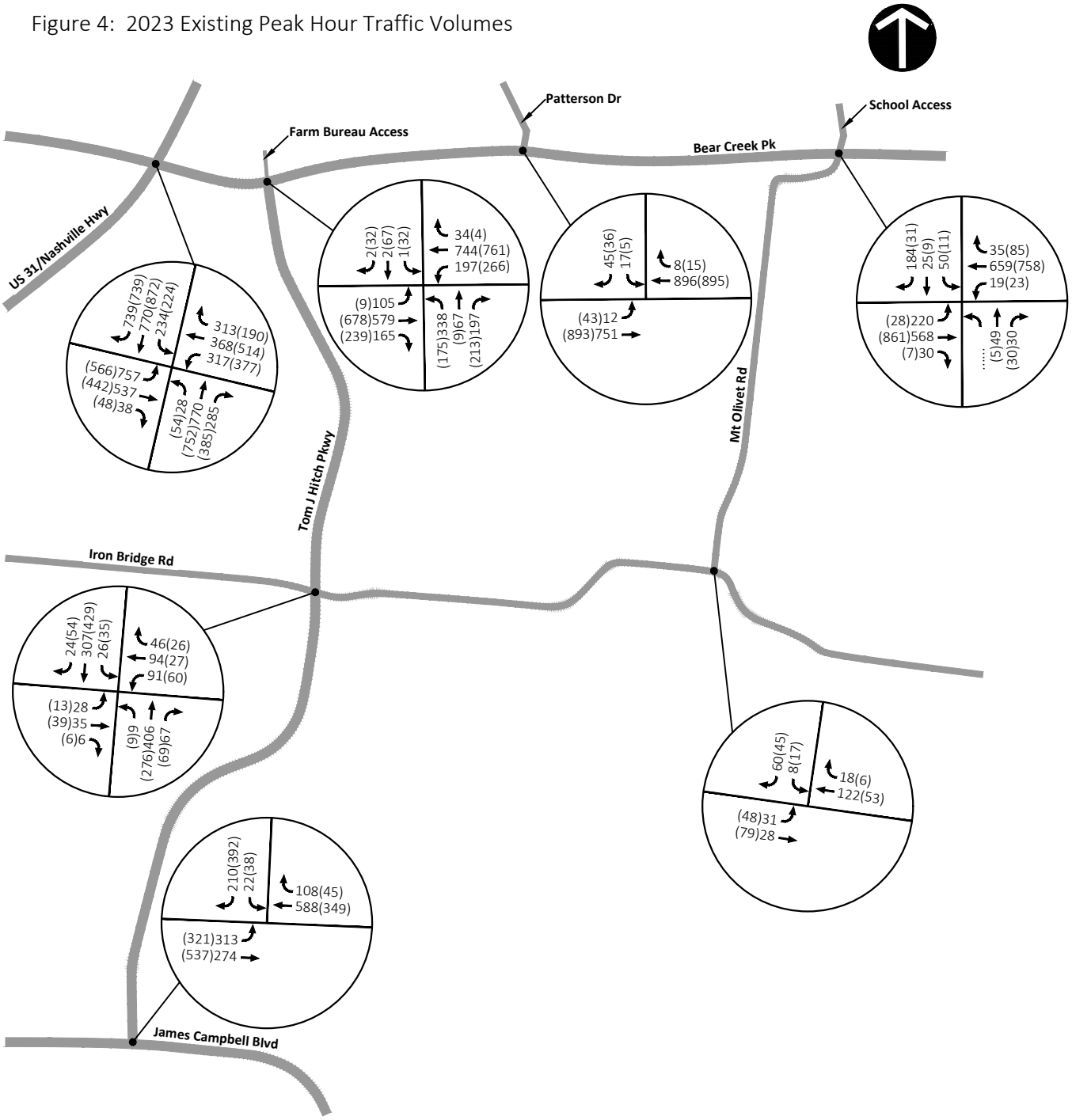
The 2023 Existing Conditions Peak Hour Traffic Volumes are presented in Figure 4. This represents the baseline conditions for the traffic analysis. The turning movement count data that was used to establish baseline conditions is included in Appendix D.

Figure 3: Daily Traffic Volumes




Source: TDOT traffic data, USGS.

Figure 4: 2023 Existing Peak Hour Traffic Volumes




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

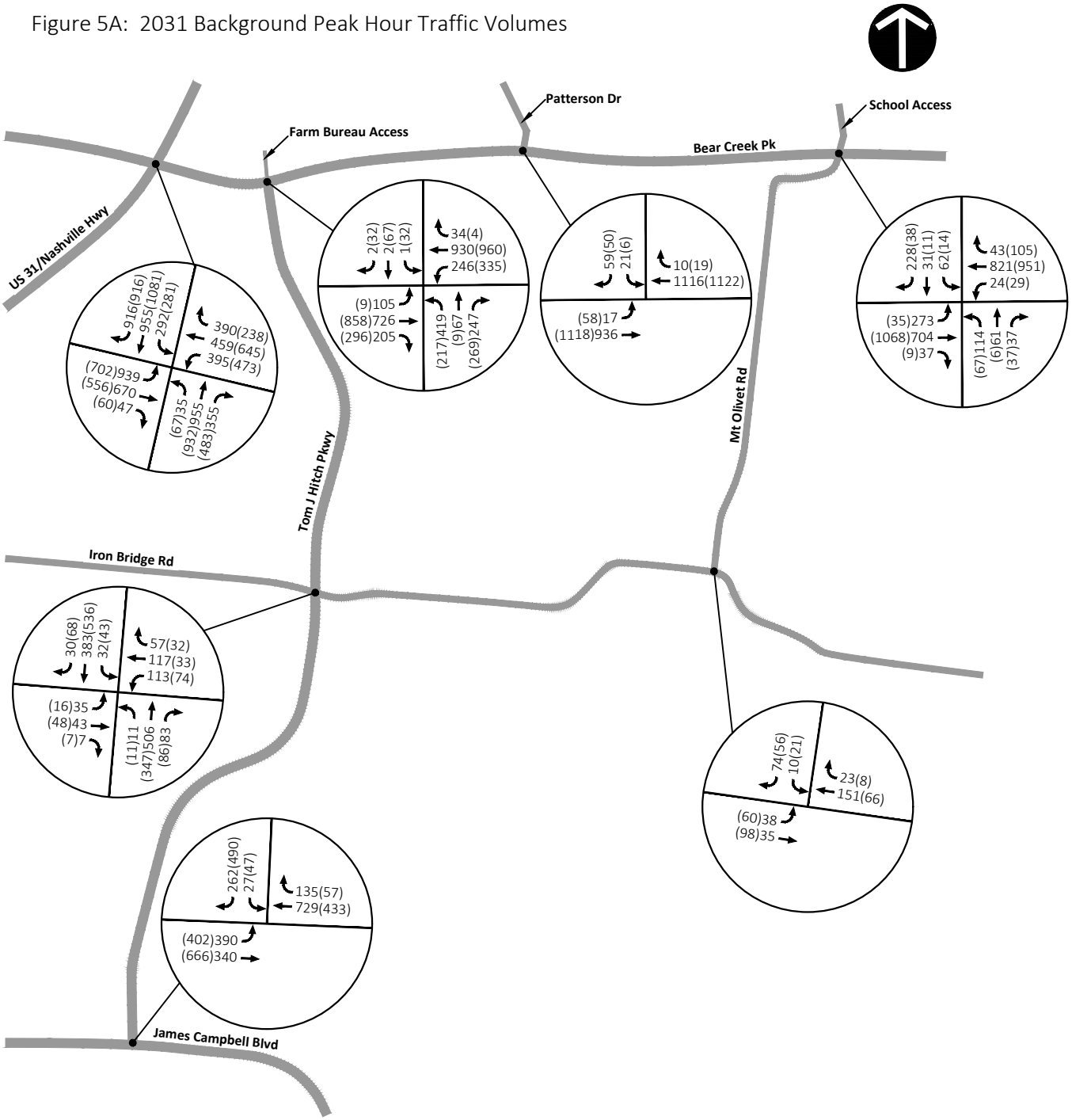
# 4. Background Conditions

As previously stated, it is assumed that the proposed Columbia Bluffs development located along Bear Creek Pike will be completed in several phases over approximately eleven years. For the purposes of this traffic study, two major phases were evaluated, which corresponds to horizon years 2031 and 2034. To account for additional traffic expected to be traveling on the study roadways in 2031 and 2034 even if the development is not completed, background traffic volumes were established. A growth rate was applied to the 2023 Existing Peak Hour Traffic Volumes. Since the baseline data represents the year 2023 conditions, an 8-year growth projection was applied for horizon year 2031 and an 11-year growth projection was applied for horizon year 2031. Based on an historical analysis and growth trends of the AADTs of the study area roadways, a 3% linear annual growth rate was applied to the 2023 Existing Conditions Peak Hour Traffic Volumes. The TDOT count station data and historical growth is included in Appendix C.

In addition to the general traffic growth in the study area, the site-specific traffic expected to be generated by one approved development was included in the background traffic volumes. The Dollar General project site is located on the north side of Bear Creek Pike west of W. Cheairs Circle. The background project data is included in Appendix E. The traffic calculation worksheets are included in Appendix G.

Figure 5A presents the 2031 Background Conditions Peak Hour Traffic Volumes, and Figure 5B presents the 2031 Background Conditions Peak Hour Traffic Volumes.

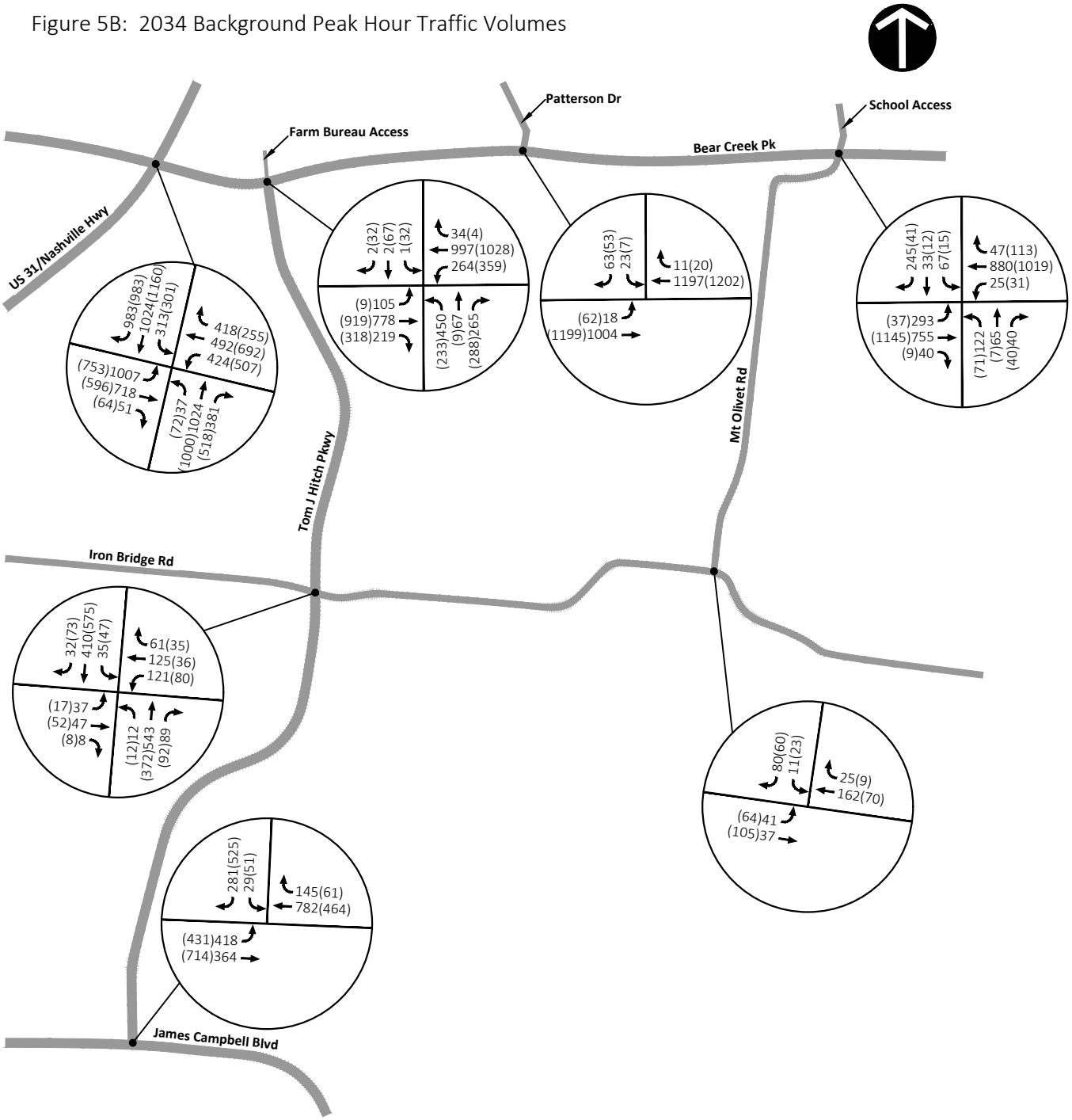
Figure 5A: 2031 Background Peak Hour Traffic Volumes




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

Figure 5B: 2034 Background Peak Hour Traffic Volumes




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

# 5. Projected Conditions

A trip generation process was used to estimate the amount of traffic that is expected to be generated by the proposed development. Trip generation rates for the land uses were taken from ITE's *Trip Generation Manual, 11th Edition*. No reductions were applied for alternate modes of transportation.

Table 2 below presents the new vehicular traffic expected to be generated by the proposed Columbia Bluffs project. As shown, the full buildout of the development is expected to generate approximately 7,324 vehicle trips per day, 658 vehicles per hour (vph) during the AM peak hour, and 768 vph during the PM peak hour. The initial phases of development, Phases 1-3, are expected to generate approximately 4,149 vehicle trips per day, 399 vph during the AM peak hour, and 475 vph during the PM peak hour. Trip generation calculations are included in Appendix F.

*Table 2: Trip Generation*

| Land Use | Size | Average Daily Traffic | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total | Enter | Exit | Total | Enter | Exit |
| **Phases 1-3** | | | | | | | | |
| Single-Family Detached Housing LUC 210 | 236 du | 2,223 | 163 | 41 | 122 | 223 | 140 | 83 |
| Single-Family Attached Housing LUC 215 | 94 du | 666 | 43 | 11 | 32 | 52 | 31 | 21 |
| Single Family Senior Adult Housing LUC 251 | 100 du | 593 | 39 | 13 | 26 | 44 | 27 | 17 |
| Day Care Center LUC 565 | 14,000 sf | 667 | 154 | 82 | 72 | 156 | 73 | 83 |
| **Total Phases 1-3** | **--** | **4,149** | **399** | **147** | **252** | **475** | **271** | **204** |
| **Full Buildout, Phases 1-6** | | | | | | | | |
| Single-Family Detached Housing LUC 210 | 472 du | 4,207 | 306 | 77 | 229 | 427 | 269 | 158 |
| Single-Family Attached Housing LUC 215 | 188 du | 1,382 | 132 | 33 | 99 | 109 | 64 | 45 |
| Single Family Senior Adult Housing LUC 251 | 200 du | 1,068 | 66 | 22 | 44 | 76 | 46 | 30 |
| Day Care Center LUC 565 | 14,000 sf | 667 | 154 | 82 | 72 | 156 | 73 | 83 |
| **Total Full Buildout, Phases 1-6** | **--** | **7,324** | **658** | **214** | **444** | **768** | **452** | **316** |

Source: ITE *Trip Generation Manual, 11th Edition.*

A directional distribution was developed based on the existing traffic counts, street network, and schools as well as the access plan for the development. Table 3 presents the roadways, directions, and percent distribution that traffic is expected to be coming from when entering the site.

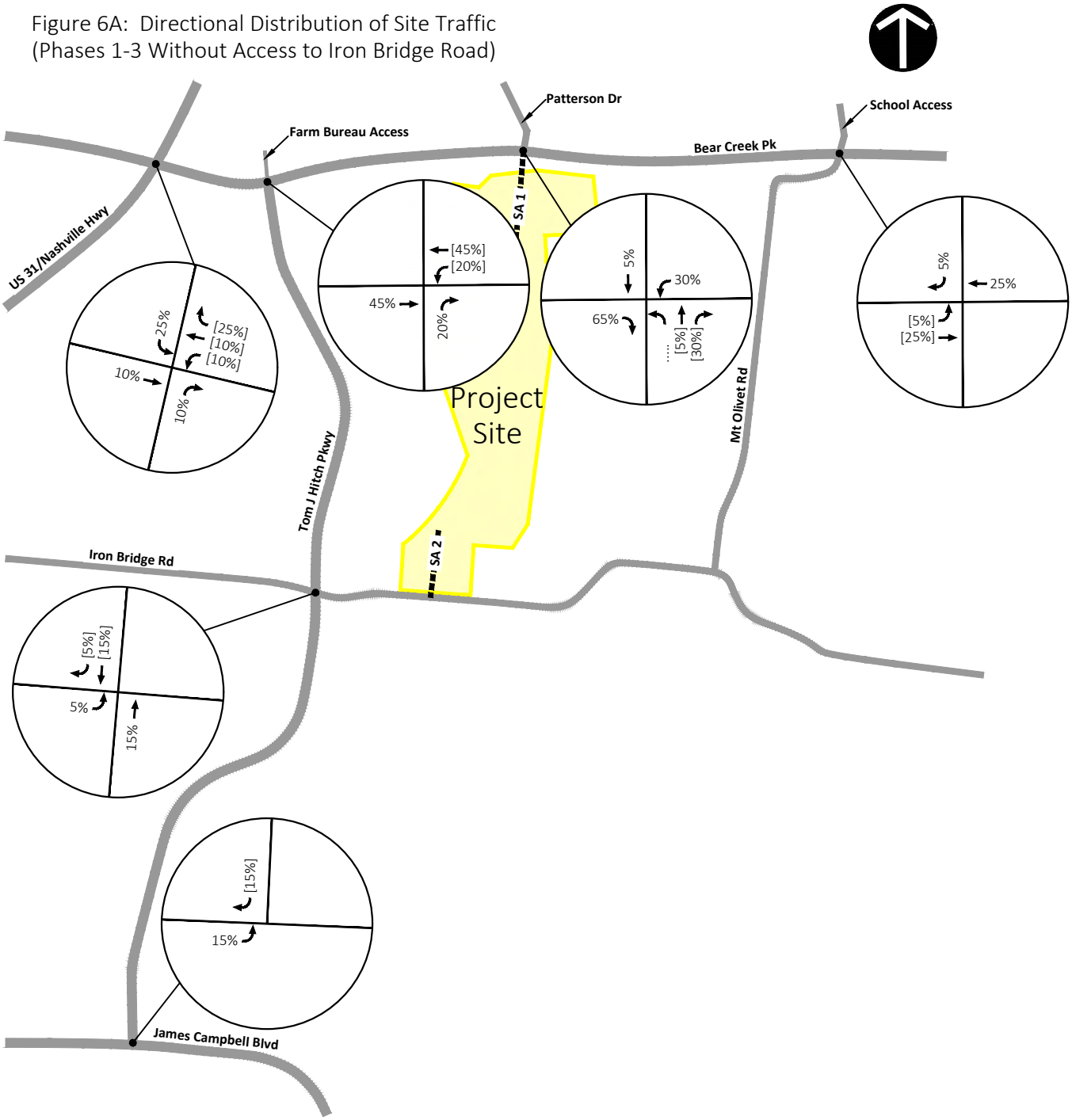
*Table 3: Directional Distribution*

| Roadway | Entering Direction (From – To the Site) | Distribution % |
|---|---|---|
| Bear Creek Pike | East | 25% |
| US 43 | West | 10% |
| Nashville Highway/US 31 S | North | 25% |
| Nashville Highway/US 31 S | South | 10% |
| James Campbell Boulevard | West | 15% |
| Iron Bridge Road | West | 5% |
| Patterson Drive | North | 5% |
| School Access | Northeast | 5% |
| Total | -- | 100% |

The current site plan includes one full access point on Bear Creek Pike aligned with Patterson Drive and one full access point on Iron Bridge Road aligned with the Maury County Yanahli Park Access. As discussed, the secondary access on Iron Bridge Road is not planned to be constructed until Phase 4 has begun. Therefore, all of the traffic generated by the site will enter and exit at the primary access on Bear Creek Pike during the initial development of Phases 1-3. Based on the directional distribution and the site access plan, the directional distribution was developed for the turning movements at each of the study intersections and site access points. The Directional Distribution for the project site at the study intersections is presented in Figure 6A for the scenario of Phases 1-3 and in Figure 6B for the full buildout scenario.

Using these directional distributions, the traffic generated by the site was assigned to the street network. The traffic assignment for the Phases 1-3 scenario is presented in Figure 7A, and the traffic assignment for the full buildout scenario is presented in Figure 7B. The site traffic was added to the background traffic volumes to obtain the 2031 Future Projected Peak Hour Traffic Volumes, which are presented in Figure 8A and the 2034 Future Projected Peak Hour Traffic Volumes, which are presented in Figure 8B. These volumes represent the total peak hour traffic expected at the study intersections following completion of Phases 1-3 and Full Buildout of the proposed development plan, respectively. The traffic calculation worksheets showing the traffic assignment and volume calculations are included in Appendix G.

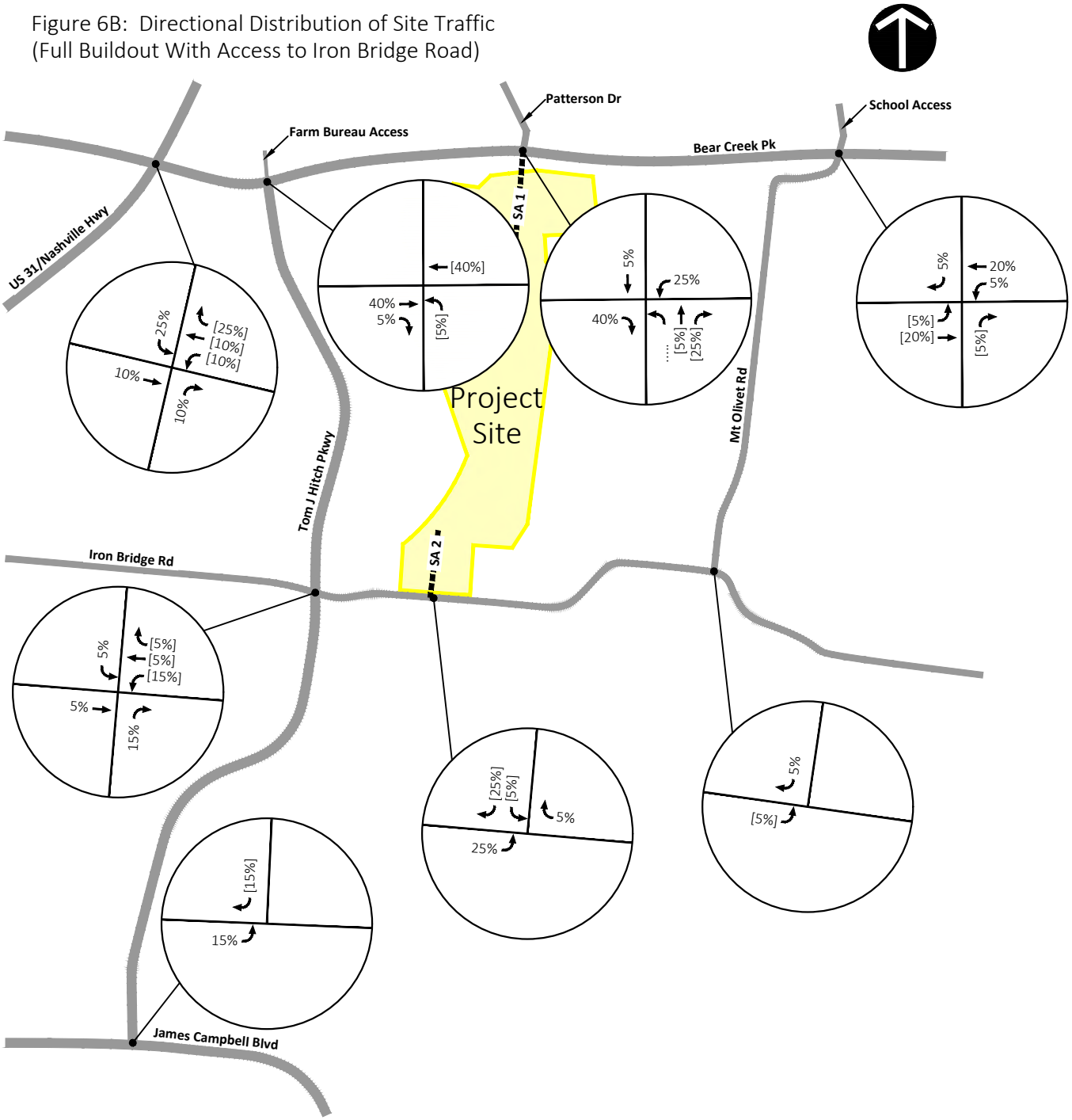
Figure 6A: Directional Distribution of Site Traffic
(Phases 1-3 Without Access to Iron Bridge Road)




Legend:
XX% - Enter
[XX%] - Exit

(Not to Scale)

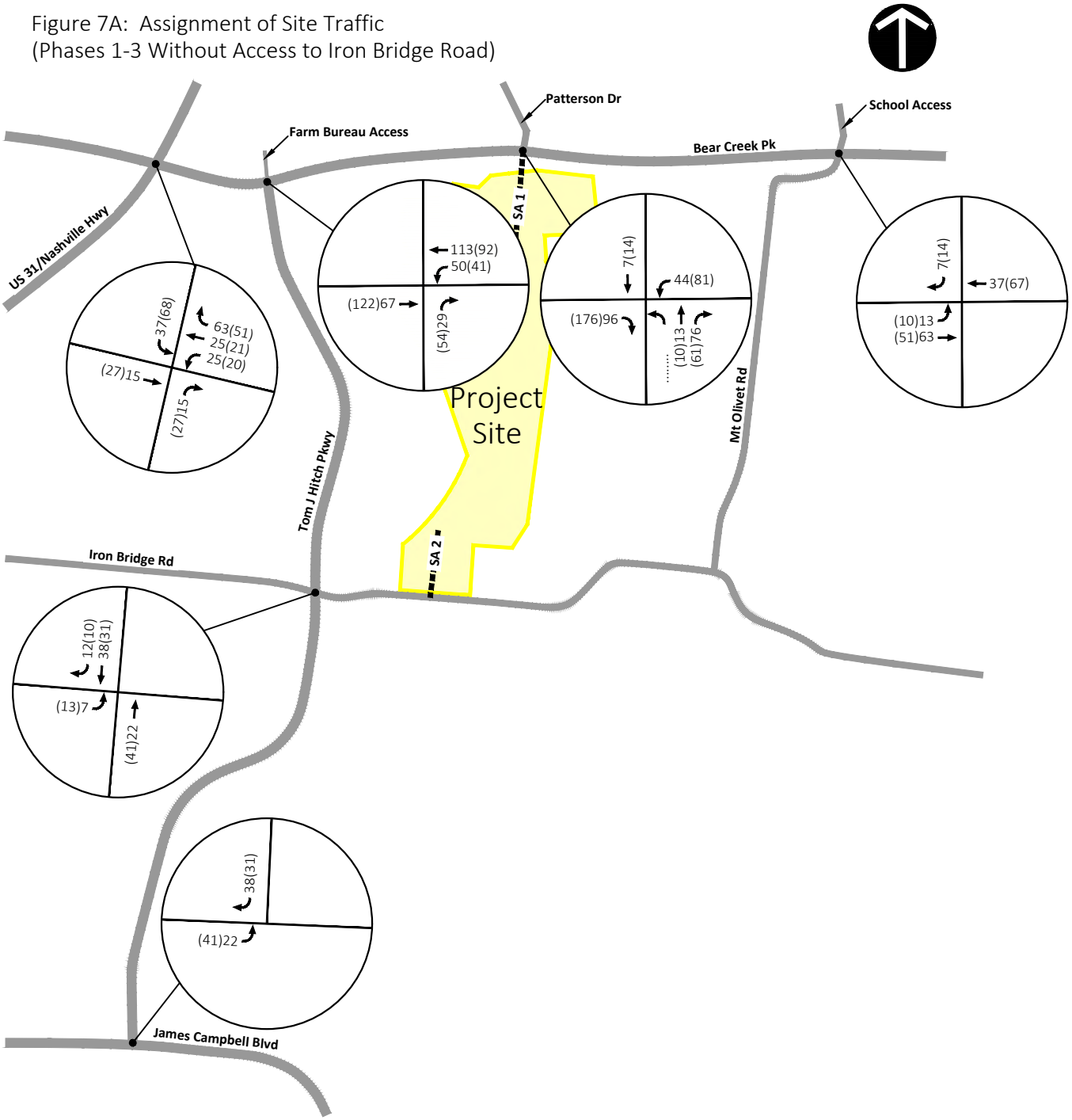
Figure 6B: Directional Distribution of Site Traffic
(Full Buildout With Access to Iron Bridge Road)




Legend:
XX% - Enter
[XX%] - Exit

(Not to Scale)

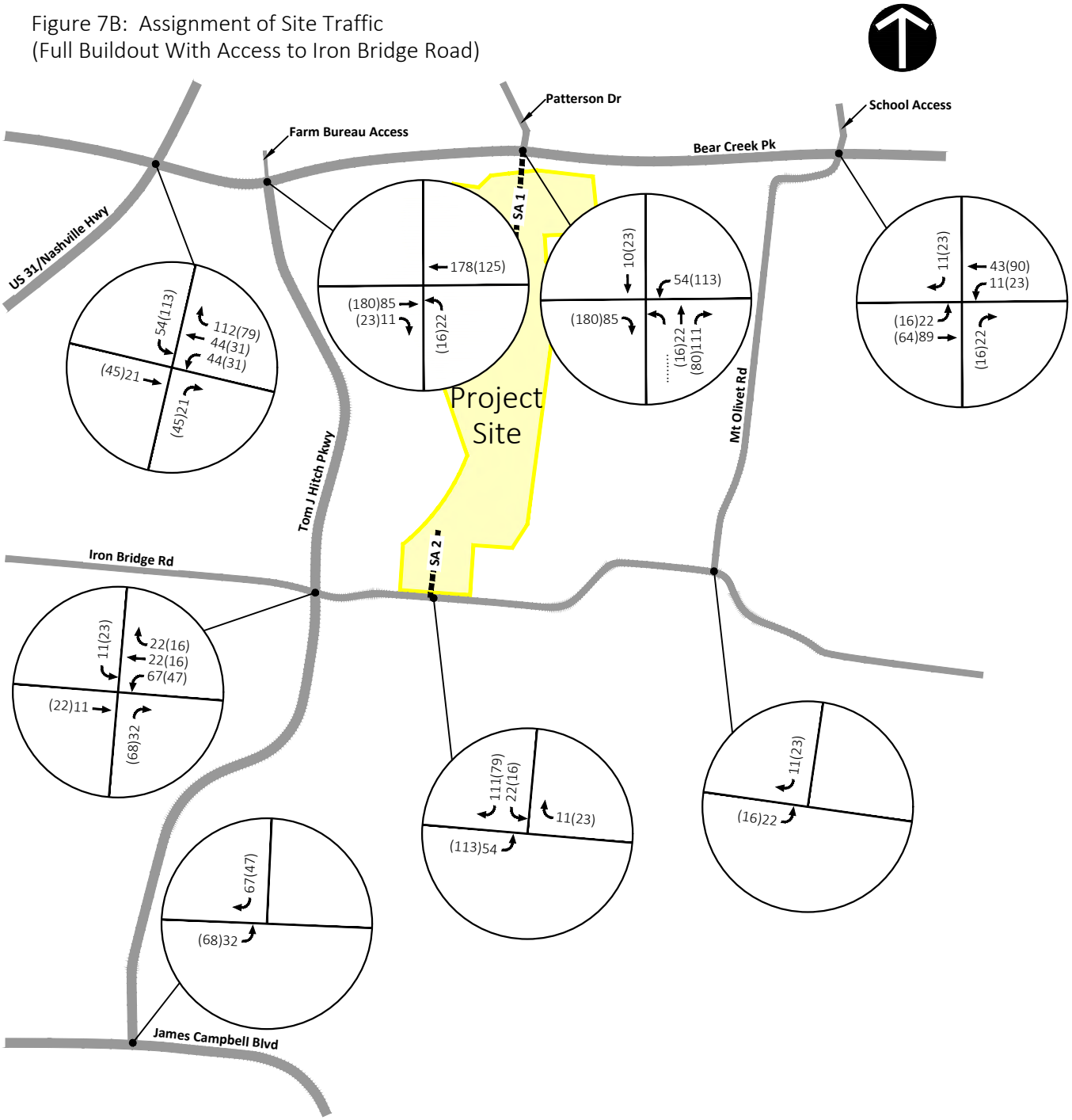
Figure 7A: Assignment of Site Traffic
(Phases 1-3 Without Access to Iron Bridge Road)




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

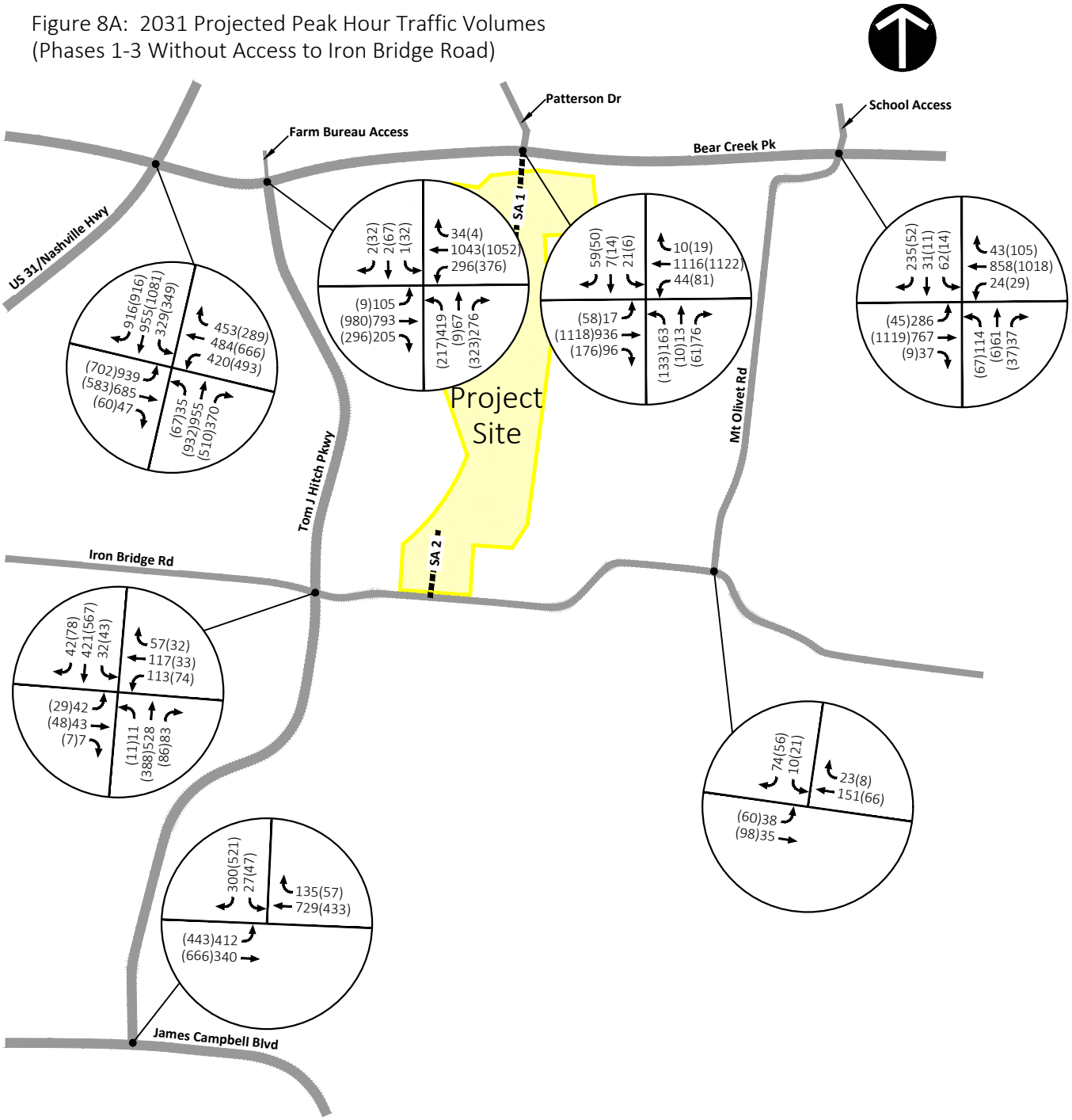
Figure 7B: Assignment of Site Traffic
(Full Buildout With Access to Iron Bridge Road)




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

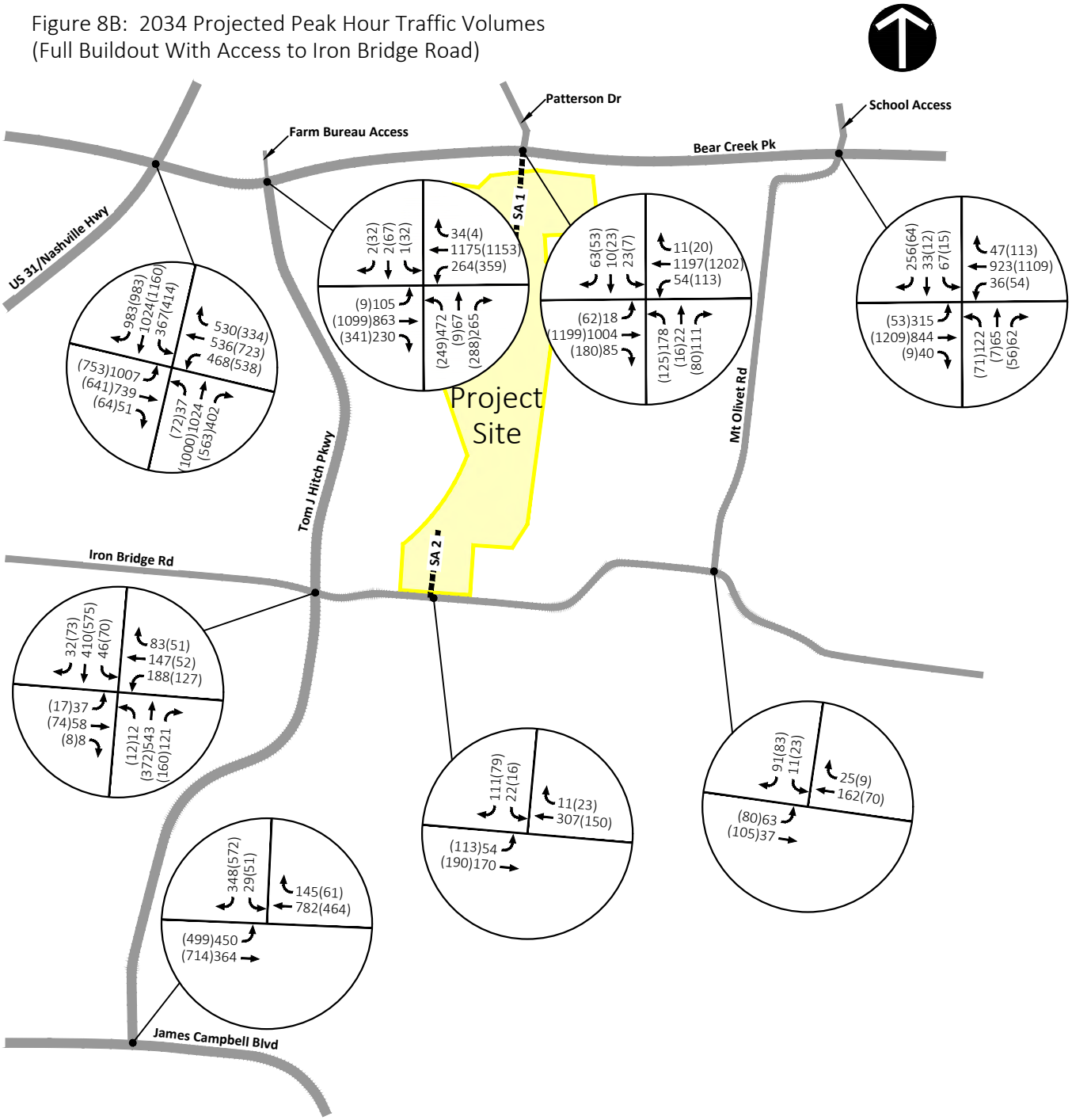
Figure 8A: 2031 Projected Peak Hour Traffic Volumes
(Phases 1-3 Without Access to Iron Bridge Road)




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

Figure 8B: 2034 Projected Peak Hour Traffic Volumes
(Full Buildout With Access to Iron Bridge Road)




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

# 6. Traffic Operational Analysis

To evaluate the study intersections under Existing, Background, and Future Projected conditions, capacity analyses were conducted for the study intersections using Synchro 11 software and HCM 6th Edition methodology. The signal timing data for the study intersections was obtained from the City of Columbia and utilized for the capacity analyses. As previously mentioned, the City of Columbia has a study and design underway to improve operation and safety at the intersection of Nashville Highway and Bear Creek Pike; however, details of the improvements are not available. For the background and projected analyses, it was assumed that a second left turn lane would be constructed within the existing medians for the southbound and westbound approaches, a westbound right turn lane would be constructed, as well as signal modification to accommodate the additional laneage.

The capacity analyses result in a control delay and corresponding level of service (LOS). The LOS and control delay are used to describe how well a turning movement and/or intersection operates. LOS A operates with the least amount of delay, and LOS F the worst. In urbanized areas, LOS D is generally considered acceptable. Table 4 presents the descriptions of LOS for unsignalized intersections, and Table 5 presents the descriptions of LOS for signalized intersections.

*Table 4: Description of Unsignalized Intersection Level of Service (LOS)*

| LOS | Control Delay (seconds per vehicle) |
|---|---|
| A | 0 – 10 |
| B | > 10 – 15 |
| C | > 15 – 25 |
| D | > 25 – 35 |
| E | > 35 – 50 |
| F | > 50 |
| Source: *Highway Capacity Manual 6th Edition* | |

*Table 5: Description of Signalized Intersection Level of Service (LOS)*

| LOS v/c ≤ 1.0 | Control Delay (seconds per vehicle) | Description |
|---|---|---|
| A | ≤ 10 | Volume-to-capacity ratio is low and either progression is exceptionally favorable or cycle length is short. |
| B | > 10 – 20 | Progression is highly favorable or the cycle length is short. More vehicles stop than LOS A. |
| C | > 20 – 35 | Progression is favorable or cycle lengths are moderate. Number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping. |
| D | > 35 – 55 | Volume-to-capacity is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable. |
| E | > 55 – 80 | Volume-to-capacity is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent. |
| F | > 80 | Volume-to-capacity is very high or exceeds 1.0, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue. |
| Source: *Highway Capacity Manual, 6th Edition* | | |

## 6.1 Capacity Analysis

Table 6 below presents the results of the AM peak hour analysis, and Table 7 presents the results of the PM peak hour analysis. The tables present a comparison between the analysis scenarios. The overall intersection LOS is presented for signalized intersections, and the LOS for critical turning movements at unsignalized intersections is presented. The Synchro worksheets and complete LOS comparison tables showing all of the turning movements are included in Appendix H. As shown, improvements will be needed at many of the study intersections in order to accommodate the proposed residential development with daycare center. The intersection improvements that are included in the 2031 Projected Phases 1-3 With Improvements scenario and the 2034 Projected Full Buildout With Improvements scenario are outlined in the Conclusions and Recommendations section.

*Table 6: Intersection Capacity Analysis – AM Peak Hour*

| Intersection | Control | Turning Movement | Level of Service (Delay in sec/veh) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2023 Existing | 2031 | | | 2034 | | |
| | | | | Background | Projected | Projected w/ Imps | Background | Projected | Projected w/ Imps |
| Nashville Hwy & US 43/Bear Creek Pk | Signal | Overall Intersection | E (70.5) | F (97.2) | F (104.0) | F (95.0) | F (120.8) | F (134.3) | F (132.2) |
| Bear Creek Pk & Tom J Hitch Pkwy/ Farm Bureau Access | Signal | Overall Intersection | D (46.7) | F (97.3) | F (135.3) | F (116.2) | F (124.4) | F (165.7) | F (155.9) |
| Bear Creek Pk & Patterson Dr/ Site Access 1 | TWSC | EB Left Turn | B (10.3) | B (11.7) | B (11.7) | -- | B (12.3) | B (12.3) | -- |
| | | WB Left Turn | -- | -- | B (11.4) | -- | -- | B (11.9) | -- |
| | | NB Left Turn | -- | -- | F (600+) | -- | -- | F (600+) | -- |
| | | NB Through/Right Turn | -- | -- | F (115.1) | -- | -- | F (444.3) | -- |
| | | SB Approach | E (40.9) | F (138.6) | F (600+) | -- | F (255.3) | F (600+) | -- |
| | Signal | Overall Intersection | -- | -- | -- | C (32.3) | -- | -- | D (46.9) |
| Bear Creek Pk & Mt Olivet Rd/School Access | Signal | Overall Intersection | C (29.2) | E (74.2) | F (85.3) | D (50.6) | F (93.5) | F (112.1) | E (66.0) |
| Tom J Hitch Pkwy & Iron Bridge Rd | Signal | Overall Intersection | B (14.8) | B (17.2) | B (17.6) | -- | B (18.5) | C (23.8) | -- |
| Iron Bridge Rd & Mt Olivet Rd | TWSC | EB Left Turn | A (7.6) | A (7.7) | A (7.7) | -- | A (7.7) | A (7.7) | -- |
| | | SB Approach | A (9.4) | A (9.7) | A (9.7) | -- | A (9.9) | B (10.0) | -- |
| James Campbell Blvd & Tom J Hitch Pkwy | TWSC | EB Left Turn | B (12.0) | C (16.5) | C (17.4) | -- | C (19.9) | C (22.1) | -- |
| | | SB Left Turn | F (82.6) | F (414.0) | F (496.8) | -- | F (600+) | F (600+) | -- |
| | | SB Right Turn | C (19.3) | E (35.7) | E (47.3) | -- | F (51.5) | F (96.1) | -- |
| | Signal | Overall Intersection | -- | -- | -- | C (24.4) | -- | -- | C (31.6) |
| Iron Bridge Rd & Site Access 2 | TWSC | EB Left Turn | -- | -- | -- | -- | -- | A (8.1) | -- |
| | | SB Approach | -- | -- | -- | -- | -- | B (12.4) | -- |

Note: HCM 6th Edition results reported above for all intersections, with one exception. HCM 2000 results reported for intersection of Nashville Highway and US 43/Bear Creek Pike.

*Table 7: Intersection Capacity Analysis – PM Peak Hour*

| Intersection | Control | Turning Movement | Level of Service (Delay in sec/veh) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2023 Existing | 2031 | | | 2034 | | |
| | | | | Background | Projected | Projected w/ Imps | Background | Projected | Projected w/ Imps |
| Nashville Hwy & US 43/Bear Creek Pk | Signal | Overall Intersection | E (58.1) | E (69.4) | E (72.6) | E (64.1) | F (84.1) | F (90.7) | F (81.9) |
| Bear Creek Pk & Tom J Hitch Pkwy/ Farm Bureau Access | Signal | Overall Intersection | D (52.4) | F (123.6) | F (173.5) | F (112.6) | F (152.6) | F (198.0) | F (144.7) |
| Bear Creek Pk & Patterson Dr/ Site Access 1 | TWSC | EB Left Turn | B (10.2) | B (11.7) | B (11.7) | -- | B (12.3) | B (12.3) | -- |
| | | WB Left Turn | -- | -- | B (13.4) | -- | -- | C (15.1) | -- |
| | | NB Left Turn | -- | -- | F (600+) | -- | -- | F (600+) | -- |
| | | NB Through/Right Turn | -- | -- | F (192.1) | -- | -- | F (600+) | -- |
| | | SB Approach | C (24.5) | E (46.9) | F (600+) | -- | F (68.4) | F (600+) | -- |
| | Signal | Overall Intersection | -- | -- | -- | C (27.5) | -- | -- | D (36.3) |
| Bear Creek Pk & Mt Olivet Rd/School Access | Signal | Overall Intersection | B (16.4) | C (29.9) | D (42.7) | D (37.5) | D (45.3) | E (77.0) | D (41.1) |
| Tom J Hitch Pkwy & Iron Bridge Rd | Signal | Overall Intersection | B (12.8) | B (14.6) | B (15.4) | -- | B (15.5) | B (16.1) | -- |
| Iron Bridge Rd & Mt Olivet Rd | TWSC | EB Left Turn | A (7.4) | A (7.5) | A (7.5) | -- | A (7.5) | A (7.5) | -- |
| | | SB Approach | A (9.3) | A (9.6) | A (9.6) | -- | A (9.7) | B (9.8) | -- |
| James Campbell Blvd & Tom J Hitch Pkwy | TWSC | EB Left Turn | A (9.5) | B (10.8) | B (11.3) | -- | B (11.5) | B (12.4) | -- |
| | | SB Left Turn | F (90.9) | F (437.1) | F (580.4) | -- | F (600+) | F (600+) | -- |
| | | SB Right Turn | C (18.6) | E (38.2) | E (46.7) | -- | F (57.5) | F (80.5) | -- |
| | Signal | Overall Intersection | -- | -- | -- | C (28.7) | -- | -- | D (35.5) |
| Iron Bridge Rd & Site Access 2 | TWSC | EB Left Turn | -- | -- | -- | -- | -- | A (7.8) | -- |
| | | SB Approach | -- | -- | -- | -- | -- | B (10.8) | -- |

Note: HCM 6th Edition results reported above for all intersections, with one exception. HCM 2000 results reported for intersection of Nashville Highway and US 43/Bear Creek Pike.

According to the City's *Connect Columbia Comprehensive Plan*, which is currently being updated, improvements are planned for the intersection of Nashville Highway and Bear Creek Pike that also include capacity and access management improvements along Bear Creek Pike between Nashville Highway and Tom J Hitch Parkway. Specific design, funding, and schedule of these improvements are unknown. However, it is reasonable to anticipate that the City and/or TDOT will complete these improvements in the next 8-11 years prior to full buildout of the Columbia Bluffs PUD since these improvements were recommended to be completed in the near term (within 10 years) when the Plan was adopted in 2018.

Additional analyses were conducted for the intersection of Bear Creek Pike and Tom J Hitch Parkway assuming that Bear Creek Pike will be widened from 3 to 5 lanes between Nashville Highway and Tom J Hitch Parkway, which is approximately 1,600 linear feet. For this analysis, the additional eastbound lane is assumed to become a right turn only lane and the northbound approach of Tom J Hitch Parkway was assumed to include one left turn lane, one shared left turn/through lane, and one right turn lane. The additional westbound lane on Bear Creek Parkway will allow dual left turn lanes from Tom J Hitch Parkway with split phasing is provided. Table 8 below presents the capacity analysis results for the intersection assuming these future improvements are provided by the City and/or TDOT. As shown, the intersection is expected to operate better than Background Conditions during the AM and PM peak hours under both buildout scenarios.

*Table 8: Intersection Capacity Analysis – Bear Creek Pike and Tom J Hitch Parkway with Future Improvements by Others*

| Turning Movement | Level of Service (Delay in sec/veh) | | | |
|---|---|---|---|---|
| | 2031 | | 2034 | |
| | AM | PM | AM | PM |
| Overall Intersection | E (58.3) | E (56.3) | E (79.3) | E (68.8) |
| Note: HCM 6th Edition results reported above. | | | | |

## 6.2 Signal Warrant Analysis

As previously discussed, the intersection of Bear Creek Pike and Patterson Drive is stop-controlled on the southbound approach of Patterson Drive, and the northbound approach of the proposed development Site Access 1 will be stop-controlled once constructed. The results of the capacity analyses indicate that the northbound and southbound stop-controlled approaches will operate with poor levels of service and long delays during both the AM and PM peak hours under the 2031 Future Projected Conditions. Therefore, the intersection was evaluated to determine whether a traffic signal will be warranted and appropriate to accommodate vehicular traffic at the intersection based on the proposed development's trip generation.

The *Manual on Uniform Traffic Control Devices* (MUTCD) includes nine (9) warrants that should be evaluated based on an engineering study of traffic conditions prior to the installation of a new traffic signal. While there are nine warrants, only one is required to be met in order to consider the need for traffic signal control at an intersection. However, satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal. Each warrant sets forth the minimum criteria related to the operation and safety of an intersection that should be met in order to satisfy the warrant.

Warrants 10 software by Trafficware was utilized for the signal warrant analysis based on 2009 Federal Warrants. The traffic volume data, speed limits, and intersection geometry were utilized for the analysis. The signal warrant analysis was based on the 70% warrants since the posted speed limit on Bear Creek Pike is 45 mph. Patterson Drive includes one approach lane in the southbound direction. Bear Creek Pike currently includes one left turn lane and one through lane in the eastbound direction and one shared through/right turn lane in the westbound direction. However, based on the turn lane analysis presented in Section 6.4, additional deceleration turn lanes are recommended on Bear Creek Pike at the intersection. Specifically, an eastbound right turn lane, a westbound right turn lane, and a westbound left turn lane are recommended. Therefore, the analysis is based on two-lane major street approaches. The analysis is based on a two-lane minor street approach since the Site Access 1 approach will include one left turn lane and one shared through/right turn lane and the Site Access 1 approach volumes are roughly balanced between the two lanes. Based on the projected delay for the minor street approaches under two-way stop-control, none of the right turn volume was removed from the analysis since the right turn is shared with the through movement.

In order to obtain hourly 2031 Background Conditions traffic volumes at the intersection, some assumptions were made to account for ambient and approved development traffic in the study area. A 13-hour turning movement count was conducted on Tuesday, February 22, 2022. Similar to the peak hour traffic volumes previously presented, a 3% annual growth was assumed and applied to the hourly 2022 turning movement data, which is a 27% background growth (representing 3% annual for 9 years). Site

specific traffic generated by approved developments was not added to the hourly traffic for this signal warrant analysis.

Finally, the trip generation for the proposed residential development was assigned to the intersection based on the directional distributions presented in Figure 6A. The signal warrant analysis was conducted based on the 2031 Future Projected Conditions for Phases 1-3 without the connection to Iron Bridge Road. The hourly distribution for each land use was taken from ITE's *Trip Generation Manual, 11th Edition*. Table 9 below presents the results of the signal warrant analysis.

*Table 9: Signal Warrant Analysis Results – 2031 Future Projected Phases 1-3 Conditions*

| **Bear Creek Pike and Patterson Drive/Site Access 1 (2029 Future Projected Phases 1-3 Conditions)** | | |
|---|---|---|
| **Warrant Description** | **Warrant Met?** | **Notes** |
| Warrant 1: 8-Hour Vehicular Volume | Y | 13 Hours Met |
| Warrant 2: 4-Hour Vehicular Volume | Y | 13 Hours Met |
| Warrant 3: Peak Hour | Y | 7 Hours Met |
| Warrant 4: Pedestrian Volume | N/A | -- |
| Warrant 5: School Crossing | N/A | -- |
| Warrant 6: Coordinated Signal System | N/A | -- |
| Warrant 7: Crash Experience | N/A | -- |
| Warrant 8: Roadway Network | Y | -- |
| Warrant 9: Intersection near a Grade Crossing | N/A | -- |
| Notes:<br>1. Based on 2029 Future Projected Phases 1-3 Conditions.<br>2. Based on 2 Lane Major Street and 2 Lane Minor Street.<br>3. Based on 70% Factor Warrants and ≥40 mph approach speed on the Major Street.<br>4. Crash data was not obtained from the City or evaluated for the warrant. | | |

Based on these data and analyses, a traffic signal will be warranted under 2031 Future Projected Phases 1-3 Conditions, which includes the traffic generated by the initial residential phases and the daycare for proposed development as well as annual traffic growth in the study area. It should be noted that the signal warrant analysis is based on the trip generation for Phases 1-3 of the Columbia Bluffs development; however, these results indicate that the traffic signal will likely be warranted prior to completion of Phase 2 and/or prior to completion of Phase 1 if the day care center is completed. Therefore, it is recommended to construct and install the traffic signal either prior to completion of Phase 2 (or comparable number of dwelling units) or prior to completion of Phase 1 if Phase 1 includes completion of the day care center. The Warrants 10 summary reports and hourly traffic calculation worksheets are presented in Appendix I.

## 6.3 Site Access Review

According to the current site plan and the project team, the proposed development will include two vehicular access points. Site Access 1, which will provide primary access to the development, is planned to be located on Bear Creek Pike and aligned with Patterson Drive. The intersection is expected to be signalized during Phase 2 of the development. Site Access 1 will be constructed at the beginning of the project. Site Access 2, which will provide secondary access to the development, is located at the south property boundary on Iron Bridge Road aligned with the Maury County Yanahli Park access. Site Access 2

is planned to be constructed when construction begins for Phase 4. Site Access 1 will include width for one entering lane and two exiting lanes. Site Access 2 will include a minimum width for one entering lane and one exiting lane.

## 6.4 Turn Lane Analysis

The Site Access 1 was evaluated for the need for left turn and right turn deceleration lanes on Bear Creek Pike based on methodology presented in *NCHRP Report 457, Evaluating Intersection Improvements: An Engineering Study Guide*. Based on the 2031 Future Projected peak hour traffic volumes previously presented, a westbound left turn deceleration lane will be warranted on Bear Creek Pike at Site Access 1. Additionally, an eastbound right turn deceleration lane will be warranted on Bear Creek Pike at Site Access 1. It should also be noted that a westbound right turn deceleration lane is also warranted on Bear Creek Pike at Patterson Drive based on the existing and background peak hour traffic volumes.

Therefore, it is recommended to construct a westbound left turn deceleration lane on Bear Creek Pike at Site Access 1. The left turn deceleration lane should include approximately 225 feet of storage, 180 feet of bay taper, and 270 feet of approach taper, assuming all of the widening is centered along Bear Creek Pike or as required by TDOT. It is also recommended to construct an eastbound right turn deceleration lane on Bear Creek Pike at Site Access 1 and a westbound right turn deceleration lane at Patterson Drive. The eastbound right turn deceleration lane should include approximately 180 feet of storage and 160 feet of bay taper so that the widening for the eastbound right turn lane begins immediately east of the existing guardrail over Bear Creek without requiring modification to the creek crossing structure, or as approved by TDOT. The westbound right turn deceleration lane should include approximately 160 feet of storage and 180 feet of bay taper.

Site Access 2 was evaluated for the need for left turn and right turn deceleration lanes on Iron Bridge Road based on the 2034 Future Projected traffic volumes, which includes full buildout of the development. The turn lane analysis determined that an eastbound left turn deceleration lane will be warranted by the development traffic following full buildout. A westbound right turn deceleration lane will not be warranted. Therefore, it is recommended to construct an eastbound left turn deceleration lane on Iron Bridge Road at Site Access 2. The left turn deceleration lane should include approximately 160 feet of storage, 180 feet of bay taper, and 270 feet of approach taper, assuming all of the widening is centered along Iron Bridge Road or as required by the City or County. Details of the turn lane analysis are included in Appendix J.

## 6.5 Intersection Sight Distance

According to the current concept plan, Site Access 1 will be located on Bear Creek Pike aligned with Patterson Drive, and Site Access 2 will be located on Iron Bridge Road aligned with the Yanahli Park Access. Both of the Site Access points were evaluated to make sure that sufficient intersection sight distance will be available for vehicles exiting the proposed residential development.

For a 45-mph speed as posted on Bear Creek Pike and Iron Bridge Road, the guidelines from the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*, call for a minimum stopping sight distance of 360 feet. This is the distance required for a driver to detect an object in the roadway that requires a stop and be able to stop in time before reaching the object. AASHTO also identifies the minimum intersection sight distance, which is the distance

a driver can see approaching vehicles before the line of sight is blocked by an object or roadway curvature. Sufficient intersection sight distance allows for adequate time gap for a driver to turn across opposing traffic from a stopped condition without requiring on-coming traffic to significantly slow down. For a speed of 45 mph, the design value for a driver turning left from a stop onto a three-lane roadway as recommended is 530 feet and for a driver turning right from a stop is 430 feet. Therefore, it is desirable to provide a minimum of 530 feet looking to the east and 430 feet looking to the west from Site Access 1 on Bear Creek Pike. At Site Access 2, it is desirable to provide a minimum of 530 feet looking to the west and 430 feet looking to the east on Iron Bridge Road.

Based on site visits at the currently proposed site access locations, it was determined that the available intersection sight distance will be sufficient to accommodate left and right turns onto Bear Creek Pike and Iron Bridge Road.

# 7. Conclusions and Recommendations

The Columbia Bluffs development is proposed to be located between Bear Creek Pike and Iron Bridge Road, east of the Duck River in Columbia, TN. A total of 860 dwelling units (472 single-family lots, 188 townhome units, and 200 active adult units) and a 14,000 square-foot day care center are proposed for the 412-acre property. The property is currently undeveloped farmland that is proposed to be annexed as a planned unit development (PUD). Primary vehicular site access will be located on Bear Creek Pike aligned with Patterson Drive. Secondary vehicular site access will be located on Iron Bridge Road. A development of this size will be constructed over several phases. For the purposes of this traffic study, two development scenarios were analyzed. Per the developer, Kolter Group Acquisitions LLC, Phases 1-3 are expected to be completed in approximately eight years, which corresponds to a 2031 horizon year. The Full Buildout (Phases 1-6) is expected to be completed in approximately eleven years, which corresponds to a 2034 horizon year. The new roadway connection to Iron Bridge Road to the south is not planned to be constructed until after Phase 3.

The analyses presented in this report indicate that the proposed development will generate new vehicular traffic to the study area. Following Full Buildout of the Columbia Bluffs development, the project is expected to generate approximately 7,324 daily trips, 658 AM peak hour trips, and 768 PM peak hour trips. Phases 1-3 of the development will include approximately 50% of the total number of dwelling units and will include the day care center. Phases 1-3 are expected to generate approximately 4,149 daily trips, 399 AM peak hour trips, and 475 PM peak hour trips.

Based on the analyses presented in this study and review of the study area and proposed development information, the following is recommended in order to accommodate the proposed development and provide for efficient traffic operations and safety:

**Recommendations Associated with Phases 1-3 Scenario**

The initial phases of development will require off-site improvements and as well as improvements to accommodate the primary access onto Bear Creek Pike. The following improvements should be coordinated with the City and could be phased in during construction of Phases 1, 2, and 3 of the development.

<u>#1 Nashville Highway (US 31) and Bear Creek Pike/US 43</u>

Laneage and traffic signal improvements are expected to be completed by the City/TDOT at the intersection of Nashville Highway (US 31) and Bear Creek Pike/US 43. These anticipated improvements were assumed to include the addition of a westbound left turn lane and a southbound left turn lane through restriping and modifying the existing median on Nashville Highway. The provision of dual left turn lanes requires protected only left turn signal phasing for the southbound approach. Additional signal timing adjustments and coordination may be needed for the intersection following the initial phases of development for Columbia Bluffs. Additionally, lead/lag protected only left turn signal phasing is recommended for the eastbound and westbound approaches of Bear Creek Pike.

No other improvements are recommended for the intersection.

#2 Bear Creek Pike and Tom J Hitch Parkway

- Construct a northbound right turn lane on Tom J Hitch Parkway with approximately 100 feet of storage and 60 feet of taper. The northbound right turn lane could be constructed using the existing shoulder and should not extend beyond the start of the bridge over Duck River.
- Restripe the northbound approach to provide one left turn lane and one through lane, plus the recommended right turn lane.
- Modify the traffic signal design to provide a northbound right turn overlap during the westbound left turn phase.
- Optimize and coordinate the signal timing along Bear Creek Pike.

#3 Bear Creek Pike and Patterson Drive/Site Access 1

- Site Access 1 should be constructed and aligned with Patterson Drive at Bear Creek Pike.
- Site Access 1 should be designed to include width for one entering lane and two exiting lanes, which should be a northbound left turn lane and a northbound shared through/right turn lane.
- An eastbound right turn deceleration lane should be constructed for Bear Creek Drive at Site Access 1 to accommodate the project traffic. The eastbound right turn lane should be designed so that the widening and taper does not begin until east of the guardrail over Bear Creek and includes approximately 180 feet of storage and 160 feet of bay taper, or as approved by the City and TDOT.
- A westbound right turn deceleration lane is recommended for Bear Creek Pike at Patterson Drive. The westbound right turn lane should be designed to include approximately 160 feet of storage and 180 feet of bay taper or as approved by the City and TDOT.
- A westbound left turn deceleration lane is recommended for Bear Creek Pike at Site Access 1 to accommodate the project traffic. The westbound left turn lane should be designed to include approximately 225 feet of storage, 180 feet of bay taper, and 270 feet of approach taper assuming the widening is centered on the roadway.
- Install a traffic signal at the intersection of Bear Creek Pike and Patterson Drive/Site Access 1. Signal warrant analyses indicate a traffic signal will be warranted by the traffic volumes generated by the project site prior to completion of Phase 2 (or comparable number of dwelling units) or prior to completion of Phase 1 if Phase 1 includes completion of the day care center. The signal design should include protected/permissive left turn signal phasing for the northbound and westbound approaches and permissive left turn signal phasing for the southbound and eastbound approaches.
- Optimize and coordinate the signal timing along Bear Creek Pike.
- Widen the north leg of Patterson Drive to provide a southbound left turn lane. The widening of Patterson Drive and the construction of Site Access 1 should be designed and constructed such that the northbound and southbound through movements are aligned and the left turn movements can operate concurrently. The southbound left turn lane should include approximately 75 feet of storage.

#4 Bear Creek Pike and Mt Olivet Road/School Access

- Restripe the southbound approach to a shared left turn/through lane and a right turn only lane.
- Modify the traffic signal design for the northbound approach to provide protected/permissive left turn signal phasing.
- Modify the traffic signal design for the southbound approach to provide a right turn overlap during the eastbound left turn phase.
- Optimize and coordinate the signal timing along Bear Creek Pike.

#5 Tom J Hitch Parkway and Iron Bridge Road

The signalized intersection of Tom J Hitch Parkway and Iron Bridge Road is expected to continue to operate acceptably under the future projected conditions.

No improvements are expected to be needed or recommended for the intersection of Tom J Hitch Parkway and Iron Bridge Road.

#6 Iron Bridge Road and Mt Olivet Road

The critical turning movements are expected to continue to operate acceptably at the one-way stop-controlled intersection of Iron Bridge Road and Mt Olivet Road under the future projected conditions.

No improvements are expected to be needed or recommended for the intersection of Iron Bridge Road and Mt Olivet Road.

#7 James Campbell Boulevard and Tom J Hitch Parkway

Tom J Hitch Parkway terminates to the south at James Campbell Boulevard. The T-intersection currently has stop-control for the southbound approach of Tom J Hitch Parkway. The intersection experiences heavy eastbound left turns and the reciprocal southbound right turns during peak hours. The southbound left turn movement currently operates at LOS F during the AM and PM peak hours and is expected to deteriorate with higher levels of delay under the 2031 Background and 2034 Future Projected Conditions with Phases 1-3. According to the City's *Connect Columbia Transportation Plan* adopted in 2018, the intersection is identified to be signalized in the near term (10-year horizon). Preliminary signal warrant analyses indicate the intersection's traffic volumes will meet signal warrants in the near future. The following intersection improvements are recommended to be constructed prior the completion of Phase 3, or comparable number of dwelling units:

- Install a traffic signal at the intersection of James Campbell Boulevard and Tom J Hitch Parkway.
- The traffic signal design should include protected/permissive left turn signal phasing for the eastbound approach and a southbound right turn overlap.

**Recommendations Associated with Full Buildout (Phases 1-6) Scenario**

As outlined above, the initial phases of development for the Columbia Bluffs project will require fairly significant improvements at many of the study intersections in order to accommodate the project's traffic plus the background traffic growth expected even without the development project's construction. In addition to the recommended improvements associated with Phases 1-3 of the development, the following is recommended for the Full Buildout Scenario:

#8 Iron Bridge Road and Site Access 2

- Site Access 2 should be constructed and connected to Iron Bridge Road prior to beginning construction for Phase 4, or comparable number of dwelling units.
- Site Access 2 should be aligned with the Maury County Yanahli Park Access on Iron Bridge Road.
- At a minimum, Site Access 2 should be designed to include width for one entering lane and one exiting lane.
- Stop-control should be provided for the southbound approach of Site Access 2 at Iron Bridge Road.

- The Site Access 2 should be designed and constructed to allow for sufficient intersection sight distance, clear of any obstructions such as vegetation, landscaping, hardscaping, signs, and fencing within the departure sight triangles.
- An eastbound left turn deceleration lane is recommended for Iron Bridge Road at Site Access 2 to accommodate the project traffic. The eastbound left turn lane should be designed to include approximately 160 feet of storage, 180 feet of bay taper, and 270 feet of approach taper assuming the widening is centered on the roadway, or as approved by the City.

**Additional Planned Improvements**

According to the City's *Connect Columbia Transportation Plan*, significant roadway improvements have been identified for some of the intersections and roadways in the study area. However, it is important to note that the improvements are not considered to be committed projects until funding has been allocated.

- In the near term, Bear Creek Pike between Nashville Highway and Tom J Hitch Parkway is planned to be widened from 3 lanes to 5 lanes and access management along the segment.
- In the midterm, Iron Bridge Road is planned to be reconstructed to improve the substandard roadway geometry between Fairview Drive and Tom J Hitch Parkway, which would include replacing the bridge/box culvert over Lytle Creek, which currently narrows the roadway to one lane at a sag vertical crest in the roadway.
- In the long-term, Bear Creek Pike is planned to be widened to four lanes between Tom J Hitch Parkway and east of Baker Road. It should be noted that the deceleration lanes recommended for Bear Creek Pike at Site Access 1/Patterson Drive as part of the initial phases of the Columbia Bluffs development will contribute towards this long-term improvement identified along Bear Creek Pike.

<u>#2 Bear Creek Pike and Tom J Hitch Parkway</u>

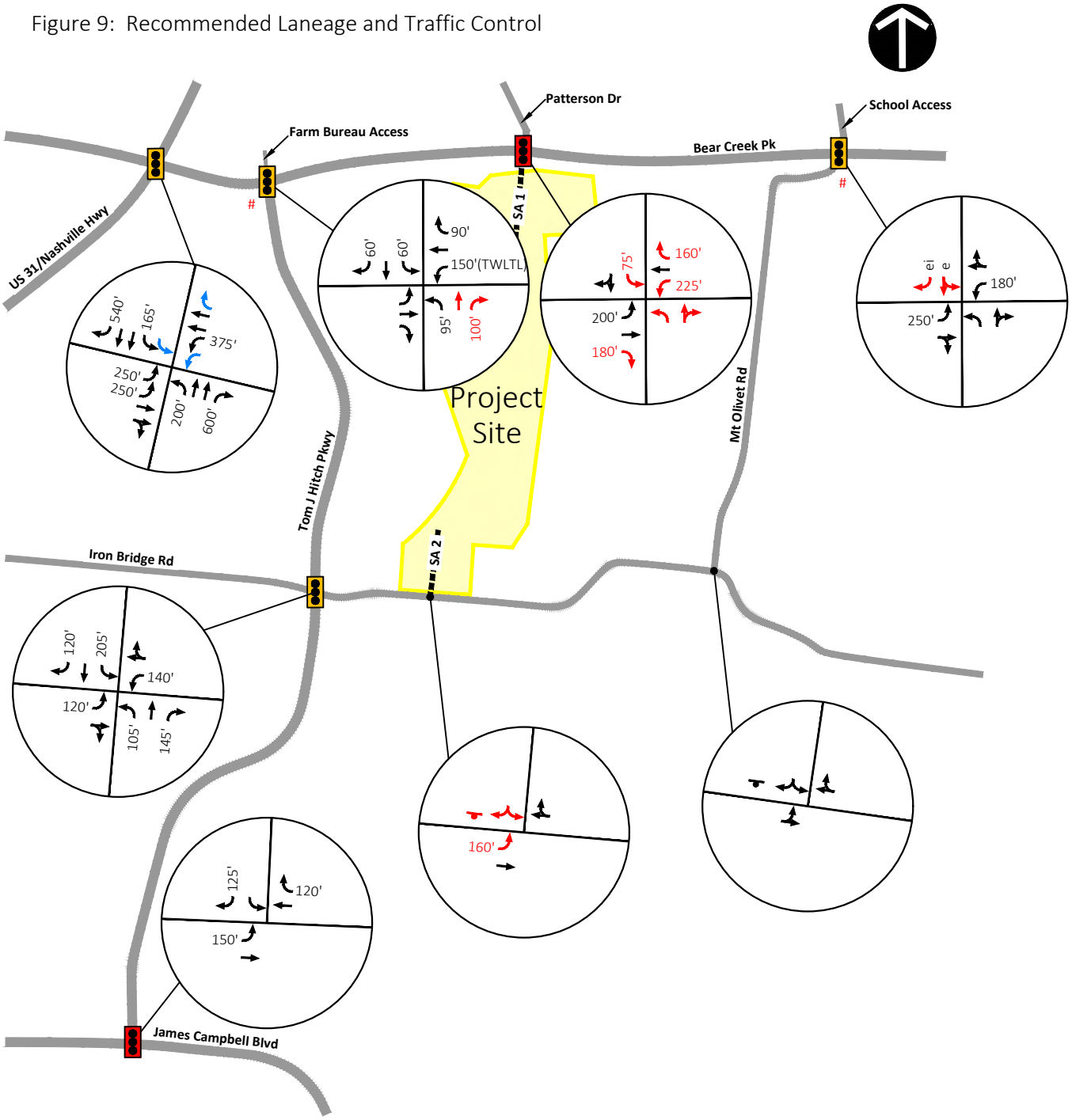
With the planned widening of Bear Creek Pike between Nashville Highway and Tom J Hitch Parkway, the following improvements should be made:

- Reassign the northbound laneage for Tom J Hitch Parkway to provide one left turn lane, one shared left turn/through lane, and one right turn lane.
- Modify the traffic signal to provide split signal phasing for the northbound and southbound approaches.

Based on the analyses presented in this report, no further improvements are recommended in association with the proposed Columbia Bluffs development in Columbia, TN. The recommended and future laneage at the study intersections is presented in Figure 9. Conceptual layouts of the recommended improvements are presented in Figures 10A-10D.

The analyses presented in this TIS evaluated two future buildout scenarios in order to determine when specific roadway improvements will need to be made. The above recommendations are presented in terms of residential phases of development as currently anticipated by Kolter; however, it is recognized that the actual construction of dwelling units for a development this size often does not occur as initially planned. Therefore, based on the analyses, the recommended improvements above were associated with unit count occupancy to identify trigger points for when each should be constructed by the developer or others. The Table in Appendix K presents the phasing for the recommended improvements by dwelling unit count.

Figure 9: Recommended Laneage and Traffic Control




Legend:
- Existing Laneage
- Future Laneage (Planned By Others)
- Future Laneage (Recommended)
- XXX' Storage Length (feet)
- Si
- icSiPeter
- trericSiecoee
- #Sioiictioecoee

(Not to Scale)

Figure 10A: Conceptual Layout of Recommended Improvements at Bear Creek Pike and Tom J Hitch Parkway/Farm Bureau Access

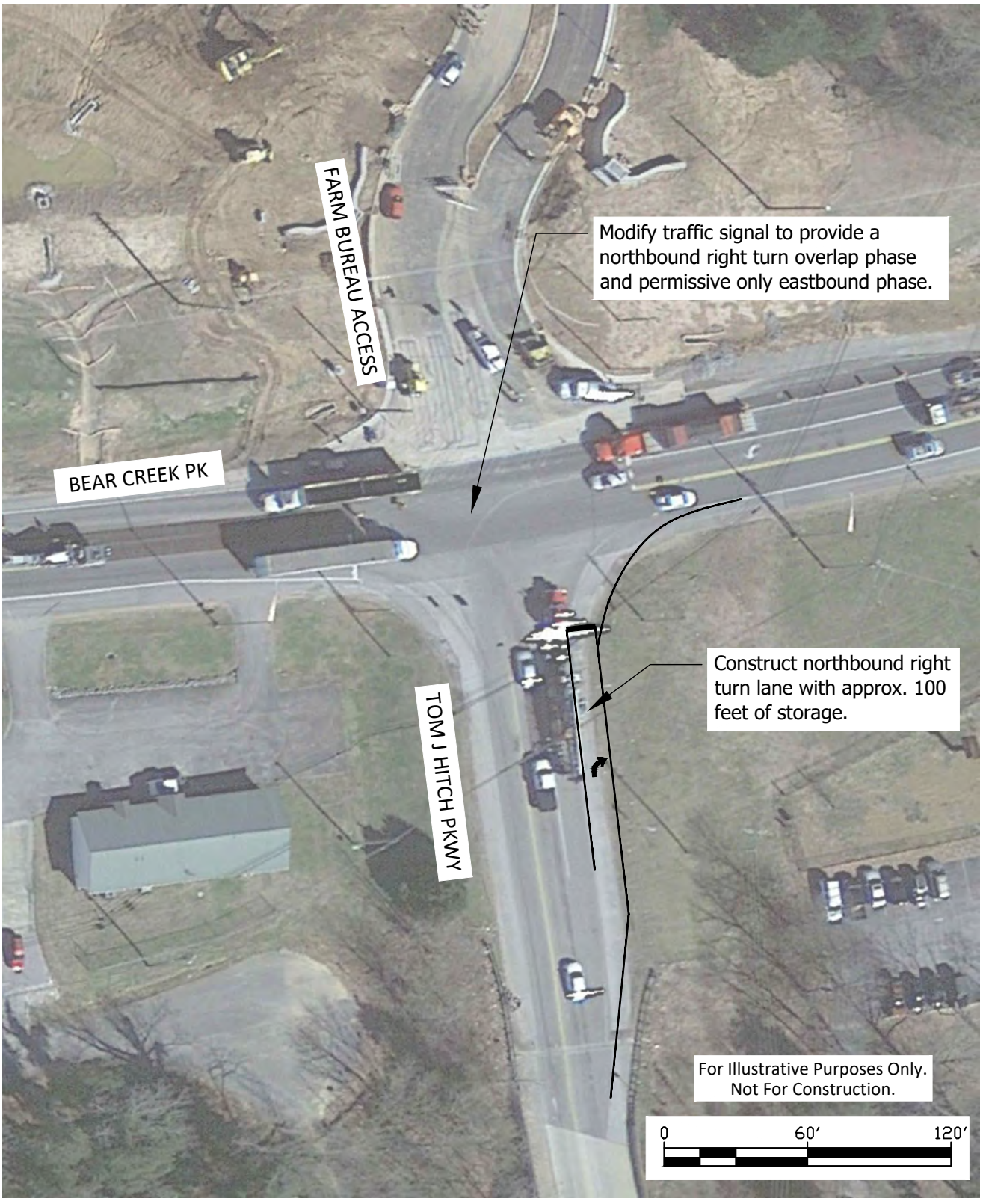


Figure 10B: Conceptual Layout of Recommended Improvements at Bear Creek Pike and Patterson Drive/Site Access 1

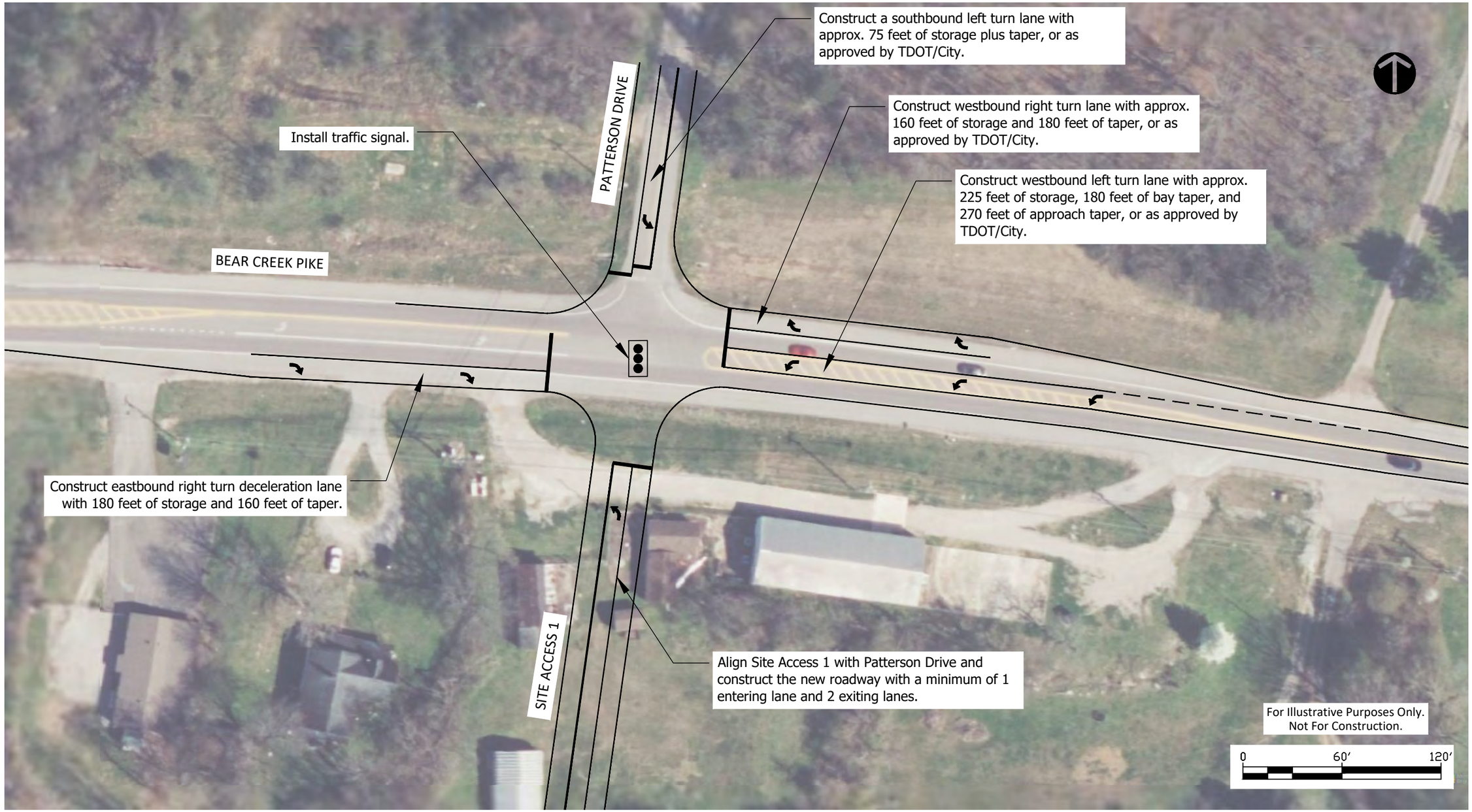


Figure 10C: Conceptual Layout of Recommended Improvements at Bear Creek Pike and Mt Olivet Road/School Access

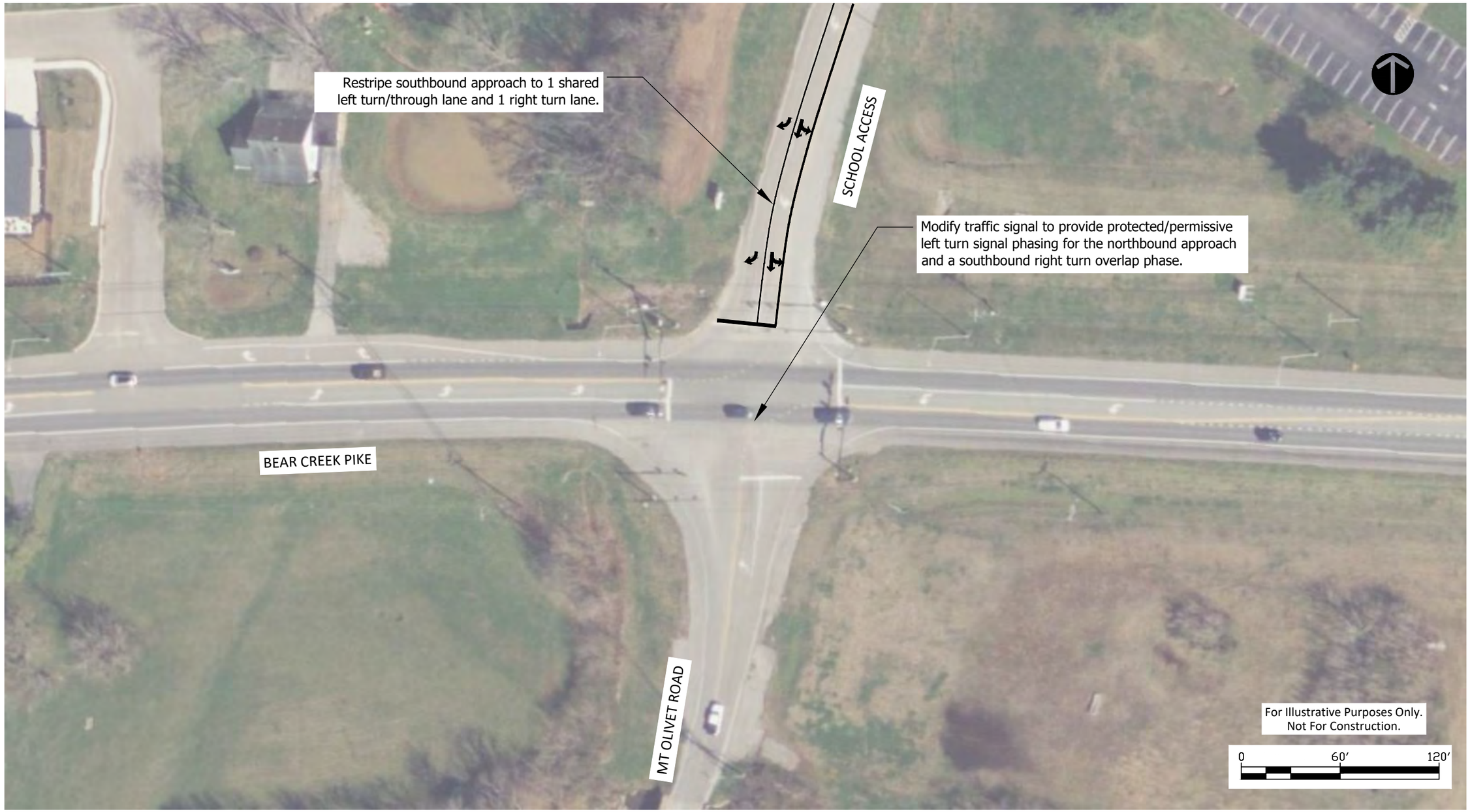


Figure 10D: Conceptual Layout of Recommended Improvements at Iron Bridge Road and Site Access 2



# APPENDIX A
# CURRENT SITE PLAN

DUCK RIVER

IRON BRIDGE RD

BEAR CREEK PKWY

CIVIC SPACE

CIVIC SPACE

CIVIC SPACE

CIVIC SPACE

CIVIC SPACE

50' ROW TYP. - LOCAL ROAD

50' ROW TYP. - LOCAL ROAD

50' ROW TYP. - LOCAL ROAD

PRIMARY AMENITY/ CIVIC SPACE

DAYCARE
+/- 2.3 ACRES

RESIDENTIAL INFORMATION

TOTAL LOTS: 865

- TOWNHOMES: 188
  MIN. LOT SIZE 20' X 120'
- ALLEY SINGLE FAMILY: 355
  MIN. LOT SIZE 40' X 120'
- FRONT LOADED SINGLE FAMILY: 312
  COURTYARD HOMES: 143
  MIN. LOT SIZE 70' X 155'
- LARGE LOT HOMES: 97
  MIN. LOT SIZE 80' X 145'
- EITHER: 72
  MIN. LOT SIZE 80' X 155'

N

0 300 600
GRAPHIC SCALE

# COLUMBIA BLUFFS

## PUD-R CONCEPT PLAN

August 22, 2023

GAMBLE DESIGN COLLABORATIVE

# APPENDIX B
# TIS SCOPE MOU

# CITY OF COLUMBIA – DEVELOPMENT SERVICES

## TRAFFIC IMPACT STUDY (TIS) MEMORANDUM OF UNDERSTANDING (MOU) & AGREEMENT

| CONTACT INFO (Identify primary point of contact) | | | |
|---|---|---|---|
| DEVELOPER/OWNER | [X] PRIMARY CONTACT | CIVIL CONSULTANT | [ ] PRIMARY CONTACT |
| Contact Name: Joshua Gibbs | | Contact Name: Jim Harrison | |
| Company: Kolter Land | | Company: CSDG | |
| Address: 1704 Tellico Drive<br>Thompsons Station, TN 37179 | | Address: 2305 Kline Avenue, Suite 300<br>Nashville, TN 37211 | |
| Email: jgibbs@kolter.com | | Email: jimh@csdgtn.com | |
| Phone: 615-582-3253 | | Phone: 615-248-9999 | |

| DEVELOPERS TIS CONSULTANT CONTACT INFO: *complete if study was completed by Developer's consultant.* | | | |
|---|---|---|---|
| Contact Name: Amy Burch | | Company: Burch Transportation, LLC | |
| Address: 1114 17th Avenue South, Ste. 103, Nashville, TN 37212 | | | |
| Email: amyburch@burchtransportation.com | | Phone: 615-258-8551 | |

**INDICATE THE LEVEL OF TIS REVIEW TO BE PERFORMED BY 3RD PARTY CONSULTANT AND CORRESPONDING FEE (SUBJECT TO STAFF CONFIRMATION):**

* Level of TIS determined by the number of Daily & Peak Hour Trips per estimated trip generation calculation.

[ ] Traffic Access Study ($2,900) [ ] Level I TIS ($3,900) [ ] Level II TIS ($4,800) [X] Level III TIS (Fee TBD)
$5,500 per call with City & Volkert on 8/15/2023

**TRANSPORTATION IMPACT STUDY – MEMORANDUM OF UNDERSTANDING (MOU)**

This MOU acknowledges that the transportation impact study for the following project will be prepared in accordance with the latest version of the City of Columbia Land Development Regulations.

**PROJECT INFORMATION:**

| | |
|---|---|
| Name: | Columbia Bluffs (Formerly Big Bear Bluff) |
| Address: | 400 Bear Creek Pike |
| Description: | Property located between Bear Creek Pike and Iron Bridge Road, east of Duck River |
| Existing Land Use (be specific): | Undeveloped, farmland |
| Proposed Land Use (be specific): | Primarily Residential with some commercial amenities/services |
| Reason for Request: (Planned Unit Development, Site Plan, Rezoning) | Planned Unit Development |
| Potential Development Yield (number of residential units; building square footage, projected number of employees, hours of operations): | +/- 500 Detached single-family units<br>+/- 300 Attached single-family units<br>Up to 800 Total residential dwelling units*<br><br>Up to 30,000 Total square feet of commercial space*<br>+/- 12,000 sf day care center<br>+/- 18,000 sf retail strip center<br><br>**Estimates based on current project planning.* |

[X] Attach a site map and a trip generation table with a description of the proposed land uses, ITE rates, estimated daily, morning, and afternoon peak hour volumes (ins/outs/totals), proposed trip credits, etc.

[X] Attach a conceptual development plan showing all access points and adjacent streets.

| Project Buildout Year: 2029 for Phases 1-3<br>2033 for Full Buildout | Ambient or CMP Growth Rate (% Per Year): 3% |
|---|---|

| STUDY INTERSECTIONS: *use additional pages as necessary | |
|---|---|
| 1. Bear Creek Pike & Nashville Highway | 9. |
| 2. Bear Creek Pike & Tom J. Hitch Parkway | 10. |
| 3. Bear Creek Pike & Patterson Drive | 11. |
| 4. Bear Creek Pike & Mt. Olivet Road | 12. |
| 5. Tom J. Hitch Parkway & Iron Bridge Road | 13. |
| 6. Iron Bridge Road & Mt. Olivet Road | 14. |
| 7. E. James M. Campbell Pkwy & Tom J. Hitch Pkwy | 15. |
| 8. | 16. |

TRIP CREDITS (EXACT AMOUNT OF CREDIT SUBJECT TO APPROVAL BY CITY OF COLUMBIA):

| | YES | (indicate ___% of total trips) | NO |
|---|---|---|---|
| Transit Usage | ☐ | % | ☒ |
| Existing Active Land Use | ☐ | % | ☒ |
| Previous Land Use | ☐ | % | ☒ |
| Internal Trip | ☐ | % | ☒ |
| Pass-By Trip | ☐ | % | ☒ |

| 3RD PARTY TRAFFIC CONSULTANT CONTACT INFO: | ☐ NEEL SCHAFFER | ☒ VOLKERT |
|---|---|---|
| NEEL SCHAFFER - GREG JUDY | | VOLKERT – DYAN DAMRON |
| 201 E. Main Street, Suite 325<br>Murfreesboro, TN 37130 | | 302 Innovation Drive, Suite 100<br>Franklin, TN 37067 |
| greg.judy@neel-schaffer.com | 615-217-0500 | dyan.damron@volkert.com | 615-656-1845 |

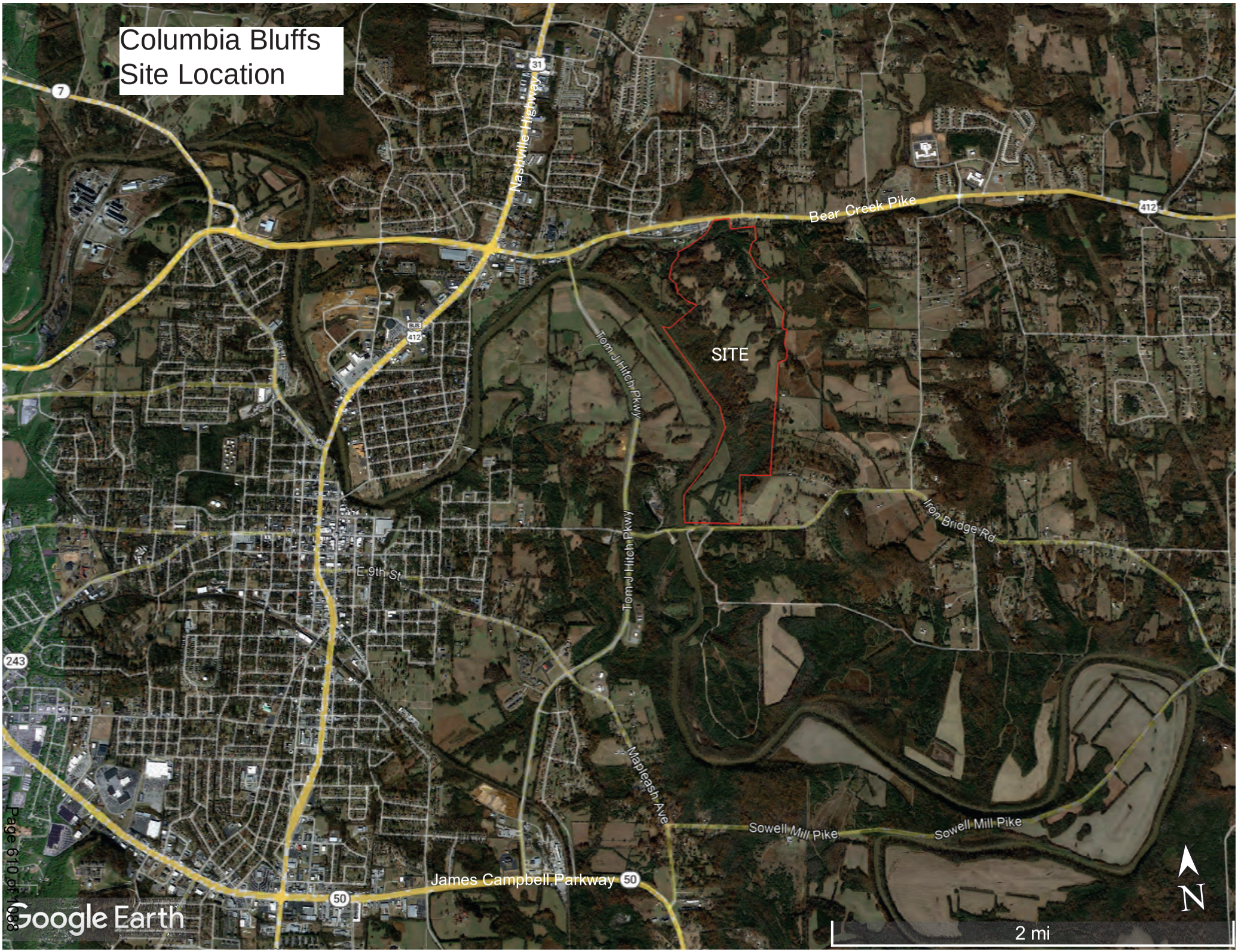
MEMORANDUM OF UNDERSTANDING SIGN OFF:

| | Name | Signature | Date |
|---|---|---|---|
| APPLICANT: | Joshua Gibbs | Digitally signed by Joshua Gibbs<br>Reason: I am approving this document<br>Location: KolterLand<br>Date: 2023.08.18 10:39:16 -05'00' | 8.18.23 |

*As applicant, I agree to pay 100% of the review fee. *Paid to the City of Columbia.*
I understand that no work will commence until FULL payment is received and that it is NON-REFUNDABLE.

| | Name | Signature | Date |
|---|---|---|---|
| 3RD PARTY TRAFFIC CONSULTANT: | Dyan Damron, PE, PTP | Dyan C Damron | 8/18/23 |
| CITY ENGINEER: | GLENN HARPER | | 8/22/23 |
| DIRECTOR OF DEVELOPMENT SERVICES: | Paul Kolter | | 8/22/23 |

*Questions may be submitted and the completed form shall be emailed for review to: Glenn Harper, City Engineer gharper@columbiatn.com.*


Columbia Bluffs
Site Location
SITE
Bear Creek Pike
Nashville Highway
Tom J Hitch Pkwy
Iron Bridge Rd
E 9th St
Mapleash Ave
Sowell Mill Pike
James Campbell Parkway
Google Earth
2 mi
N

**Columbia Bluffs**
**Trip Generation Calculations**

**Base Trip Generation**

| Land Use | Size | Unit | Weekday ADT | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | Enter | Exit | Total | Enter | Exit |
| Single-Family Detached Housing LUC 210 | 500 | DU | 4,436 | 322 | 81 | 241 | 451 | 284 | 167 |
| Single-Family Attached Housing LUC 215 | 300 | DU | 2,236 | 150 | 38 | 112 | 176 | 104 | 72 |
| Day Care Center LUC 565 | 12,000 | SF | 571 | 132 | 70 | 62 | 133 | 63 | 70 |
| Strip Retail Plaza (<40 k) LUC 822 | 18,000 | SF | 989 | 42 | 25 | 17 | 118 | 59 | 59 |
| **Total Development** | **--** | **--** | **8,232** | **646** | **214** | **432** | **878** | **510** | **368** |

Source: *ITE Trip Generation Manual, 11th Edition*

# APPENDIX C
# TDOT COUNT DATA & HISTORICAL ANALYSIS

**TDOT Count Station Data Historical Growth Analysis (AADT)**

| Station No. | Station 204 | Annual | Station 45 | Annual | Station 47 | Annual | Station 44 | Annual | Station 46 | Annual | | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Street | Tom J Hitch Pkwy | % | Bear Creek Pk | % | Iron Bridge Rd | % | Nashville Hwy | % | Nashville Hwy | % | | % |
| Location | South of Bear Creek Pike | Growth | East of Tom J Hitch Pkwy | Growth | West of Tom J Hitch Pkwy | Growth | North of Bear Creek Pike | Growth | South of Bear Creek Pike | Growth | Total | Growth |
| Year | | | | | | | | | | | | |
| 2022 | 9651 | -1.0% | 17487 | 3.1% | 1342 | 4.1% | 45166 | 11.8% | 29584 | 12.4% | 103230 | 9.0% |
| 2021 | 9751 | 2.1% | 16963 | -0.2% | 1289 | -11.9% | 40382 | 6.3% | 26329 | -5.1% | 94714 | 1.1% |
| 2020 | 9546 | -8.3% | 17002 | 1.0% | 1463 | -2.1% | 37972 | -12.4% | 27741 | 1.0% | 93724 | -5.8% |
| 2019 | 10410 | 36.7% | 16834 | 2.3% | 1495 | -4.5% | 43329 | 5.9% | 27466 | 2.1% | 99534 | 6.5% |
| 2018 | 7613 | -17.6% | 16449 | -7.5% | 1565 | 4.3% | 40922 | -7.5% | 26893 | 3.8% | 93442 | -5.3% |
| 2017 | 9234 | 4.2% | 17774 | 34.1% | 1501 | 39.6% | 44228 | 3.7% | 25904 | -0.8% | 98641 | 7.3% |
| 2016 | 8858 | 21.9% | 13258 | 1.0% | 1075 | -1.5% | 42666 | 13.6% | 26101 | 12.1% | 91958 | 11.7% |
| 2015 | 7269 | -3.0% | 13127 | -1.6% | 1091 | 3.0% | 37557 | 5.5% | 23291 | -5.2% | 82335 | 0.3% |
| 2014 | 7493 | 15.0% | 13345 | 10.5% | 1059 | 5.3% | 35584 | 3.3% | 24575 | 3.8% | 82056 | 5.6% |
| 2013 | 6516 | -4.9% | 12078 | -7.8% | 1006 | -4.3% | 34432 | 4.8% | 23686 | 8.9% | 77718 | 2.8% |
| 2012 | 6851 | -0.2% | 13102 | -2.4% | 1051 | 3.0% | 32860 | -3.4% | 21745 | -1.3% | 75609 | -2.2% |
| 2011 | 6863 | | 13419 | | 1020 | | 34003 | | 22040 | | 77345 | |
| | | | | | | | | | | | | |
| With 2021 Data: | | | | | | | | | | | | |
| 10-year Annual Avg Growth | | 4.5% | | 3.5% | | 3.2% | | 3.5% | | 3.3% | | 3.3% |
| 5-year Annual Avg Growth | | 2.4% | | -0.3% | | -2.0% | | 0.8% | | 2.8% | | 1.1% |
| 3-year Annual Avg Growth | | -2.4% | | 1.3% | | -3.3% | | 1.9% | | 2.8% | | 1.4% |
| | | | | | | | | | | | | |
| Pre-2021 Data: | | | | | | | | | | | | |
| 9-year Annual Avg Growth | | 4.9% | | 3.3% | | 4.8% | | 1.5% | | 2.7% | | 2.3% |
| 5-year Annual Avg Growth | | 7.4% | | 6.2% | | 7.2% | | 0.7% | | 3.7% | | 2.9% |
| 3-year Annual Avg Growth | | 3.6% | | -1.4% | | -0.8% | | -4.7% | | 2.3% | | -1.5% |
| | | | | | | | | | | | | |
| Pre-pandemic Data: | | | | | | | | | | | | |
| 8-year Annual Avg Growth | | 6.5% | | 3.6% | | 5.6% | | 3.2% | | 2.9% | | 3.3% |
| 5-year Annual Avg Growth | | 8.5% | | 5.7% | | 8.2% | | 4.2% | | 2.4% | | 4.1% |
| 3-year Annual Avg Growth | | 7.8% | | 9.6% | | 13.1% | | 0.7% | | 1.7% | | 2.8% |

# APPENDIX D
# TURNING MOVEMENT COUNTS

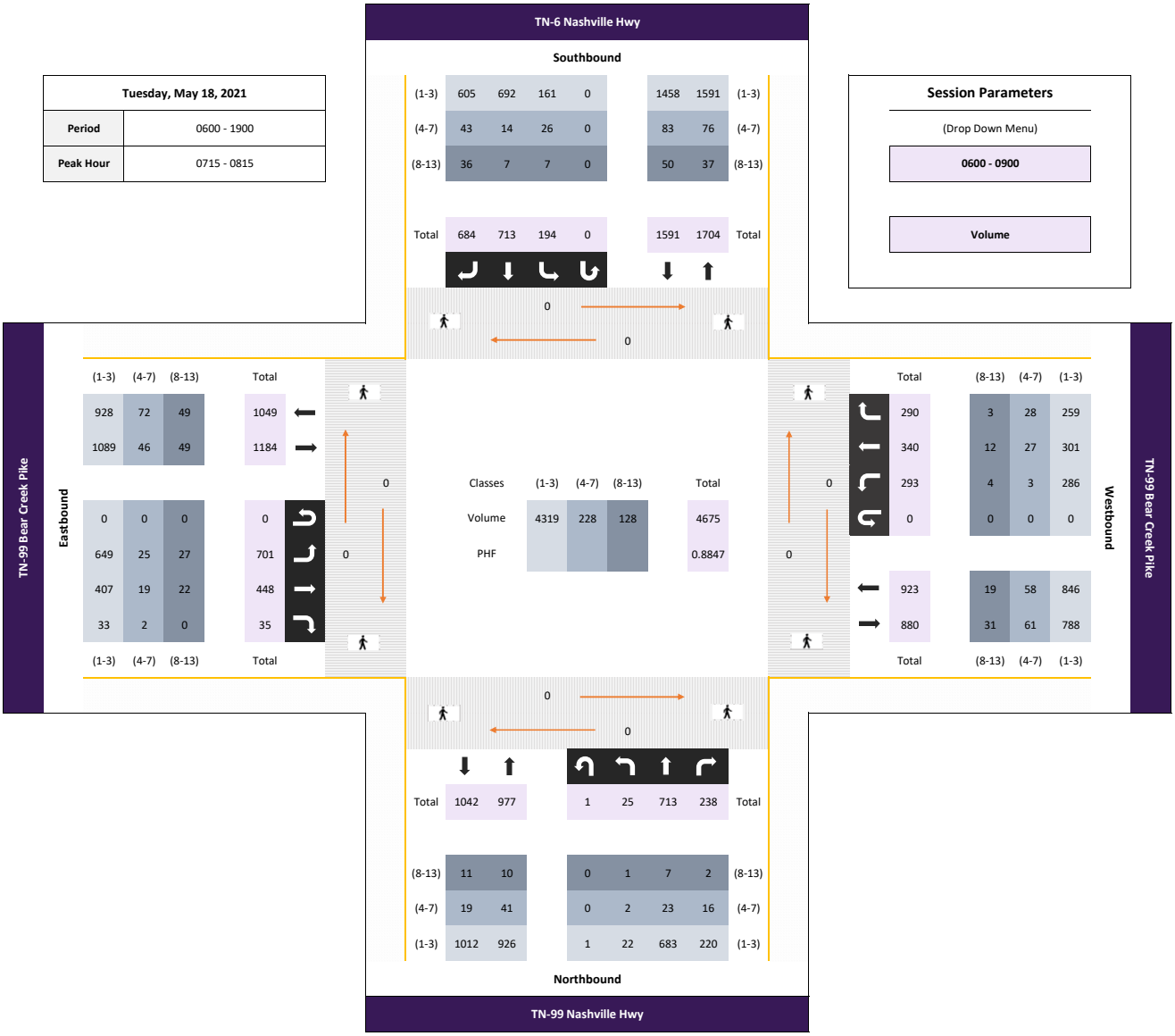
Click here for Map

## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com




| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 0715 - 0815 |

**Session Parameters**

(Drop Down Menu)

0600 - 0900

Volume

**All vehicles**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 0715 - 0730 | 9 | 152 | 60 | 0 | 221 | 49 | 137 | 170 | 0 | 356 | 176 | 127 | 9 | 0 | 312 | 81 | 78 | 75 | 0 | 234 | 1123 |
| 0730 - 0745 | 9 | 192 | 73 | 1 | 275 | 55 | 194 | 160 | 0 | 409 | 164 | 93 | 10 | 0 | 267 | 68 | 89 | 70 | 0 | 227 | 1178 |
| 0745 - 0800 | 5 | 229 | 61 | 0 | 295 | 43 | 229 | 180 | 0 | 452 | 174 | 132 | 11 | 0 | 317 | 72 | 102 | 83 | 0 | 257 | 1321 |
| 0800 - 0815 | 2 | 140 | 44 | 0 | 186 | 47 | 153 | 174 | 0 | 374 | 187 | 96 | 5 | 0 | 288 | 72 | 71 | 62 | 0 | 205 | 1053 |
| Total | 25 | 713 | 238 | 1 | 977 | 194 | 713 | 684 | 0 | 1591 | 701 | 448 | 35 | 0 | 1184 | 293 | 340 | 290 | 0 | 923 | 4675 |
| Approach % | 2.56 | 72.98 | 24.36 | 0.10 | - | 12.19 | 44.81 | 42.99 | 0.00 | - | 59.21 | 37.84 | 2.96 | 0.00 | - | 31.74 | 36.84 | 31.42 | 0.00 | - | |
| PHF | 0.69 | 0.78 | 0.82 | 0.25 | **0.83** | 0.88 | 0.78 | 0.95 | 0.00 | **0.88** | 0.94 | 0.85 | 0.80 | 0.00 | **0.93** | 0.90 | 0.83 | 0.87 | 0.00 | **0.90** | **0.88** |

**Bikes**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0800 - 0815 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 0715 - 0730 | 8 | 147 | 57 | 0 | 212 | 43 | 133 | 148 | 0 | 324 | 168 | 116 | 9 | 0 | 293 | 80 | 73 | 63 | 0 | 216 | 1045 |
| 0730 - 0745 | 7 | 185 | 68 | 1 | 261 | 49 | 185 | 141 | 0 | 375 | 152 | 92 | 9 | 0 | 253 | 67 | 81 | 60 | 0 | 208 | 1097 |
| 0745 - 0800 | 5 | 217 | 55 | 0 | 277 | 36 | 223 | 161 | 0 | 420 | 155 | 119 | 11 | 0 | 285 | 71 | 88 | 74 | 0 | 233 | 1215 |
| 0800 - 0815 | 2 | 134 | 40 | 0 | 176 | 33 | 151 | 155 | 0 | 339 | 174 | 80 | 4 | 0 | 258 | 68 | 59 | 62 | 0 | 189 | 962 |
| Total | 22 | 683 | 220 | 1 | 926 | 161 | 692 | 605 | 0 | 1458 | 649 | 407 | 33 | 0 | 1089 | 286 | 301 | 259 | 0 | 846 | 4319 |
| Approach % | 2.38 | 73.76 | 23.76 | 0.11 | - | 11.04 | 47.46 | 41.50 | 0.00 | - | 59.60 | 37.37 | 3.03 | 0.00 | - | 33.81 | 35.58 | 30.61 | 0.00 | - | |
| PHF | 0.69 | 0.79 | 0.81 | 0.25 | **0.84** | 0.82 | 0.78 | 0.94 | 0.00 | **0.87** | 0.93 | 0.86 | 0.75 | 0.00 | **0.93** | 0.89 | 0.86 | 0.88 | 0.00 | **0.91** | **0.89** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 0715 - 0730 | 1 | 2 | 3 | 0 | 6 | 4 | 2 | 12 | 0 | 18 | 5 | 5 | 0 | 0 | 10 | 1 | 3 | 9 | 0 | 13 | 47 |
| 0730 - 0745 | 1 | 6 | 4 | 0 | 11 | 6 | 6 | 6 | 0 | 18 | 4 | 0 | 1 | 0 | 5 | 0 | 5 | 10 | 0 | 15 | 49 |
| 0745 - 0800 | 0 | 10 | 5 | 0 | 15 | 7 | 5 | 10 | 0 | 22 | 12 | 9 | 0 | 0 | 21 | 0 | 14 | 9 | 0 | 23 | 81 |
| 0800 - 0815 | 0 | 5 | 4 | 0 | 9 | 9 | 1 | 15 | 0 | 25 | 4 | 5 | 1 | 0 | 10 | 2 | 5 | 0 | 0 | 7 | 51 |
| Total | 2 | 23 | 16 | 0 | 41 | 26 | 14 | 43 | 0 | 83 | 25 | 19 | 2 | 0 | 46 | 3 | 27 | 28 | 0 | 58 | 228 |
| Approach % | 4.88 | 56.10 | 39.02 | 0.00 | - | 31.33 | 16.87 | 51.81 | 0.00 | - | 54.35 | 41.30 | 4.35 | 0.00 | - | 5.17 | 46.55 | 48.28 | 0.00 | - | |
| PHF | 0.50 | 0.58 | 0.80 | 0.00 | **0.68** | 0.72 | 0.58 | 0.72 | 0.00 | **0.83** | 0.52 | 0.53 | 0.50 | 0.00 | **0.55** | 0.38 | 0.48 | 0.70 | 0.00 | **0.63** | **0.70** |

**Combination Trucks (8-13)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 0715 - 0730 | 0 | 3 | 0 | 0 | 3 | 2 | 2 | 10 | 0 | 14 | 3 | 6 | 0 | 0 | 9 | 0 | 2 | 3 | 0 | 5 | 31 |
| 0730 - 0745 | 1 | 1 | 1 | 0 | 3 | 0 | 3 | 13 | 0 | 16 | 8 | 1 | 0 | 0 | 9 | 1 | 3 | 0 | 0 | 4 | 32 |
| 0745 - 0800 | 0 | 2 | 1 | 0 | 3 | 0 | 1 | 9 | 0 | 10 | 7 | 4 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 1 | 25 |
| 0800 - 0815 | 0 | 1 | 0 | 0 | 1 | 5 | 1 | 4 | 0 | 10 | 9 | 11 | 0 | 0 | 20 | 2 | 7 | 0 | 0 | 9 | 40 |
| Total | 1 | 7 | 2 | 0 | 10 | 7 | 7 | 36 | 0 | 50 | 27 | 22 | 0 | 0 | 49 | 4 | 12 | 3 | 0 | 19 | 128 |
| Approach % | 10.00 | 70.00 | 20.00 | 0.00 | - | 14.00 | 14.00 | 72.00 | 0.00 | - | 55.10 | 44.90 | 0.00 | 0.00 | - | 21.05 | 63.16 | 15.79 | 0.00 | - | |
| PHF | 0.25 | 0.58 | 0.50 | 0.00 | **0.83** | 0.35 | 0.58 | 0.69 | 0.00 | **0.78** | 0.75 | 0.50 | 0.00 | 0.00 | **0.61** | 0.50 | 0.43 | 0.25 | 0.00 | **0.53** | **0.80** |

**Pedestrians**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | EB | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 5a | 5b | | | Total | 5c | 5d | | | Total | 5e | 5f | | | Total | 5g | 5h | | | Total | Total |
| 0715 - 0730 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0800 - 0815 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 1630 - 1730 |

**Session Parameters**

(Drop Down Menu)

1400 - 1830

Volume



**All vehicles**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 1630 - 1645 | 14 | 185 | 93 | 0 | 292 | 49 | 211 | 163 | 0 | 423 | 149 | 93 | 2 | 0 | 244 | 93 | 146 | 43 | 0 | 282 | 1241 |
| 1645 - 1700 | 13 | 143 | 98 | 0 | 254 | 53 | 223 | 182 | 0 | 458 | 118 | 85 | 14 | 0 | 217 | 103 | 117 | 44 | 0 | 264 | 1193 |
| 1700 - 1715 | 16 | 192 | 102 | 0 | 310 | 60 | 210 | 171 | 0 | 441 | 129 | 182 | 18 | 0 | 329 | 92 | 131 | 48 | 0 | 271 | 1351 |
| 1715 - 1730 | 11 | 232 | 89 | 0 | 332 | 60 | 228 | 223 | 0 | 511 | 170 | 78 | 14 | 0 | 262 | 78 | 105 | 49 | 0 | 232 | 1337 |
| Total | 54 | 752 | 382 | 0 | 1188 | 222 | 872 | 739 | 0 | 1833 | 566 | 438 | 48 | 0 | 1052 | 366 | 499 | 184 | 0 | 1049 | 5122 |
| Approach % | 4.55 | 63.30 | 32.15 | 0.00 | - | 12.11 | 47.57 | 40.32 | 0.00 | - | 53.80 | 41.63 | 4.56 | 0.00 | - | 34.89 | 47.57 | 17.54 | 0.00 | - | |
| PHF | 0.84 | 0.81 | 0.94 | 0.00 | **0.89** | 0.93 | 0.96 | 0.83 | 0.00 | **0.90** | 0.83 | 0.60 | 0.67 | 0.00 | **0.80** | 0.89 | 0.85 | 0.94 | 0.00 | **0.93** | **0.95** |

**Bikes**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 1630 - 1645 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1645 - 1700 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1700 - 1715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1715 - 1730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 1630 - 1645 | 14 | 179 | 91 | 0 | 284 | 46 | 202 | 151 | 0 | 399 | 144 | 88 | 2 | 0 | 234 | 93 | 136 | 40 | 0 | 269 | 1186 |
| 1645 - 1700 | 13 | 139 | 97 | 0 | 249 | 48 | 219 | 175 | 0 | 442 | 114 | 81 | 14 | 0 | 209 | 103 | 110 | 40 | 0 | 253 | 1153 |
| 1700 - 1715 | 16 | 190 | 100 | 0 | 306 | 59 | 199 | 163 | 0 | 421 | 126 | 157 | 17 | 0 | 300 | 89 | 126 | 44 | 0 | 259 | 1286 |
| 1715 - 1730 | 11 | 227 | 89 | 0 | 327 | 58 | 223 | 218 | 0 | 499 | 163 | 72 | 14 | 0 | 249 | 77 | 98 | 46 | 0 | 221 | 1296 |
| Total | 54 | 735 | 377 | 0 | 1166 | 211 | 843 | 707 | 0 | 1761 | 547 | 398 | 47 | 0 | 992 | 362 | 470 | 170 | 0 | 1002 | 4921 |
| Approach % | 4.63 | 63.04 | 32.33 | 0.00 | - | 11.98 | 47.87 | 40.15 | 0.00 | - | 55.14 | 40.12 | 4.74 | 0.00 | - | 36.13 | 46.91 | 16.97 | 0.00 | - | |
| PHF | 0.84 | 0.81 | 0.94 | 0.00 | **0.89** | 0.89 | 0.95 | 0.81 | 0.00 | **0.88** | 0.84 | 0.63 | 0.69 | 0.00 | **0.83** | 0.88 | 0.86 | 0.92 | 0.00 | **0.93** | **0.95** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 1630 - 1645 | 0 | 5 | 2 | 0 | 7 | 3 | 9 | 3 | 0 | 15 | 1 | 2 | 0 | 0 | 3 | 0 | 5 | 3 | 0 | 8 | 33 |
| 1645 - 1700 | 0 | 2 | 1 | 0 | 3 | 2 | 2 | 6 | 0 | 10 | 4 | 2 | 0 | 0 | 6 | 0 | 4 | 3 | 0 | 7 | 26 |
| 1700 - 1715 | 0 | 1 | 2 | 0 | 3 | 1 | 9 | 4 | 0 | 14 | 0 | 11 | 1 | 0 | 12 | 2 | 5 | 3 | 0 | 10 | 39 |
| 1715 - 1730 | 0 | 4 | 0 | 0 | 4 | 1 | 5 | 3 | 0 | 9 | 4 | 4 | 0 | 0 | 8 | 1 | 6 | 2 | 0 | 9 | 30 |
| Total | 0 | 12 | 5 | 0 | 17 | 7 | 25 | 16 | 0 | 48 | 9 | 19 | 1 | 0 | 29 | 3 | 20 | 11 | 0 | 34 | 128 |
| Approach % | 0.00 | 70.59 | 29.41 | 0.00 | - | 14.58 | 52.08 | 33.33 | 0.00 | - | 31.03 | 65.52 | 3.45 | 0.00 | - | 8.82 | 58.82 | 32.35 | 0.00 | - | |
| PHF | 0.00 | 0.60 | 0.63 | 0.00 | **0.61** | 0.58 | 0.69 | 0.67 | 0.00 | **0.80** | 0.56 | 0.43 | 0.25 | 0.00 | **0.60** | 0.38 | 0.83 | 0.92 | 0.00 | **0.85** | **0.82** |

**Combination Trucks (8-13)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 5.1 | 5.2 | 5.3 | 5.4 | Total | 5.5 | 5.6 | 5.7 | 5.8 | Total | 5.9 | 5.10 | 5.11 | 5.12 | Total | 5.13 | 5.14 | 5.15 | 5.16 | Total | Total |
| 1630 - 1645 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 9 | 4 | 3 | 0 | 0 | 7 | 0 | 5 | 0 | 0 | 5 | 22 |
| 1645 - 1700 | 0 | 2 | 0 | 0 | 2 | 3 | 2 | 1 | 0 | 6 | 0 | 2 | 0 | 0 | 2 | 0 | 3 | 1 | 0 | 4 | 14 |
| 1700 - 1715 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 4 | 0 | 6 | 3 | 14 | 0 | 0 | 17 | 1 | 0 | 1 | 0 | 2 | 26 |
| 1715 - 1730 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 3 | 3 | 2 | 0 | 0 | 5 | 0 | 1 | 1 | 0 | 2 | 11 |
| Total | 0 | 5 | 0 | 0 | 5 | 4 | 4 | 16 | 0 | 24 | 10 | 21 | 0 | 0 | 31 | 1 | 9 | 3 | 0 | 13 | 73 |
| Approach % | 0.00 | 100.00 | 0.00 | 0.00 | - | 16.67 | 16.67 | 66.67 | 0.00 | - | 32.26 | 67.74 | 0.00 | 0.00 | - | 7.69 | 69.23 | 23.08 | 0.00 | - | |
| PHF | 0.00 | 0.63 | 0.00 | 0.00 | **0.63** | 0.33 | 0.50 | 0.44 | 0.00 | **0.67** | 0.63 | 0.38 | 0.00 | 0.00 | **0.46** | 0.25 | 0.45 | 0.75 | 0.00 | **0.65** | **0.70** |

**Pedestrians**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TN-99 Nashville Hwy | | | | | TN-6 Nashville Hwy | | | | | TN-99 Bear Creek Pike | | | | | TN-99 Bear Creek Pike | | | | | |
| | EB | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 5a | 5b | | | Total | 5c | 5d | | | Total | 5e | 5f | | | Total | 5g | 5h | | | Total | Total |
| 1630 - 1645 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1645 - 1700 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1700 - 1715 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1715 - 1730 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 0715 - 0815 |

**Session Parameters**

(Drop Down Menu)

0600 - 0900

Volume



**All vehicles**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 0715 - 0730 | 89 | - | 57 | 0 | 146 | - | - | - | - | 0 | - | 135 | 37 | 0 | 172 | 37 | 156 | - | 0 | 193 | 511 |
| 0730 - 0745 | 86 | - | 49 | 0 | 135 | - | - | - | - | 0 | - | 139 | 41 | 0 | 180 | 40 | 183 | - | 0 | 223 | 538 |
| 0745 - 0800 | 90 | - | 51 | 0 | 141 | - | - | - | - | 0 | - | 130 | 41 | 0 | 171 | 64 | 200 | - | 0 | 264 | 576 |
| 0800 - 0815 | 48 | - | 25 | 0 | 73 | - | - | - | - | 0 | - | 132 | 34 | 0 | 166 | 41 | 150 | - | 0 | 191 | 430 |
| Total | 313 | 0 | 182 | 0 | 495 | 0 | 0 | 0 | 0 | 0 | 0 | 536 | 153 | 0 | 689 | 182 | 689 | 0 | 0 | 871 | 2055 |
| Approach % | 63.23 | 0.00 | 36.77 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 77.79 | 22.21 | 0.00 | - | 20.90 | 79.10 | 0.00 | 0.00 | - | |
| PHF | 0.87 | 0.00 | 0.80 | 0.00 | **0.85** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.96 | 0.93 | 0.00 | **0.96** | 0.71 | 0.86 | 0.00 | 0.00 | **0.82** | **0.89** |

**Bikes**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 0715 - 0730 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 0730 - 0745 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 0745 - 0800 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 0800 - 0815 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 0715 - 0730 | 78 | - | 54 | 0 | 132 | - | - | - | - | 0 | - | 122 | 33 | 0 | 155 | 35 | 145 | - | 0 | 180 | 467 |
| 0730 - 0745 | 78 | - | 45 | 0 | 123 | - | - | - | - | 0 | - | 125 | 40 | 0 | 165 | 38 | 167 | - | 0 | 205 | 493 |
| 0745 - 0800 | 87 | - | 48 | 0 | 135 | - | - | - | - | 0 | - | 112 | 40 | 0 | 152 | 63 | 184 | - | 0 | 247 | 534 |
| 0800 - 0815 | 44 | - | 24 | 0 | 68 | - | - | - | - | 0 | - | 112 | 24 | 0 | 136 | 37 | 139 | - | 0 | 176 | 380 |
| Total | 287 | 0 | 171 | 0 | 458 | 0 | 0 | 0 | 0 | 0 | 0 | 471 | 137 | 0 | 608 | 173 | 635 | 0 | 0 | 808 | 1874 |
| Approach % | 62.66 | 0.00 | 37.34 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 77.47 | 22.53 | 0.00 | - | 21.41 | 78.59 | 0.00 | 0.00 | - | |
| PHF | 0.82 | 0.00 | 0.79 | 0.00 | **0.85** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.94 | 0.86 | 0.00 | **0.92** | 0.69 | 0.86 | 0.00 | 0.00 | **0.82** | **0.88** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 0715 - 0730 | 9 | - | 3 | 0 | 12 | - | - | - | - | 0 | - | 8 | 3 | 0 | 11 | 2 | 7 | - | 0 | 9 | 32 |
| 0730 - 0745 | 8 | - | 4 | 0 | 12 | - | - | - | - | 0 | - | 9 | 1 | 0 | 10 | 2 | 14 | - | 0 | 16 | 38 |
| 0745 - 0800 | 3 | - | 2 | 0 | 5 | - | - | - | - | 0 | - | 13 | 1 | 0 | 14 | 1 | 15 | - | 0 | 16 | 35 |
| 0800 - 0815 | 3 | - | 1 | 0 | 4 | - | - | - | - | 0 | - | 7 | 8 | 0 | 15 | 4 | 3 | - | 0 | 7 | 26 |
| Total | 23 | 0 | 10 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 13 | 0 | 50 | 9 | 39 | 0 | 0 | 48 | 131 |
| Approach % | 69.70 | 0.00 | 30.30 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 74.00 | 26.00 | 0.00 | - | 18.75 | 81.25 | 0.00 | 0.00 | - | |
| PHF | 0.64 | 0.00 | 0.63 | 0.00 | **0.69** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.71 | 0.41 | 0.00 | **0.83** | 0.56 | 0.65 | 0.00 | 0.00 | **0.75** | **0.86** |

**Combination Trucks (8-13)**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 0715 - 0730 | 2 | - | 0 | 0 | 2 | - | - | - | - | 0 | - | 5 | 1 | 0 | 6 | 0 | 4 | - | 0 | 4 | 12 |
| 0730 - 0745 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 5 | 0 | 0 | 5 | 0 | 2 | - | 0 | 2 | 7 |
| 0745 - 0800 | 0 | - | 1 | 0 | 1 | - | - | - | - | 0 | - | 5 | 0 | 0 | 5 | 0 | 1 | - | 0 | 1 | 7 |
| 0800 - 0815 | 1 | - | 0 | 0 | 1 | - | - | - | - | 0 | - | 13 | 2 | 0 | 15 | 0 | 8 | - | 0 | 8 | 24 |
| Total | 3 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 3 | 0 | 31 | 0 | 15 | 0 | 0 | 15 | 50 |
| Approach % | 75.00 | 0.00 | 25.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 90.32 | 9.68 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.38 | 0.00 | 0.25 | 0.00 | **0.50** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.54 | 0.38 | 0.00 | **0.52** | 0.00 | 0.47 | 0.00 | 0.00 | **0.47** | **0.52** |

**Pedestrians**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | EB | WB | | | App | | | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 6a | 6b | | | Total | | | | | Total | 6e | 6f | | | Total | 6g | 6h | | | Total | Total |
| 0715 - 0730 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0800 - 0815 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

Click here for Map

## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 1615 - 1715 |

**Session Parameters**

(Drop Down Menu)

1400 - 1830

Volume



**All vehicles**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 1615 - 1630 | 48 | - | 57 | 0 | 105 | - | - | - | - | 0 | - | 159 | 51 | 0 | 210 | 59 | 198 | - | 0 | 257 | 572 |
| 1630 - 1645 | 37 | - | 55 | 0 | 92 | - | - | - | - | 0 | - | 188 | 76 | 0 | 264 | 65 | 178 | - | 0 | 243 | 599 |
| 1645 - 1700 | 37 | - | 52 | 0 | 89 | - | - | - | - | 0 | - | 175 | 62 | 0 | 237 | 57 | 192 | - | 0 | 249 | 575 |
| 1700 - 1715 | 53 | - | 49 | 0 | 102 | - | - | - | - | 0 | - | 156 | 50 | 0 | 206 | 85 | 193 | - | 0 | 278 | 586 |
| Total | 175 | 0 | 213 | 0 | 388 | 0 | 0 | 0 | 0 | 0 | 0 | 678 | 239 | 0 | 917 | 266 | 761 | 0 | 0 | 1027 | 2332 |
| Approach % | 45.10 | 0.00 | 54.90 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 73.94 | 26.06 | 0.00 | - | 25.90 | 74.10 | 0.00 | 0.00 | - | |
| PHF | 0.83 | 0.00 | 0.93 | 0.00 | **0.92** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.90 | 0.79 | 0.00 | **0.87** | 0.78 | 0.96 | 0.00 | 0.00 | **0.92** | **0.97** |

**Bikes**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 1615 - 1630 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 1630 - 1645 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 1645 - 1700 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 1700 - 1715 | 0 | - | 0 | 0 | 0 | - | - | - | - | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 1615 - 1630 | 45 | - | 53 | 0 | 98 | - | - | - | - | 0 | - | 144 | 48 | 0 | 192 | 57 | 189 | - | 0 | 246 | 536 |
| 1630 - 1645 | 33 | - | 53 | 0 | 86 | - | - | - | - | 0 | - | 181 | 72 | 0 | 253 | 62 | 166 | - | 0 | 228 | 567 |
| 1645 - 1700 | 36 | - | 49 | 0 | 85 | - | - | - | - | 0 | - | 165 | 59 | 0 | 224 | 55 | 186 | - | 0 | 241 | 550 |
| 1700 - 1715 | 51 | - | 47 | 0 | 98 | - | - | - | - | 0 | - | 141 | 50 | 0 | 191 | 77 | 183 | - | 0 | 260 | 549 |
| Total | 165 | 0 | 202 | 0 | 367 | 0 | 0 | 0 | 0 | 0 | 0 | 631 | 229 | 0 | 860 | 251 | 724 | 0 | 0 | 975 | 2202 |
| Approach % | 44.96 | 0.00 | 55.04 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 73.37 | 26.63 | 0.00 | - | 25.74 | 74.26 | 0.00 | 0.00 | - | |
| PHF | 0.81 | 0.00 | 0.95 | 0.00 | **0.94** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.87 | 0.80 | 0.00 | **0.85** | 0.81 | 0.96 | 0.00 | 0.00 | **0.94** | **0.97** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 1615 - 1630 | 3 | - | 1 | 0 | 4 | - | - | - | - | 0 | - | 4 | 2 | 0 | 6 | 1 | 2 | - | 0 | 3 | 13 |
| 1630 - 1645 | 4 | - | 1 | 0 | 5 | - | - | - | - | 0 | - | 5 | 3 | 0 | 8 | 2 | 8 | - | 0 | 10 | 23 |
| 1645 - 1700 | 1 | - | 2 | 0 | 3 | - | - | - | - | 0 | - | 5 | 3 | 0 | 8 | 1 | 2 | - | 0 | 3 | 14 |
| 1700 - 1715 | 1 | - | 1 | 0 | 2 | - | - | - | - | 0 | - | 10 | 0 | 0 | 10 | 7 | 10 | - | 0 | 17 | 29 |
| Total | 9 | 0 | 5 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 8 | 0 | 32 | 11 | 22 | 0 | 0 | 33 | 79 |
| Approach % | 64.29 | 0.00 | 35.71 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 75.00 | 25.00 | 0.00 | - | 33.33 | 66.67 | 0.00 | 0.00 | - | |
| PHF | 0.56 | 0.00 | 0.63 | 0.00 | **0.70** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.60 | 0.67 | 0.00 | **0.80** | 0.39 | 0.55 | 0.00 | 0.00 | **0.49** | **0.68** |

**Combination Trucks (8-13)**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | | Right | U-Turn | App | | | | | App | | Thru | Right | U-Turn | App | Left | Thru | | U-Turn | App | Int |
| Time | 6.1 | | 6.2 | 6.3 | Total | | | | | Total | | 6.4 | 6.5 | 6.6 | Total | 6.7 | 6.8 | | 6.9 | Total | Total |
| 1615 - 1630 | 0 | - | 3 | 0 | 3 | - | - | - | - | 0 | - | 11 | 1 | 0 | 12 | 1 | 7 | - | 0 | 8 | 23 |
| 1630 - 1645 | 0 | - | 1 | 0 | 1 | - | - | - | - | 0 | - | 2 | 1 | 0 | 3 | 1 | 4 | - | 0 | 5 | 9 |
| 1645 - 1700 | 0 | - | 1 | 0 | 1 | - | - | - | - | 0 | - | 5 | 0 | 0 | 5 | 1 | 4 | - | 0 | 5 | 11 |
| 1700 - 1715 | 1 | - | 1 | 0 | 2 | - | - | - | - | 0 | - | 5 | 0 | 0 | 5 | 1 | 0 | - | 0 | 1 | 8 |
| Total | 1 | 0 | 6 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 2 | 0 | 25 | 4 | 15 | 0 | 0 | 19 | 51 |
| Approach % | 14.29 | 0.00 | 85.71 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 92.00 | 8.00 | 0.00 | - | 21.05 | 78.95 | 0.00 | 0.00 | - | |
| PHF | 0.25 | 0.00 | 0.50 | 0.00 | **0.58** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.52 | 0.50 | 0.00 | **0.52** | 1.00 | 0.54 | 0.00 | 0.00 | **0.59** | **0.55** |

**Pedestrians**

| | Northbound | | | | | | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy | | | | | | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | EB | WB | | | App | | | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 6a | 6b | | | Total | | | | | Total | 6e | 6f | | | Total | 6g | 6h | | | Total | Total |
| 1615 - 1630 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1630 - 1645 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1645 - 1700 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1700 - 1715 | 0 | 0 | - | - | 0 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

Click here for Map

## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

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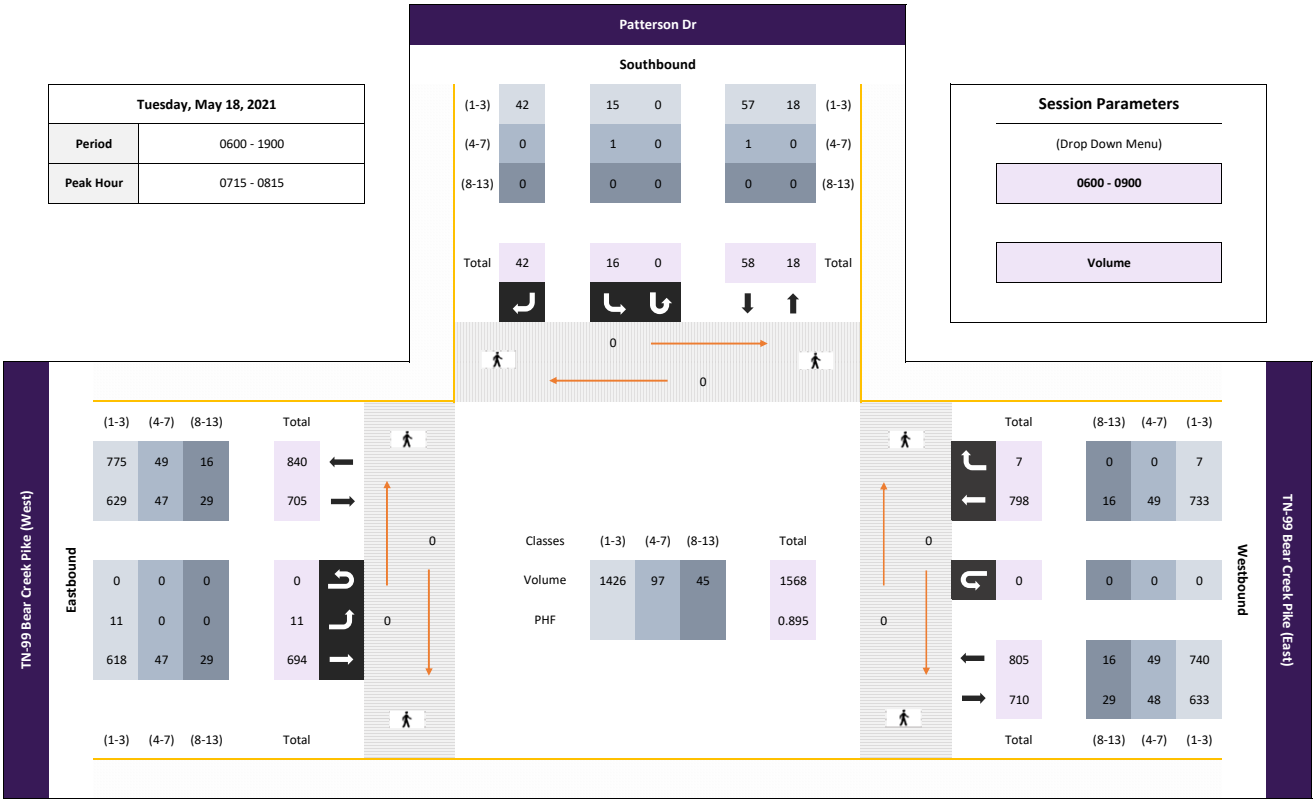
| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 0715 - 0815 |

**Session Parameters**

(Drop Down Menu)

0600 - 0900

Volume



**All vehicles**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 0715 - 0730 | - | - | - | - | 0 | 5 | - | 8 | 0 | 13 | 1 | 187 | - | 0 | 188 | - | 182 | 1 | 0 | 183 | 384 |
| 0730 - 0745 | - | - | - | - | 0 | 6 | - | 17 | 0 | 23 | 5 | 176 | - | 0 | 181 | - | 230 | 4 | 0 | 234 | 438 |
| 0745 - 0800 | - | - | - | - | 0 | 2 | - | 11 | 0 | 13 | 3 | 171 | - | 0 | 174 | - | 206 | 2 | 0 | 208 | 395 |
| 0800 - 0815 | - | - | - | - | 0 | 3 | - | 6 | 0 | 9 | 2 | 160 | - | 0 | 162 | - | 180 | 0 | 0 | 180 | 351 |
| Total | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 42 | 0 | 58 | 11 | 694 | 0 | 0 | 705 | 0 | 798 | 7 | 0 | 805 | 1568 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 27.59 | 0.00 | 72.41 | 0.00 | - | 1.56 | 98.44 | 0.00 | 0.00 | - | 0.00 | 99.13 | 0.87 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.67 | 0.00 | 0.62 | 0.00 | **0.63** | 0.55 | 0.93 | 0.00 | 0.00 | **0.94** | 0.00 | 0.87 | 0.44 | 0.00 | **0.86** | **0.89** |

**Bikes**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 0715 - 0730 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0800 - 0815 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 0715 - 0730 | - | - | - | - | 0 | 5 | - | 8 | 0 | 13 | 1 | 170 | - | 0 | 171 | - | 166 | 1 | 0 | 167 | 351 |
| 0730 - 0745 | - | - | - | - | 0 | 5 | - | 17 | 0 | 22 | 5 | 157 | - | 0 | 162 | - | 216 | 4 | 0 | 220 | 404 |
| 0745 - 0800 | - | - | - | - | 0 | 2 | - | 11 | 0 | 13 | 3 | 154 | - | 0 | 157 | - | 189 | 2 | 0 | 191 | 361 |
| 0800 - 0815 | - | - | - | - | 0 | 3 | - | 6 | 0 | 9 | 2 | 137 | - | 0 | 139 | - | 162 | 0 | 0 | 162 | 310 |
| Total | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 42 | 0 | 57 | 11 | 618 | 0 | 0 | 629 | 0 | 733 | 7 | 0 | 740 | 1426 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 26.32 | 0.00 | 73.68 | 0.00 | - | 1.75 | 98.25 | 0.00 | 0.00 | - | 0.00 | 99.05 | 0.95 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.75 | 0.00 | 0.62 | 0.00 | **0.65** | 0.55 | 0.91 | 0.00 | 0.00 | **0.92** | 0.00 | 0.85 | 0.44 | 0.00 | **0.84** | **0.88** |

**Single Unit Trucks (4-7)**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 0715 - 0730 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 12 | - | 0 | 12 | - | 12 | 0 | 0 | 12 | 24 |
| 0730 - 0745 | - | - | - | - | 0 | 1 | - | 0 | 0 | 1 | 0 | 14 | - | 0 | 14 | - | 12 | 0 | 0 | 12 | 27 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 11 | - | 0 | 11 | - | 15 | 0 | 0 | 15 | 26 |
| 0800 - 0815 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 10 | - | 0 | 10 | - | 10 | 0 | 0 | 10 | 20 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 47 | 0 | 0 | 47 | 0 | 49 | 0 | 0 | 49 | 97 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.00 | 0.00 | 0.00 | **0.25** | 0.00 | 0.84 | 0.00 | 0.00 | **0.84** | 0.00 | 0.82 | 0.00 | 0.00 | **0.82** | **0.90** |

**Combination Trucks (8-13)**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 0715 - 0730 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 5 | - | 0 | 5 | - | 4 | 0 | 0 | 4 | 9 |
| 0730 - 0745 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 5 | - | 0 | 5 | - | 2 | 0 | 0 | 2 | 7 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 6 | - | 0 | 6 | - | 2 | 0 | 0 | 2 | 8 |
| 0800 - 0815 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 13 | - | 0 | 13 | - | 8 | 0 | 0 | 8 | 21 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 29 | 0 | 16 | 0 | 0 | 16 | 45 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.56 | 0.00 | 0.00 | **0.56** | 0.00 | 0.50 | 0.00 | 0.00 | **0.50** | **0.54** |

**Pedestrians**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| Time | | | | | App Total | EB 2c | WB 2d | | | App Total | NB 2e | SB 2f | | | App Total | NB 2g | SB 2h | | | App Total | Int Total |
| 0715 - 0730 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0800 - 0815 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

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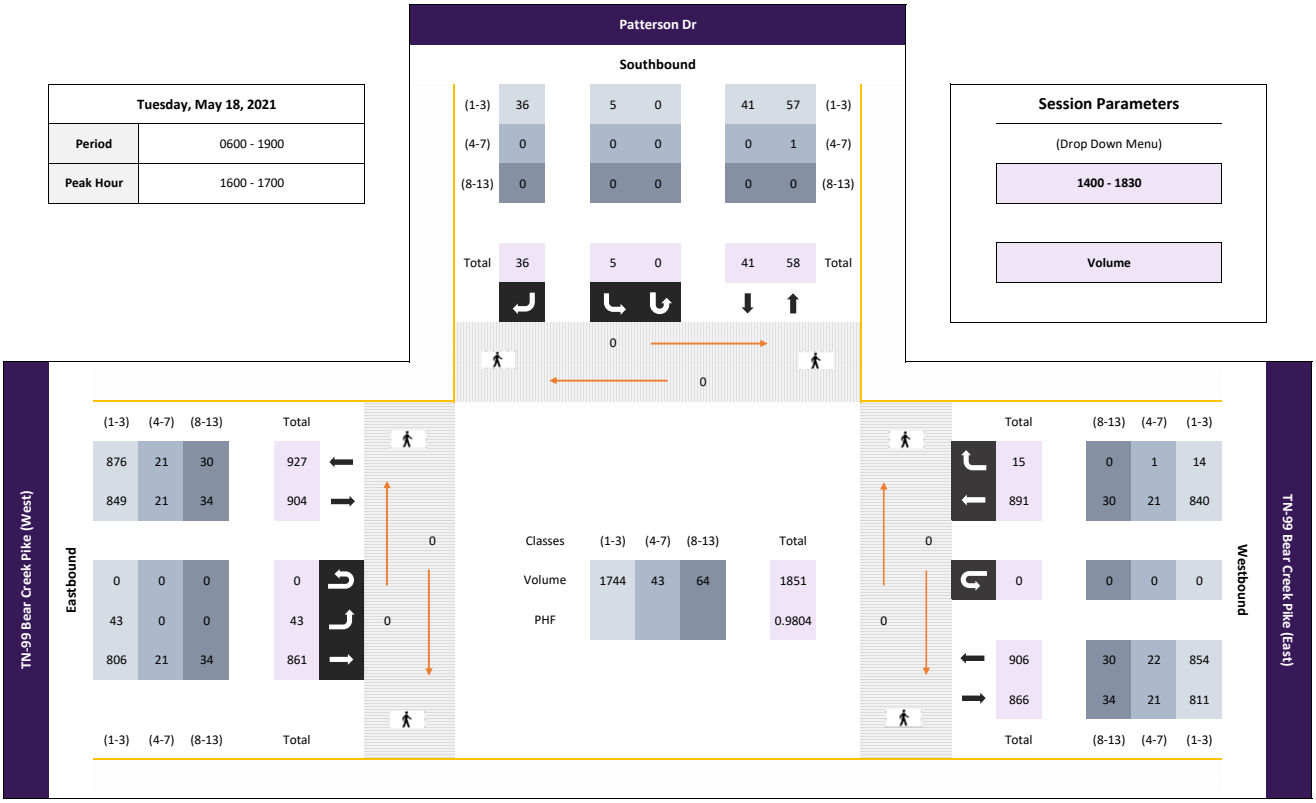
| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 1600 - 1700 |

**Session Parameters**

(Drop Down Menu)

1400 - 1830

Volume



**All vehicles**

| | Southbound | | | | | Patterson Dr | | | | | Eastbound | | | | | TN-99 Bear Creek Pike (West) | | | | | Westbound | | | | | TN-99 Bear Creek Pike (East) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 1600 - 1615 | - | - | - | - | 0 | 1 | - | 6 | 0 | 7 | 10 | 223 | - | 0 | 233 | - | 216 | 4 | 0 | 220 | 460 |
| 1615 - 1630 | - | - | - | - | 0 | 2 | - | 9 | 0 | 11 | 15 | 203 | - | 0 | 218 | - | 240 | 3 | 0 | 243 | 472 |
| 1630 - 1645 | - | - | - | - | 0 | 2 | - | 8 | 0 | 10 | 9 | 226 | - | 0 | 235 | - | 202 | 1 | 0 | 203 | 448 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 13 | 0 | 13 | 9 | 209 | - | 0 | 218 | - | 233 | 7 | 0 | 240 | 471 |
| Total | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 36 | 0 | 41 | 43 | 861 | 0 | 0 | 904 | 0 | 891 | 15 | 0 | 906 | 1851 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 12.20 | 0.00 | 87.80 | 0.00 | - | 4.76 | 95.24 | 0.00 | 0.00 | - | 0.00 | 98.34 | 1.66 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.63 | 0.00 | 0.69 | 0.00 | **0.79** | 0.72 | 0.95 | 0.00 | 0.00 | **0.96** | 0.00 | 0.93 | 0.54 | 0.00 | **0.93** | **0.98** |

**Bikes**

| | Southbound | | | | | Patterson Dr | | | | | Eastbound | | | | | TN-99 Bear Creek Pike (West) | | | | | Westbound | | | | | TN-99 Bear Creek Pike (East) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 1600 - 1615 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1615 - 1630 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1630 - 1645 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Southbound | | | | | Patterson Dr | | | | | Eastbound | | | | | TN-99 Bear Creek Pike (West) | | | | | Westbound | | | | | TN-99 Bear Creek Pike (East) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 1600 - 1615 | - | - | - | - | 0 | 1 | - | 6 | 0 | 7 | 10 | 207 | - | 0 | 217 | - | 198 | 4 | 0 | 202 | 426 |
| 1615 - 1630 | - | - | - | - | 0 | 2 | - | 9 | 0 | 11 | 15 | 186 | - | 0 | 201 | - | 231 | 3 | 0 | 234 | 446 |
| 1630 - 1645 | - | - | - | - | 0 | 2 | - | 8 | 0 | 10 | 9 | 214 | - | 0 | 223 | - | 192 | 1 | 0 | 193 | 426 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 13 | 0 | 13 | 9 | 199 | - | 0 | 208 | - | 219 | 6 | 0 | 225 | 446 |
| Total | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 36 | 0 | 41 | 43 | 806 | 0 | 0 | 849 | 0 | 840 | 14 | 0 | 854 | 1744 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 12.20 | 0.00 | 87.80 | 0.00 | - | 5.06 | 94.94 | 0.00 | 0.00 | - | 0.00 | 98.36 | 1.64 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.63 | 0.00 | 0.69 | 0.00 | **0.79** | 0.72 | 0.94 | 0.00 | 0.00 | **0.95** | 0.00 | 0.91 | 0.58 | 0.00 | **0.91** | **0.98** |

**Single Unit Trucks (4-7)**

| | Southbound | | | | | Patterson Dr | | | | | Eastbound | | | | | TN-99 Bear Creek Pike (West) | | | | | Westbound | | | | | TN-99 Bear Creek Pike (East) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 1600 - 1615 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 6 | - | 0 | 6 | - | 6 | 0 | 0 | 6 | 12 |
| 1615 - 1630 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 2 | - | 0 | 2 | - | 4 | 0 | 0 | 4 | 6 |
| 1630 - 1645 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 8 | - | 0 | 8 | - | 4 | 0 | 0 | 4 | 12 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 5 | - | 0 | 5 | - | 7 | 1 | 0 | 8 | 13 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 21 | 0 | 21 | 1 | 0 | 22 | 43 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 95.45 | 4.55 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.66 | 0.00 | 0.00 | **0.66** | 0.00 | 0.75 | 0.25 | 0.00 | **0.69** | **0.83** |

**Combination Trucks (8-13)**

| | Southbound | | | | | Patterson Dr | | | | | Eastbound | | | | | TN-99 Bear Creek Pike (West) | | | | | Westbound | | | | | TN-99 Bear Creek Pike (East) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | | | | | App Total | Left 2.1 | | Right 2.2 | U-Turn 2.3 | App Total | Left 2.4 | Thru 2.5 | | U-Turn 2.6 | App Total | | Thru 2.7 | Right 2.8 | U-Turn 2.9 | App Total | Int Total |
| 1600 - 1615 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 10 | - | 0 | 10 | - | 12 | 0 | 0 | 12 | 22 |
| 1615 - 1630 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 15 | - | 0 | 15 | - | 5 | 0 | 0 | 5 | 20 |
| 1630 - 1645 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 4 | - | 0 | 4 | - | 6 | 0 | 0 | 6 | 10 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 5 | - | 0 | 5 | - | 7 | 0 | 0 | 7 | 12 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 34 | 0 | 30 | 0 | 0 | 30 | 64 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.57 | 0.00 | 0.00 | **0.57** | 0.00 | 0.63 | 0.00 | 0.00 | **0.63** | **0.73** |

**Pedestrians**

| | Southbound | | | | | Patterson Dr | | | | | Eastbound | | | | | TN-99 Bear Creek Pike (West) | | | | | Westbound | | | | | TN-99 Bear Creek Pike (East) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | | | | | App Total | EB 2c | WB 2d | | | App Total | NB 2e | SB 2f | | | App Total | NB 2g | SB 2h | | | App Total | Int Total |
| 1600 - 1615 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1615 - 1630 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1630 - 1645 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 0715 - 0815 |

**Session Parameters**

(Drop Down Menu)

0600 - 0900

Volume



**All vehicles**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 0715 - 0730 | 34 | 10 | 7 | 0 | 51 | 2 | 1 | 25 | 0 | 28 | 68 | 132 | 3 | 0 | 203 | 5 | 134 | 10 | 0 | 149 | 431 |
| 0730 - 0745 | 16 | 12 | 9 | 0 | 37 | 22 | 9 | 68 | 0 | 99 | 57 | 137 | 6 | 0 | 200 | 3 | 156 | 8 | 0 | 167 | 503 |
| 0745 - 0800 | 16 | 11 | 6 | 0 | 33 | 11 | 4 | 42 | 0 | 57 | 44 | 128 | 7 | 0 | 179 | 4 | 161 | 4 | 0 | 169 | 438 |
| 0800 - 0815 | 18 | 12 | 6 | 0 | 36 | 11 | 9 | 35 | 0 | 55 | 35 | 128 | 12 | 0 | 175 | 6 | 128 | 10 | 0 | 144 | 410 |
| Total | 84 | 45 | 28 | 0 | 157 | 46 | 23 | 170 | 0 | 239 | 204 | 525 | 28 | 0 | 757 | 18 | 579 | 32 | 0 | 629 | 1782 |
| Approach % | 53.50 | 28.66 | 17.83 | 0.00 | - | 19.25 | 9.62 | 71.13 | 0.00 | - | 26.95 | 69.35 | 3.70 | 0.00 | - | 2.86 | 92.05 | 5.09 | 0.00 | - | |
| PHF | 0.62 | 0.94 | 0.78 | 0.00 | **0.77** | 0.52 | 0.64 | 0.63 | 0.00 | **0.60** | 0.75 | 0.96 | 0.58 | 0.00 | **0.93** | 0.75 | 0.90 | 0.80 | 0.00 | **0.93** | **0.89** |

**Bikes**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0800 - 0815 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 0715 - 0730 | 34 | 10 | 7 | 0 | 51 | 2 | 1 | 23 | 0 | 26 | 63 | 120 | 3 | 0 | 186 | 4 | 122 | 10 | 0 | 136 | 399 |
| 0730 - 0745 | 16 | 11 | 9 | 0 | 36 | 22 | 9 | 66 | 0 | 97 | 53 | 118 | 6 | 0 | 177 | 3 | 141 | 8 | 0 | 152 | 462 |
| 0745 - 0800 | 16 | 11 | 6 | 0 | 33 | 11 | 4 | 37 | 0 | 52 | 43 | 112 | 7 | 0 | 162 | 4 | 150 | 4 | 0 | 158 | 405 |
| 0800 - 0815 | 18 | 12 | 6 | 0 | 36 | 11 | 9 | 35 | 0 | 55 | 34 | 107 | 12 | 0 | 153 | 6 | 111 | 10 | 0 | 127 | 371 |
| Total | 84 | 44 | 28 | 0 | 156 | 46 | 23 | 161 | 0 | 230 | 193 | 457 | 28 | 0 | 678 | 17 | 524 | 32 | 0 | 573 | 1637 |
| Approach % | 53.85 | 28.21 | 17.95 | 0.00 | - | 20.00 | 10.00 | 70.00 | 0.00 | - | 28.47 | 67.40 | 4.13 | 0.00 | - | 2.97 | 91.45 | 5.58 | 0.00 | - | |
| PHF | 0.62 | 0.92 | 0.78 | 0.00 | **0.76** | 0.52 | 0.64 | 0.61 | 0.00 | **0.59** | 0.77 | 0.95 | 0.58 | 0.00 | **0.91** | 0.71 | 0.87 | 0.80 | 0.00 | **0.91** | **0.89** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 5 | 7 | 0 | 0 | 12 | 1 | 9 | 0 | 0 | 10 | 24 |
| 0730 - 0745 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 2 | 4 | 12 | 0 | 0 | 16 | 0 | 12 | 0 | 0 | 12 | 31 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 1 | 11 | 0 | 0 | 12 | 0 | 8 | 0 | 0 | 8 | 25 |
| 0800 - 0815 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 0 | 0 | 10 | 0 | 9 | 0 | 0 | 9 | 19 |
| Total | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 9 | 11 | 39 | 0 | 0 | 50 | 1 | 38 | 0 | 0 | 39 | 99 |
| Approach % | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 100.00 | 0.00 | - | 22.00 | 78.00 | 0.00 | 0.00 | - | 2.56 | 97.44 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.25 | 0.00 | 0.00 | **0.25** | 0.00 | 0.00 | 0.45 | 0.00 | **0.45** | 0.55 | 0.81 | 0.00 | 0.00 | **0.78** | 0.25 | 0.79 | 0.00 | 0.00 | **0.81** | **0.80** |

**Combination Trucks (8-13)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 3 | 0 | 0 | 3 | 8 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 3 | 0 | 0 | 3 | 10 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 3 | 0 | 0 | 3 | 8 |
| 0800 - 0815 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 12 | 0 | 8 | 0 | 0 | 8 | 20 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 29 | 0 | 17 | 0 | 0 | 17 | 46 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.60 | 0.00 | 0.00 | **0.60** | 0.00 | 0.53 | 0.00 | 0.00 | **0.53** | **0.58** |

**Pedestrians**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | EB | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 7a | 7b | | | Total | 7c | 7d | | | Total | 7e | 7f | | | Total | 7g | 7h | | | Total | Total |
| 0715 - 0730 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0800 - 0815 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

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| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 1615 - 1715 |

**Session Parameters**

(Drop Down Menu)

1400 - 1830

Volume

**All vehicles**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 1615 - 1630 | 6 | 1 | 7 | 0 | 14 | 3 | 0 | 7 | 0 | 10 | 4 | 203 | 12 | 0 | 219 | 6 | 223 | 1 | 0 | 230 | 473 |
| 1630 - 1645 | 10 | 1 | 7 | 0 | 18 | 4 | 3 | 12 | 0 | 19 | 7 | 189 | 25 | 0 | 221 | 9 | 187 | 2 | 0 | 198 | 456 |
| 1645 - 1700 | 15 | 3 | 9 | 0 | 27 | 0 | 1 | 6 | 0 | 7 | 7 | 179 | 22 | 0 | 208 | 6 | 208 | 3 | 0 | 217 | 459 |
| 1700 - 1715 | 22 | 0 | 7 | 0 | 29 | 4 | 5 | 6 | 0 | 15 | 5 | 183 | 26 | 0 | 214 | 7 | 211 | 1 | 0 | 219 | 477 |
| Total | 53 | 5 | 30 | 0 | 88 | 11 | 9 | 31 | 0 | 51 | 23 | 754 | 85 | 0 | 862 | 28 | 829 | 7 | 0 | 864 | 1865 |
| Approach % | 60.23 | 5.68 | 34.09 | 0.00 | - | 21.57 | 17.65 | 60.78 | 0.00 | - | 2.67 | 87.47 | 9.86 | 0.00 | - | 3.24 | 95.95 | 0.81 | 0.00 | - | |
| PHF | 0.60 | 0.42 | 0.83 | 0.00 | **0.76** | 0.69 | 0.45 | 0.65 | 0.00 | **0.67** | 0.82 | 0.93 | 0.82 | 0.00 | **0.98** | 0.78 | 0.93 | 0.58 | 0.00 | **0.94** | **0.98** |

**Bikes**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 1615 - 1630 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1630 - 1645 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1645 - 1700 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1700 - 1715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 1615 - 1630 | 6 | 1 | 7 | 0 | 14 | 3 | 0 | 7 | 0 | 10 | 4 | 180 | 12 | 0 | 196 | 6 | 214 | 1 | 0 | 221 | 441 |
| 1630 - 1645 | 10 | 1 | 7 | 0 | 18 | 4 | 3 | 12 | 0 | 19 | 7 | 180 | 25 | 0 | 212 | 9 | 176 | 2 | 0 | 187 | 436 |
| 1645 - 1700 | 15 | 3 | 9 | 0 | 27 | 0 | 1 | 6 | 0 | 7 | 7 | 170 | 22 | 0 | 199 | 6 | 195 | 3 | 0 | 204 | 437 |
| 1700 - 1715 | 22 | 0 | 7 | 0 | 29 | 4 | 5 | 6 | 0 | 15 | 5 | 172 | 25 | 0 | 202 | 7 | 199 | 1 | 0 | 207 | 453 |
| Total | 53 | 5 | 30 | 0 | 88 | 11 | 9 | 31 | 0 | 51 | 23 | 702 | 84 | 0 | 809 | 28 | 784 | 7 | 0 | 819 | 1767 |
| Approach % | 60.23 | 5.68 | 34.09 | 0.00 | - | 21.57 | 17.65 | 60.78 | 0.00 | - | 2.84 | 86.77 | 10.38 | 0.00 | - | 3.42 | 95.73 | 0.85 | 0.00 | - | |
| PHF | 0.60 | 0.42 | 0.83 | 0.00 | **0.76** | 0.69 | 0.45 | 0.65 | 0.00 | **0.67** | 0.82 | 0.98 | 0.84 | 0.00 | **0.95** | 0.78 | 0.92 | 0.58 | 0.00 | **0.93** | **0.98** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 1615 - 1630 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 5 | 0 | 0 | 5 | 11 |
| 1630 - 1645 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 4 | 7 |
| 1645 - 1700 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 6 | 12 |
| 1700 - 1715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 5 | 0 | 11 | 0 | 0 | 11 | 16 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | 0 | 20 | 0 | 26 | 0 | 0 | 26 | 46 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 95.00 | 5.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.79 | 0.25 | 0.00 | **0.83** | 0.00 | 0.59 | 0.00 | 0.00 | **0.59** | **0.72** |

**Combination Trucks (8-13)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 7.1 | 7.2 | 7.3 | 7.4 | Total | 7.5 | 7.6 | 7.7 | 7.8 | Total | 7.9 | 7.10 | 7.11 | 7.12 | Total | 7.13 | 7.14 | 7.15 | 7.16 | Total | Total |
| 1615 - 1630 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 17 | 0 | 4 | 0 | 0 | 4 | 21 |
| 1630 - 1645 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 7 | 0 | 0 | 7 | 13 |
| 1645 - 1700 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 7 | 0 | 0 | 7 | 10 |
| 1700 - 1715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 1 | 0 | 0 | 1 | 8 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 33 | 0 | 19 | 0 | 0 | 19 | 52 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.49 | 0.00 | 0.00 | **0.49** | 0.00 | 0.68 | 0.00 | 0.00 | **0.68** | **0.62** |

**Pedestrians**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Local Rd | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | EB | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 7a | 7b | | | Total | 7c | 7d | | | Total | 7e | 7f | | | Total | 7g | 7h | | | Total | Total |
| 1615 - 1630 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1630 - 1645 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1645 - 1700 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1700 - 1715 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com

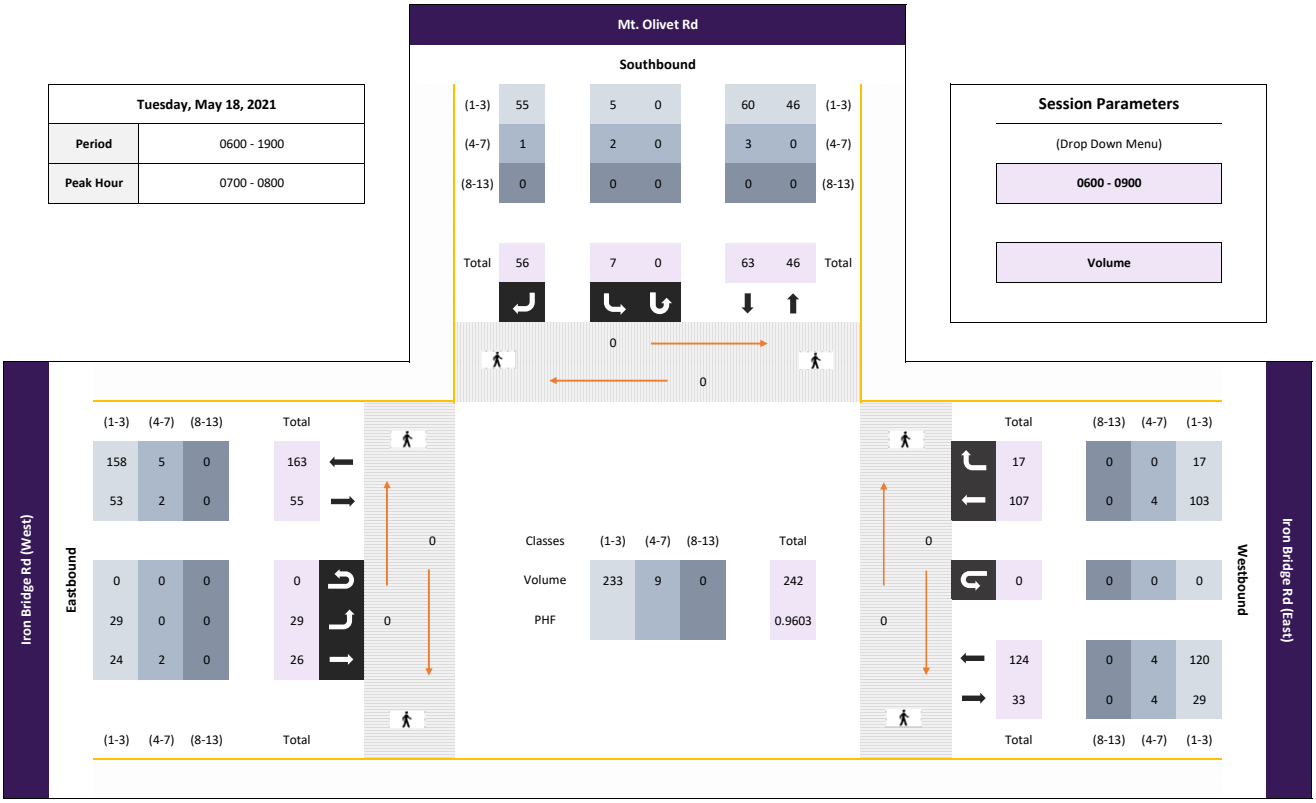
| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 0700 - 0800 |

**Session Parameters**

(Drop Down Menu)

0600 - 0900

Volume



**All vehicles**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| Time | Left 8.1 | | Right 8.2 | U-Turn 8.3 | App Total | Left 8.4 | Thru 8.5 | | U-Turn 8.6 | App Total | | Thru 8.7 | Right 8.8 | U-Turn 8.9 | App Total | Int Total |
| 0700 - 0715 | 2 | - | 9 | 0 | 11 | 7 | 5 | - | 0 | 12 | - | 33 | 1 | 0 | 34 | 57 |
| 0715 - 0730 | 1 | - | 10 | 0 | 11 | 8 | 6 | - | 0 | 14 | - | 30 | 5 | 0 | 35 | 60 |
| 0730 - 0745 | 3 | - | 17 | 0 | 20 | 10 | 4 | - | 0 | 14 | - | 23 | 6 | 0 | 29 | 63 |
| 0745 - 0800 | 1 | - | 20 | 0 | 21 | 4 | 11 | - | 0 | 15 | - | 21 | 5 | 0 | 26 | 62 |
| Total | 7 | 0 | 56 | 0 | 63 | 29 | 26 | 0 | 0 | 55 | 0 | 107 | 17 | 0 | 124 | 242 |
| Approach % | 11.11 | 0.00 | 88.89 | 0.00 | - | 52.73 | 47.27 | 0.00 | 0.00 | - | 0.00 | 86.29 | 13.71 | 0.00 | - | |
| PHF | 0.58 | 0.00 | 0.70 | 0.00 | **0.75** | 0.73 | 0.59 | 0.00 | 0.00 | **0.92** | 0.00 | 0.81 | 0.71 | 0.00 | **0.89** | **0.96** |

**Bikes**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| Time | Left 8.1 | | Right 8.2 | U-Turn 8.3 | App Total | Left 8.4 | Thru 8.5 | | U-Turn 8.6 | App Total | | Thru 8.7 | Right 8.8 | U-Turn 8.9 | App Total | Int Total |
| 0700 - 0715 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0715 - 0730 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| Time | Left 8.1 | | Right 8.2 | U-Turn 8.3 | App Total | Left 8.4 | Thru 8.5 | | U-Turn 8.6 | App Total | | Thru 8.7 | Right 8.8 | U-Turn 8.9 | App Total | Int Total |
| 0700 - 0715 | 1 | - | 9 | 0 | 10 | 7 | 4 | - | 0 | 11 | - | 32 | 1 | 0 | 33 | 54 |
| 0715 - 0730 | 0 | - | 10 | 0 | 10 | 8 | 5 | - | 0 | 13 | - | 28 | 5 | 0 | 33 | 56 |
| 0730 - 0745 | 3 | - | 17 | 0 | 20 | 10 | 4 | - | 0 | 14 | - | 22 | 6 | 0 | 28 | 62 |
| 0745 - 0800 | 1 | - | 19 | 0 | 20 | 4 | 11 | - | 0 | 15 | - | 21 | 5 | 0 | 26 | 61 |
| Total | 5 | 0 | 55 | 0 | 60 | 29 | 24 | 0 | 0 | 53 | 0 | 103 | 17 | 0 | 120 | 233 |
| Approach % | 8.33 | 0.00 | 91.67 | 0.00 | - | 54.72 | 45.28 | 0.00 | 0.00 | - | 0.00 | 85.83 | 14.17 | 0.00 | - | |
| PHF | 0.42 | 0.00 | 0.72 | 0.00 | **0.75** | 0.73 | 0.55 | 0.00 | 0.00 | **0.88** | 0.00 | 0.80 | 0.71 | 0.00 | **0.91** | **0.94** |

**Single Unit Trucks (4-7)**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| Time | Left 8.1 | | Right 8.2 | U-Turn 8.3 | App Total | Left 8.4 | Thru 8.5 | | U-Turn 8.6 | App Total | | Thru 8.7 | Right 8.8 | U-Turn 8.9 | App Total | Int Total |
| 0700 - 0715 | 1 | - | 0 | 0 | 1 | 0 | 1 | - | 0 | 1 | - | 1 | 0 | 0 | 1 | 3 |
| 0715 - 0730 | 1 | - | 0 | 0 | 1 | 0 | 1 | - | 0 | 1 | - | 2 | 0 | 0 | 2 | 4 |
| 0730 - 0745 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 1 | 0 | 0 | 1 | 1 |
| 0745 - 0800 | 0 | - | 1 | 0 | 1 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 |
| Total | 2 | 0 | 1 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 4 | 9 |
| Approach % | 66.67 | 0.00 | 33.33 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.50 | 0.00 | 0.25 | 0.00 | **0.75** | 0.00 | 0.50 | 0.00 | 0.00 | **0.50** | 0.00 | 0.50 | 0.00 | 0.00 | **0.50** | **0.56** |

**Combination Trucks (8-13)**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| Time | Left 8.1 | | Right 8.2 | U-Turn 8.3 | App Total | Left 8.4 | Thru 8.5 | | U-Turn 8.6 | App Total | | Thru 8.7 | Right 8.8 | U-Turn 8.9 | App Total | Int Total |
| 0700 - 0715 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0715 - 0730 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Pedestrians**

| | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| Time | EB 8c | WB 8d | | | App Total | NB 8e | SB 8f | | | App Total | NB 8g | SB 8h | | | App Total | Int Total |
| 0700 - 0715 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0715 - 0730 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

Click here for Map

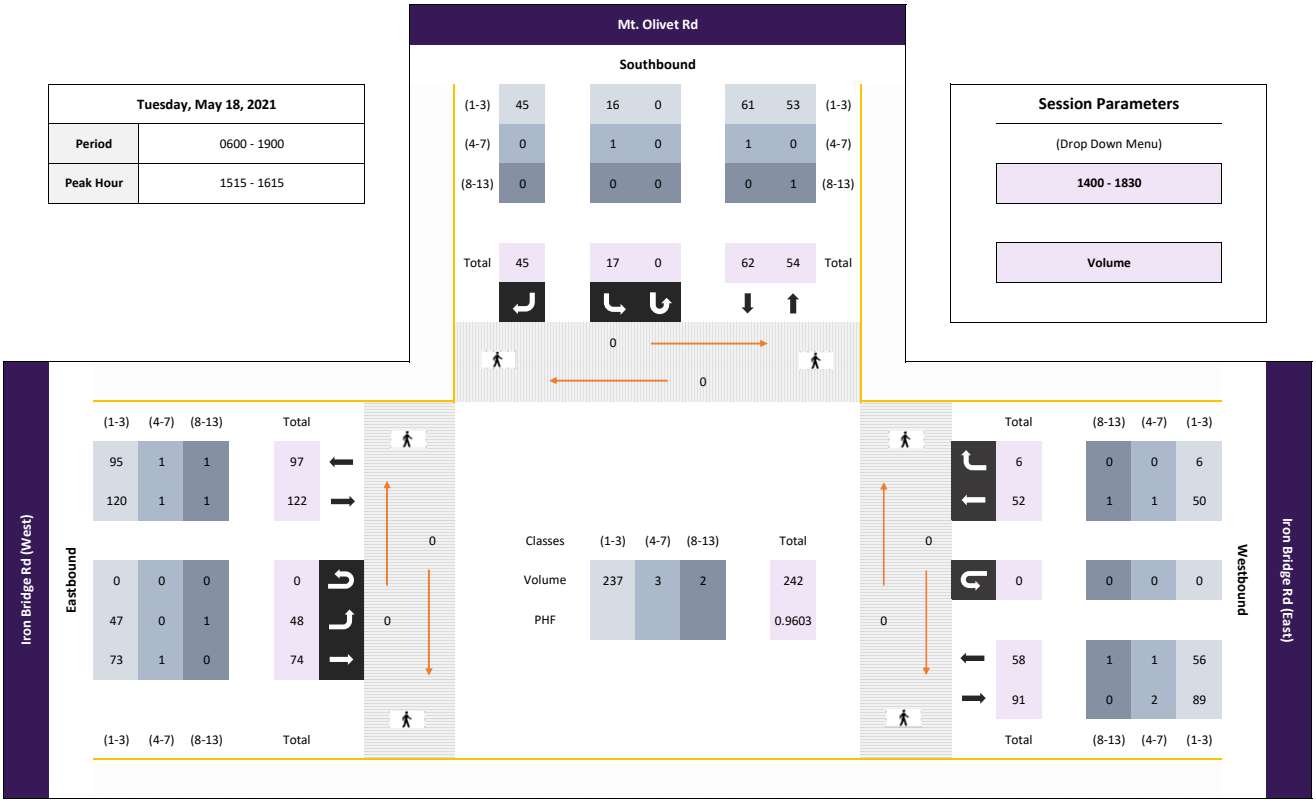
## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 1515 - 1615 |



**All vehicles**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 8.1 | | 8.2 | 8.3 | Total | 8.4 | 8.5 | | 8.6 | Total | | 8.7 | 8.8 | 8.9 | Total | Total |
| 1515 - 1530 | - | - | - | - | 0 | 4 | - | 12 | 0 | 16 | 14 | 16 | - | 0 | 30 | - | 13 | 3 | 0 | 16 | 62 |
| 1530 - 1545 | - | - | - | - | 0 | 7 | - | 17 | 0 | 24 | 11 | 13 | - | 0 | 24 | - | 14 | 1 | 0 | 15 | 63 |
| 1545 - 1600 | - | - | - | - | 0 | 1 | - | 10 | 0 | 11 | 10 | 22 | - | 0 | 32 | - | 13 | 1 | 0 | 14 | 57 |
| 1600 - 1615 | - | - | - | - | 0 | 5 | - | 6 | 0 | 11 | 13 | 23 | - | 0 | 36 | - | 12 | 1 | 0 | 13 | 60 |
| Total | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 45 | 0 | 62 | 48 | 74 | 0 | 0 | 122 | 0 | 52 | 6 | 0 | 58 | 242 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 27.42 | 0.00 | 72.58 | 0.00 | - | 39.34 | 60.66 | 0.00 | 0.00 | - | 0.00 | 89.66 | 10.34 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.61 | 0.00 | 0.66 | 0.00 | **0.65** | 0.86 | 0.80 | 0.00 | 0.00 | **0.85** | 0.00 | 0.93 | 0.50 | 0.00 | **0.91** | **0.96** |

**Bikes**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 8.1 | | 8.2 | 8.3 | Total | 8.4 | 8.5 | | 8.6 | Total | | 8.7 | 8.8 | 8.9 | Total | Total |
| 1515 - 1530 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1530 - 1545 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1545 - 1600 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1600 - 1615 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 8.1 | | 8.2 | 8.3 | Total | 8.4 | 8.5 | | 8.6 | Total | | 8.7 | 8.8 | 8.9 | Total | Total |
| 1515 - 1530 | - | - | - | - | 0 | 3 | - | 12 | 0 | 15 | 13 | 16 | - | 0 | 29 | - | 13 | 3 | 0 | 16 | 60 |
| 1530 - 1545 | - | - | - | - | 0 | 7 | - | 17 | 0 | 24 | 11 | 13 | - | 0 | 24 | - | 12 | 1 | 0 | 13 | 61 |
| 1545 - 1600 | - | - | - | - | 0 | 1 | - | 10 | 0 | 11 | 10 | 21 | - | 0 | 31 | - | 13 | 1 | 0 | 14 | 56 |
| 1600 - 1615 | - | - | - | - | 0 | 5 | - | 6 | 0 | 11 | 13 | 23 | - | 0 | 36 | - | 12 | 1 | 0 | 13 | 60 |
| Total | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 45 | 0 | 61 | 47 | 73 | 0 | 0 | 120 | 0 | 50 | 6 | 0 | 56 | 237 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 26.23 | 0.00 | 73.77 | 0.00 | - | 39.17 | 60.83 | 0.00 | 0.00 | - | 0.00 | 89.29 | 10.71 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.57 | 0.00 | 0.66 | 0.00 | **0.64** | 0.90 | 0.79 | 0.00 | 0.00 | **0.83** | 0.00 | 0.96 | 0.50 | 0.00 | **0.88** | **0.97** |

**Single Unit Trucks (4-7)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 8.1 | | 8.2 | 8.3 | Total | 8.4 | 8.5 | | 8.6 | Total | | 8.7 | 8.8 | 8.9 | Total | Total |
| 1515 - 1530 | - | - | - | - | 0 | 1 | - | 0 | 0 | 1 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 |
| 1530 - 1545 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 1 | 0 | 0 | 1 | 1 |
| 1545 - 1600 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 | - | 0 | 1 | - | 0 | 0 | 0 | 0 | 1 |
| 1600 - 1615 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 3 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.00 | 0.00 | 0.00 | **0.25** | 0.00 | 0.25 | 0.00 | 0.00 | **0.25** | 0.00 | 0.25 | 0.00 | 0.00 | **0.25** | **0.75** |

**Combination Trucks (8-13)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 8.1 | | 8.2 | 8.3 | Total | 8.4 | 8.5 | | 8.6 | Total | | 8.7 | 8.8 | 8.9 | Total | Total |
| 1515 - 1530 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 1 | 0 | - | 0 | 1 | - | 0 | 0 | 0 | 0 | 1 |
| 1530 - 1545 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 1 | 0 | 0 | 1 | 1 |
| 1545 - 1600 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1600 - 1615 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.00 | 0.00 | 0.00 | **0.25** | 0.00 | 0.25 | 0.00 | 0.00 | **0.25** | **0.50** |

**Pedestrians**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mt. Olivet Rd | | | | | Iron Bridge Rd (West) | | | | | Iron Bridge Rd (East) | | | | | |
| | | | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | | | | | Total | 8c | 8d | | | Total | 8e | 8f | | | Total | 8g | 8h | | | Total | Total |
| 1515 - 1530 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1530 - 1545 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1545 - 1600 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1600 - 1615 | - | - | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

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## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

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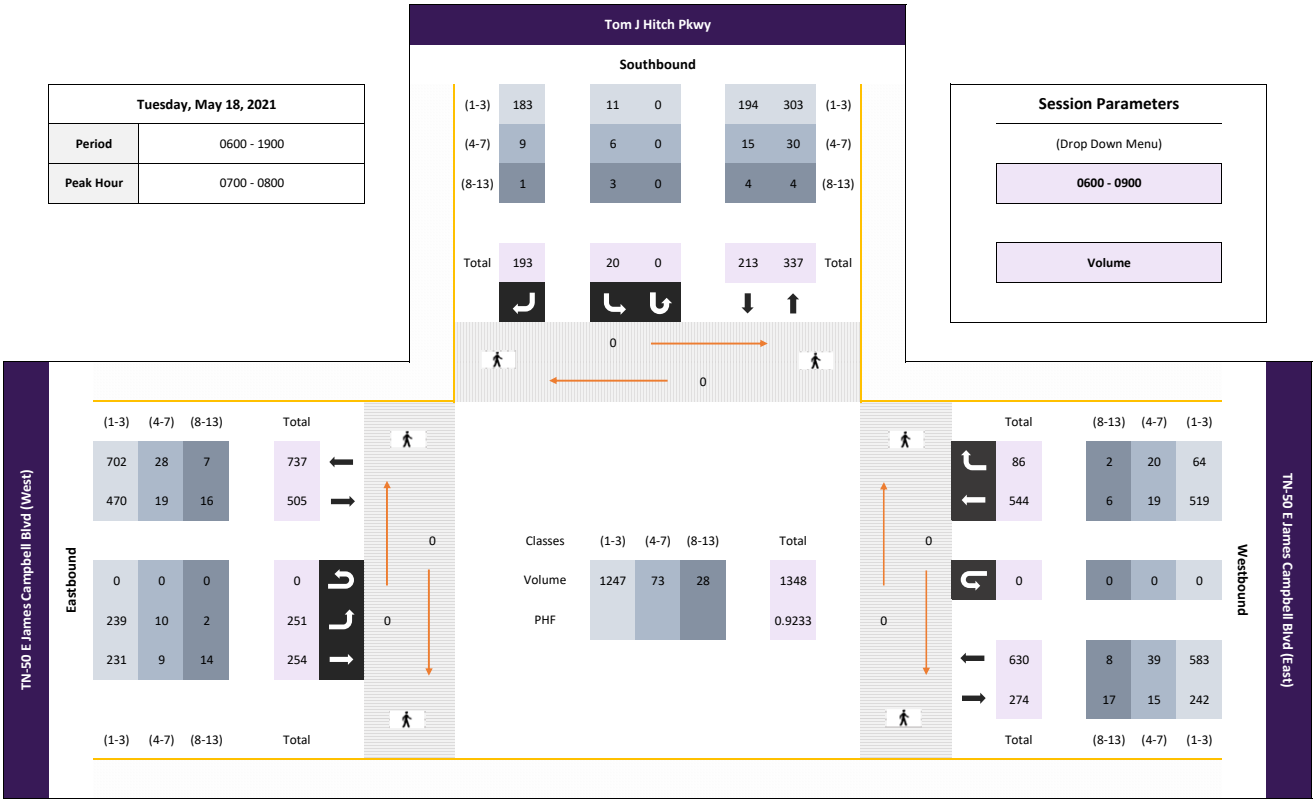
| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 0700 - 0800 |

**Session Parameters**

(Drop Down Menu)

0600 - 0900

Volume



**All vehicles**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 0700 - 0715 | - | - | - | - | 0 | 7 | - | 40 | 0 | 47 | 60 | 70 | - | 0 | 130 | - | 111 | 12 | 0 | 123 | 300 |
| 0715 - 0730 | - | - | - | - | 0 | 5 | - | 29 | 0 | 34 | 69 | 65 | - | 0 | 134 | - | 142 | 19 | 0 | 161 | 329 |
| 0730 - 0745 | - | - | - | - | 0 | 5 | - | 58 | 0 | 63 | 63 | 65 | - | 0 | 128 | - | 144 | 30 | 0 | 174 | 365 |
| 0745 - 0800 | - | - | - | - | 0 | 3 | - | 66 | 0 | 69 | 59 | 54 | - | 0 | 113 | - | 147 | 25 | 0 | 172 | 354 |
| Total | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 193 | 0 | 213 | 251 | 254 | 0 | 0 | 505 | 0 | 544 | 86 | 0 | 630 | 1348 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 9.39 | 0.00 | 90.61 | 0.00 | - | 49.70 | 50.30 | 0.00 | 0.00 | - | 0.00 | 86.35 | 13.65 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.71 | 0.00 | 0.73 | 0.00 | **0.77** | 0.91 | 0.91 | 0.00 | 0.00 | **0.94** | 0.00 | 0.93 | 0.72 | 0.00 | **0.91** | **0.92** |

**Bikes**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 0700 - 0715 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0715 - 0730 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 0700 - 0715 | - | - | - | - | 0 | 5 | - | 39 | 0 | 44 | 57 | 62 | - | 0 | 119 | - | 100 | 6 | 0 | 106 | 269 |
| 0715 - 0730 | - | - | - | - | 0 | 2 | - | 27 | 0 | 29 | 67 | 62 | - | 0 | 129 | - | 139 | 12 | 0 | 151 | 309 |
| 0730 - 0745 | - | - | - | - | 0 | 1 | - | 53 | 0 | 54 | 61 | 60 | - | 0 | 121 | - | 137 | 25 | 0 | 162 | 337 |
| 0745 - 0800 | - | - | - | - | 0 | 3 | - | 64 | 0 | 67 | 54 | 47 | - | 0 | 101 | - | 143 | 21 | 0 | 164 | 332 |
| Total | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 183 | 0 | 194 | 239 | 231 | 0 | 0 | 470 | 0 | 519 | 64 | 0 | 583 | 1247 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 5.67 | 0.00 | 94.33 | 0.00 | - | 50.85 | 49.15 | 0.00 | 0.00 | - | 0.00 | 89.02 | 10.98 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.55 | 0.00 | 0.71 | 0.00 | **0.72** | 0.89 | 0.93 | 0.00 | 0.00 | **0.91** | 0.00 | 0.91 | 0.64 | 0.00 | **0.89** | **0.93** |

**Single Unit Trucks (4-7)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 0700 - 0715 | - | - | - | - | 0 | 1 | - | 1 | 0 | 2 | 3 | 3 | - | 0 | 6 | - | 10 | 5 | 0 | 15 | 23 |
| 0715 - 0730 | - | - | - | - | 0 | 2 | - | 2 | 0 | 4 | 2 | 1 | - | 0 | 3 | - | 2 | 6 | 0 | 8 | 15 |
| 0730 - 0745 | - | - | - | - | 0 | 3 | - | 4 | 0 | 7 | 2 | 1 | - | 0 | 3 | - | 4 | 5 | 0 | 9 | 19 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | - | 2 | 0 | 2 | 3 | 4 | - | 0 | 7 | - | 3 | 4 | 0 | 7 | 16 |
| Total | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 9 | 0 | 15 | 10 | 9 | 0 | 0 | 19 | 0 | 19 | 20 | 0 | 39 | 73 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 40.00 | 0.00 | 60.00 | 0.00 | - | 52.63 | 47.37 | 0.00 | 0.00 | - | 0.00 | 48.72 | 51.28 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.50 | 0.00 | 0.56 | 0.00 | **0.54** | 0.83 | 0.56 | 0.00 | 0.00 | **0.68** | 0.00 | 0.48 | 0.83 | 0.00 | **0.65** | **0.79** |

**Combination Trucks (8-13)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 0700 - 0715 | - | - | - | - | 0 | 1 | - | 0 | 0 | 1 | 0 | 5 | - | 0 | 5 | - | 1 | 1 | 0 | 2 | 8 |
| 0715 - 0730 | - | - | - | - | 0 | 1 | - | 0 | 0 | 1 | 0 | 2 | - | 0 | 2 | - | 1 | 1 | 0 | 2 | 5 |
| 0730 - 0745 | - | - | - | - | 0 | 1 | - | 1 | 0 | 2 | 0 | 4 | - | 0 | 4 | - | 3 | 0 | 0 | 3 | 9 |
| 0745 - 0800 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 2 | 3 | - | 0 | 5 | - | 1 | 0 | 0 | 1 | 6 |
| Total | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 4 | 2 | 14 | 0 | 0 | 16 | 0 | 6 | 2 | 0 | 8 | 28 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 75.00 | 0.00 | 25.00 | 0.00 | - | 12.50 | 87.50 | 0.00 | 0.00 | - | 0.00 | 75.00 | 25.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.75 | 0.00 | 0.25 | 0.00 | **0.50** | 0.25 | 0.70 | 0.00 | 0.00 | **0.80** | 0.00 | 0.50 | 0.50 | 0.00 | **0.67** | **0.78** |

**Pedestrians**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | | 4b | | | Total | 4c | 4d | | | Total | 4e | 4f | | | Total | 4g | 4h | | | Total | Total |
| 0700 - 0715 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0715 - 0730 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

Click here for Map

## Peak Hour Turning Movement Count

Columbia, TN

Marr Traffic DATA COLLECTION

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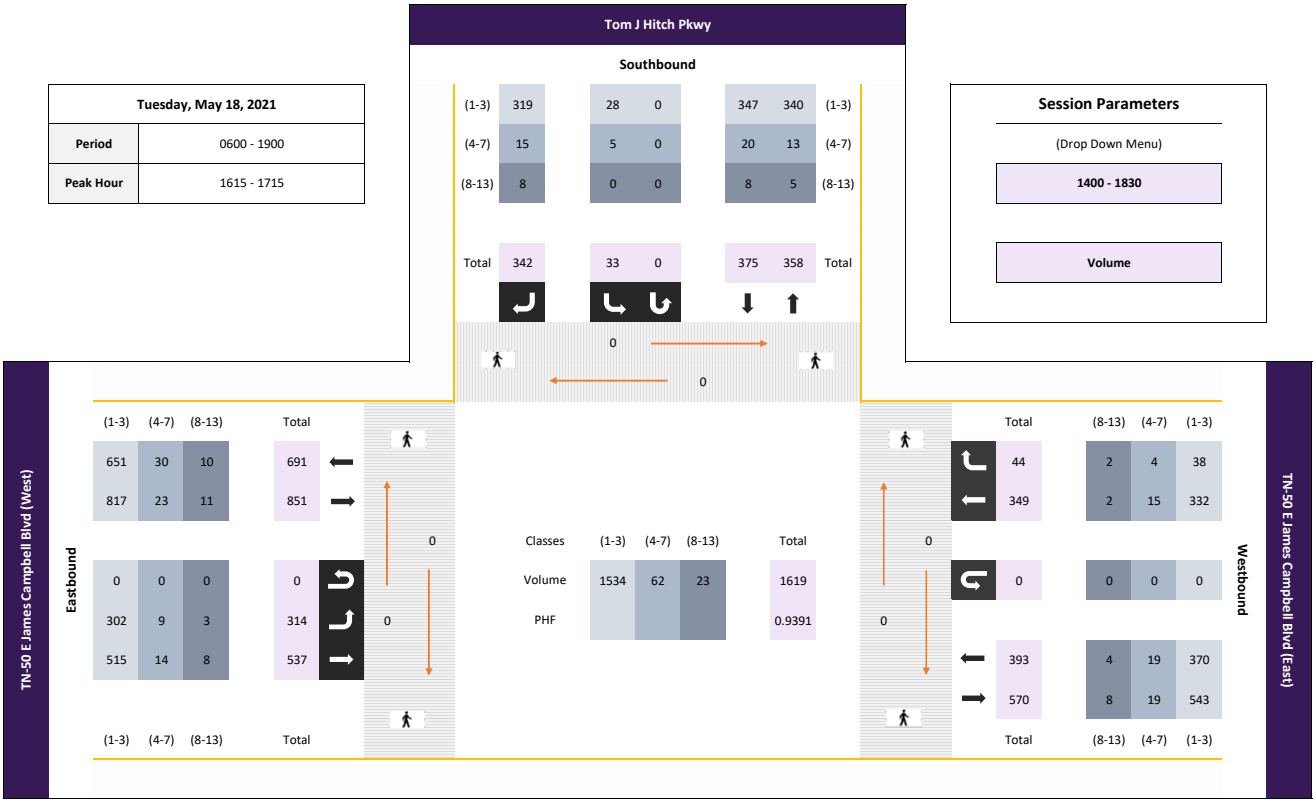
| Tuesday, May 18, 2021 | |
|---|---|
| Period | 0600 - 1900 |
| Peak Hour | 1615 - 1715 |

**Session Parameters**

(Drop Down Menu)

1400 - 1830

Volume



**All vehicles**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 1615 - 1630 | - | - | - | - | 0 | 5 | - | 81 | 0 | 86 | 74 | 145 | - | 0 | 219 | - | 78 | 11 | 0 | 89 | 394 |
| 1630 - 1645 | - | - | - | - | 0 | 12 | - | 81 | 0 | 93 | 82 | 132 | - | 0 | 214 | - | 84 | 8 | 0 | 92 | 399 |
| 1645 - 1700 | - | - | - | - | 0 | 8 | - | 84 | 0 | 92 | 73 | 121 | - | 0 | 194 | - | 95 | 14 | 0 | 109 | 395 |
| 1700 - 1715 | - | - | - | - | 0 | 8 | - | 96 | 0 | 104 | 85 | 139 | - | 0 | 224 | - | 92 | 11 | 0 | 103 | 431 |
| Total | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 342 | 0 | 375 | 314 | 537 | 0 | 0 | 851 | 0 | 349 | 44 | 0 | 393 | 1619 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 8.80 | 0.00 | 91.20 | 0.00 | - | 36.90 | 63.10 | 0.00 | 0.00 | - | 0.00 | 88.80 | 11.20 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.69 | 0.00 | 0.89 | 0.00 | **0.90** | 0.92 | 0.93 | 0.00 | 0.00 | **0.95** | 0.00 | 0.92 | 0.79 | 0.00 | **0.90** | **0.94** |

**Bikes**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 1615 - 1630 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1630 - 1645 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| 1700 - 1715 | - | - | - | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Passenger Vehicles (1-3)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 1615 - 1630 | - | - | - | - | 0 | 3 | - | 77 | 0 | 80 | 71 | 135 | - | 0 | 206 | - | 77 | 10 | 0 | 87 | 373 |
| 1630 - 1645 | - | - | - | - | 0 | 9 | - | 76 | 0 | 85 | 78 | 128 | - | 0 | 206 | - | 78 | 6 | 0 | 84 | 375 |
| 1645 - 1700 | - | - | - | - | 0 | 8 | - | 78 | 0 | 86 | 69 | 117 | - | 0 | 186 | - | 91 | 12 | 0 | 103 | 375 |
| 1700 - 1715 | - | - | - | - | 0 | 8 | - | 88 | 0 | 96 | 84 | 135 | - | 0 | 219 | - | 86 | 10 | 0 | 96 | 411 |
| Total | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 319 | 0 | 347 | 302 | 515 | 0 | 0 | 817 | 0 | 332 | 38 | 0 | 370 | 1534 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 8.07 | 0.00 | 91.93 | 0.00 | - | 36.96 | 63.04 | 0.00 | 0.00 | - | 0.00 | 89.73 | 10.27 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.78 | 0.00 | 0.91 | 0.00 | **0.90** | 0.90 | 0.95 | 0.00 | 0.00 | **0.93** | 0.00 | 0.91 | 0.79 | 0.00 | **0.90** | **0.93** |

**Single Unit Trucks (4-7)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 1615 - 1630 | - | - | - | - | 0 | 2 | - | 3 | 0 | 5 | 2 | 6 | - | 0 | 8 | - | 1 | 1 | 0 | 2 | 15 |
| 1630 - 1645 | - | - | - | - | 0 | 3 | - | 2 | 0 | 5 | 3 | 2 | - | 0 | 5 | - | 5 | 1 | 0 | 6 | 16 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 5 | 0 | 5 | 3 | 3 | - | 0 | 6 | - | 3 | 2 | 0 | 5 | 16 |
| 1700 - 1715 | - | - | - | - | 0 | 0 | - | 5 | 0 | 5 | 1 | 3 | - | 0 | 4 | - | 6 | 0 | 0 | 6 | 15 |
| Total | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 15 | 0 | 20 | 9 | 14 | 0 | 0 | 23 | 0 | 15 | 4 | 0 | 19 | 62 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 25.00 | 0.00 | 75.00 | 0.00 | - | 39.13 | 60.87 | 0.00 | 0.00 | - | 0.00 | 78.95 | 21.05 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.42 | 0.00 | 0.75 | 0.00 | **1.00** | 0.75 | 0.58 | 0.00 | 0.00 | **0.72** | 0.00 | 0.63 | 0.50 | 0.00 | **0.79** | **0.97** |

**Combination Trucks (8-13)**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | | | | App | Left | | Right | U-Turn | App | Left | Thru | | U-Turn | App | | Thru | Right | U-Turn | App | Int |
| Time | | | | | Total | 4.1 | | 4.2 | 4.3 | Total | 4.4 | 4.5 | | 4.6 | Total | | 4.7 | 4.8 | 4.9 | Total | Total |
| 1615 - 1630 | - | - | - | - | 0 | 0 | - | 1 | 0 | 1 | 1 | 4 | - | 0 | 5 | - | 0 | 0 | 0 | 0 | 6 |
| 1630 - 1645 | - | - | - | - | 0 | 0 | - | 3 | 0 | 3 | 1 | 2 | - | 0 | 3 | - | 1 | 1 | 0 | 2 | 8 |
| 1645 - 1700 | - | - | - | - | 0 | 0 | - | 1 | 0 | 1 | 1 | 1 | - | 0 | 2 | - | 1 | 0 | 0 | 1 | 4 |
| 1700 - 1715 | - | - | - | - | 0 | 0 | - | 3 | 0 | 3 | 0 | 1 | - | 0 | 1 | - | 0 | 1 | 0 | 1 | 5 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 8 | 3 | 8 | 0 | 0 | 11 | 0 | 2 | 2 | 0 | 4 | 23 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 100.00 | 0.00 | - | 27.27 | 72.73 | 0.00 | 0.00 | - | 0.00 | 50.00 | 50.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.67 | 0.00 | **0.67** | 0.75 | 0.50 | 0.00 | 0.00 | **0.55** | 0.00 | 0.50 | 0.50 | 0.00 | **0.50** | **0.72** |

**Pedestrians**

| | | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tom J Hitch Pkwy | | | | | TN-50 E James Campbell Blvd (West) | | | | | TN-50 E James Campbell Blvd (East) | | | | | |
| | | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | | 4b | | | Total | 4c | 4d | | | Total | 4e | 4f | | | Total | 4g | 4h | | | Total | Total |
| 1615 - 1630 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1630 - 1645 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1645 - 1700 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 1700 - 1715 | - | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

# Peak Hour Turning Movement Count

Columbia, TN

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**All vehicles**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 | 0 | 14 | 1 | 186 | 0 | 0 | 187 | 0 | 168 | 0 | 0 | 168 | 369 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 8 | 0 | 15 | 4 | 221 | 1 | 0 | 226 | 0 | 189 | 1 | 0 | 190 | 431 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 14 | 0 | 15 | 1 | 185 | 0 | 0 | 186 | 0 | 241 | 0 | 0 | 241 | 442 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 18 | 3 | 177 | 0 | 0 | 180 | 0 | 239 | 1 | 0 | 240 | 438 |
| Total | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 50 | 0 | 62 | 9 | 769 | 1 | 0 | 779 | 0 | 837 | 2 | 0 | 839 | 1680 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 19.35 | 0.00 | 80.65 | 0.00 | - | 1.16 | 98.72 | 0.13 | 0.00 | - | 0.00 | 99.76 | 0.24 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.43 | 0.00 | 0.83 | 0.00 | **0.86** | 0.56 | 0.87 | 0.25 | 0.00 | **0.86** | 0.00 | 0.87 | 0.50 | 0.00 | **0.87** | **0.95** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 | 0 | 14 | 1 | 168 | 0 | 0 | 169 | 0 | 148 | 0 | 0 | 148 | 331 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 8 | 0 | 14 | 4 | 203 | 1 | 0 | 208 | 0 | 179 | 1 | 0 | 180 | 402 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 14 | 0 | 15 | 1 | 169 | 0 | 0 | 170 | 0 | 220 | 0 | 0 | 220 | 405 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 18 | 3 | 164 | 0 | 0 | 167 | 0 | 222 | 1 | 0 | 223 | 408 |
| Total | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 50 | 0 | 61 | 9 | 704 | 1 | 0 | 714 | 0 | 769 | 2 | 0 | 771 | 1546 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 18.03 | 0.00 | 81.97 | 0.00 | - | 1.26 | 98.60 | 0.14 | 0.00 | - | 0.00 | 99.74 | 0.26 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.46 | 0.00 | 0.83 | 0.00 | **0.85** | 0.56 | 0.87 | 0.25 | 0.00 | **0.86** | 0.00 | 0.87 | 0.50 | 0.00 | **0.86** | **0.95** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 13 | 0 | 14 | 0 | 0 | 14 | 27 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 16 | 0 | 0 | 16 | 0 | 8 | 0 | 0 | 8 | 25 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 11 | 0 | 14 | 0 | 0 | 14 | 25 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 11 | 0 | 0 | 11 | 18 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 47 | 0 | 0 | 47 | 0 | 47 | 0 | 0 | 47 | 95 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.00 | 0.00 | 0.00 | **0.25** | 0.00 | 0.73 | 0.00 | 0.00 | **0.73** | 0.00 | 0.84 | 0.00 | 0.00 | **0.84** | **0.88** |

**Combination Trucks (8-13)**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 6 | 0 | 0 | 6 | 11 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 4 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 7 | 0 | 0 | 7 | 12 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 6 | 0 | 0 | 6 | 12 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 | 0 | 21 | 0 | 0 | 21 | 39 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.75 | 0.00 | 0.00 | **0.75** | 0.00 | 0.75 | 0.00 | 0.00 | **0.75** | **0.81** |

**Bikes**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

**Pedestrians**

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | EB | WB | | | App | EB | WB | | | App | NB | SB | | | App | NB | SB | | | App | Int |
| Time | 1a | 1b | | | Total | 1c | 1d | | | Total | 1e | 1f | | | Total | 1g | 1h | | | Total | Total |
| 0700 - 0715 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0715 - 0730 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0730 - 0745 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| 0745 - 0800 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 | 0 | - | - | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

## Classified Turn Movement Count || All vehicles

Columbia, TN

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**Site 1 of 1**
Driveway
Patterson Dr
TN-99 Bear Creek Pike (West)
TN-99 Bear Creek Pike (East)

**Date**
Tuesday, February 22, 2022

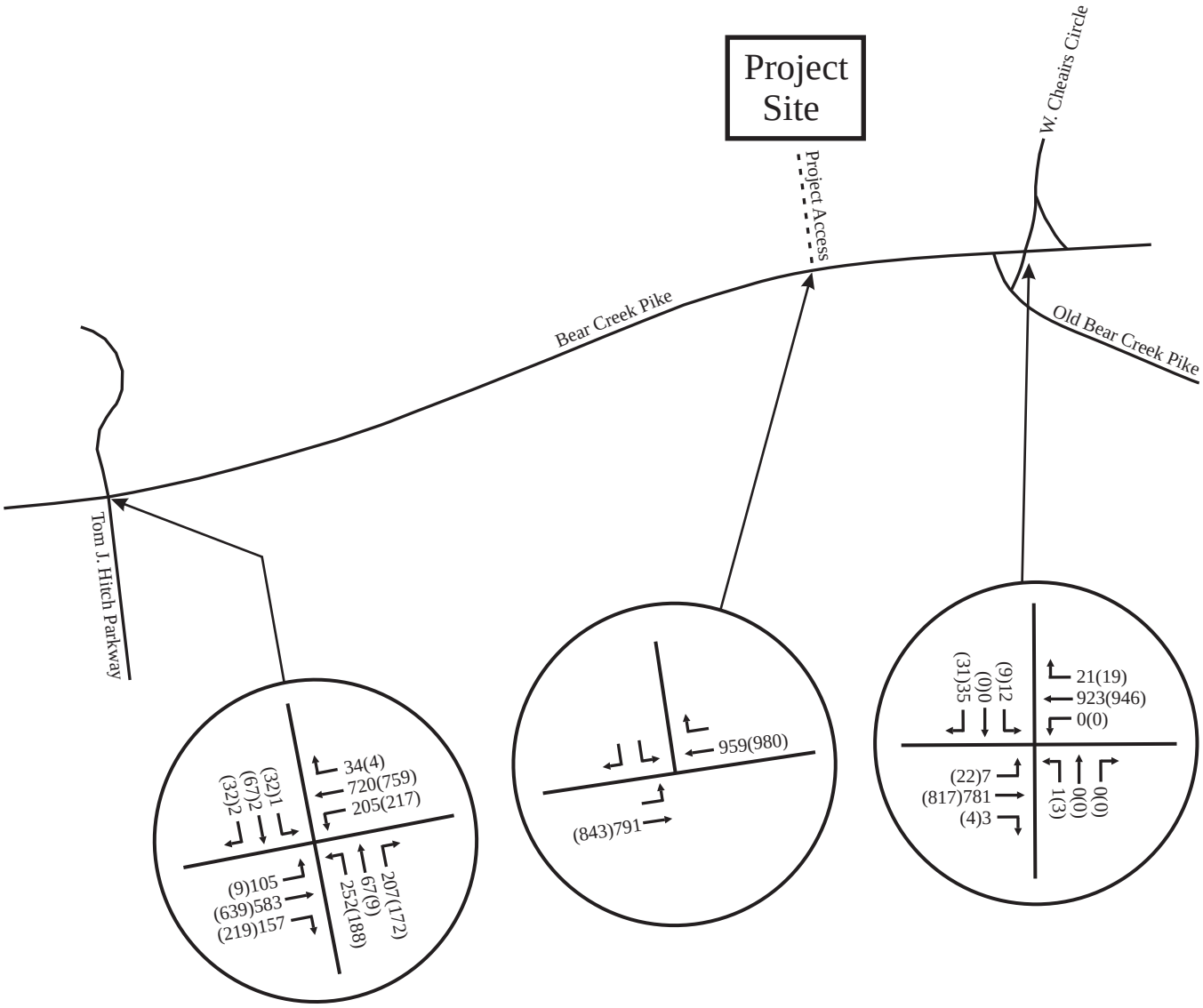
**Weather**
Cloudy
60°F

**Lat/Long**
35.636515°, -86.993469°

**0600 - 1900 (Weekday 13h Session) (02-22-2022)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Patterson Dr | | | | | TN-99 Bear Creek Pike (West) | | | | | TN-99 Bear Creek Pike (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| TIME | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0600 - 0615 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 | 0 | 118 | 0 | 0 | 118 | 0 | 62 | 0 | 0 | 62 | 183 |
| 0615 - 0630 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 7 | 1 | 120 | 2 | 1 | 124 | 0 | 93 | 0 | 0 | 93 | 224 |
| 0630 - 0645 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 5 | 0 | 147 | 0 | 0 | 147 | 0 | 108 | 0 | 0 | 108 | 260 |
| 0645 - 0700 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 8 | 0 | 12 | 1 | 167 | 0 | 0 | 168 | 0 | 124 | 0 | 0 | 124 | 304 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 8 | 0 | 19 | 0 | **27** | 2 | 552 | 2 | 1 | **557** | 0 | 387 | 0 | 0 | **387** | **971** |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 | 0 | 14 | 1 | 186 | 0 | 0 | 187 | 0 | 168 | 0 | 0 | 168 | 369 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 8 | 0 | 15 | 4 | 221 | 1 | 0 | 226 | 0 | 189 | 1 | 0 | 190 | 431 |
| 0730 - 0745 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 14 | 0 | 15 | 1 | 185 | 0 | 0 | 186 | 0 | 241 | 0 | 0 | 241 | 442 |
| 0745 - 0800 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 18 | 3 | 177 | 0 | 0 | 180 | 0 | 239 | 1 | 0 | 240 | 438 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 12 | 0 | 50 | 0 | **62** | 9 | 769 | 1 | 0 | **779** | 0 | 837 | 2 | 0 | **839** | **1680** |
| 0800 - 0815 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 5 | 6 | 150 | 0 | 0 | 156 | 0 | 186 | 1 | 0 | 187 | 348 |
| 0815 - 0830 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 8 | 0 | 9 | 3 | 135 | 0 | 0 | 138 | 0 | 163 | 1 | 0 | 164 | 311 |
| 0830 - 0845 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 7 | 4 | 125 | 0 | 0 | 129 | 0 | 150 | 2 | 0 | 152 | 288 |
| 0845 - 0900 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 | 5 | 88 | 0 | 0 | 93 | 0 | 129 | 0 | 0 | 129 | 226 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 20 | 0 | **25** | 18 | 498 | 0 | 0 | **516** | 0 | 628 | 4 | 0 | **632** | **1173** |
| 0900 - 0915 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 12 | 0 | 16 | 4 | 95 | 0 | 0 | 99 | 0 | 117 | 0 | 0 | 117 | 232 |
| 0915 - 0930 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 5 | 111 | 0 | 0 | 116 | 0 | 95 | 3 | 0 | 98 | 221 |
| 0930 - 0945 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 3 | 109 | 0 | 0 | 112 | 0 | 127 | 0 | 0 | 127 | 244 |
| 0945 - 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 9 | 6 | 113 | 1 | 0 | 120 | 0 | 127 | 2 | 0 | 129 | 258 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 33 | 0 | **37** | 18 | 428 | 1 | 0 | **447** | 0 | 466 | 5 | 0 | **471** | **955** |
| 1000 - 1015 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 11 | 0 | 12 | 3 | 127 | 0 | 0 | 130 | 0 | 105 | 0 | 0 | 105 | 247 |
| 1015 - 1030 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 8 | 116 | 0 | 0 | 124 | 0 | 114 | 0 | 0 | 114 | 245 |
| 1030 - 1045 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 0 | 8 | 6 | 109 | 0 | 0 | 115 | 0 | 147 | 0 | 0 | 147 | 270 |
| 1045 - 1100 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 | 3 | 117 | 0 | 0 | 120 | 0 | 87 | 1 | 0 | 88 | 212 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 5 | 0 | 26 | 0 | **31** | 20 | 469 | 0 | 0 | **489** | 0 | 453 | 1 | 0 | **454** | **974** |
| 1100 - 1115 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 7 | 8 | 117 | 0 | 0 | 125 | 0 | 110 | 1 | 0 | 111 | 243 |
| 1115 - 1130 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 4 | 10 | 128 | 0 | 0 | 138 | 0 | 114 | 1 | 0 | 115 | 258 |
| 1130 - 1145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 | 113 | 0 | 0 | 115 | 0 | 108 | 0 | 0 | 108 | 225 |
| 1145 - 1200 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 10 | 0 | 12 | 7 | 106 | 0 | 0 | 113 | 0 | 96 | 0 | 0 | 96 | 221 |
| Hourly Total | 1 | 0 | 0 | 0 | **1** | 5 | 0 | 20 | 0 | **25** | 27 | 464 | 0 | 0 | **491** | 0 | 428 | 2 | 0 | **430** | **947** |
| 1200 - 1215 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 7 | 121 | 0 | 0 | 128 | 0 | 109 | 0 | 0 | 109 | 240 |
| 1215 - 1230 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 8 | 0 | 9 | 10 | 119 | 0 | 0 | 129 | 0 | 130 | 0 | 0 | 130 | 269 |
| 1230 - 1245 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 10 | 0 | 11 | 4 | 126 | 0 | 0 | 130 | 0 | 128 | 0 | 0 | 128 | 269 |
| 1245 - 1300 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 3 | 7 | 104 | 0 | 0 | 111 | 0 | 113 | 0 | 0 | 113 | 228 |
| Hourly Total | 1 | 0 | 1 | 0 | **2** | 2 | 0 | 24 | 0 | **26** | 28 | 470 | 0 | 0 | **498** | 0 | 480 | 0 | 0 | **480** | **1006** |
| 1300 - 1315 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 5 | 7 | 123 | 0 | 0 | 130 | 0 | 101 | 0 | 0 | 101 | 236 |
| 1315 - 1330 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 4 | 104 | 1 | 0 | 109 | 0 | 125 | 2 | 0 | 127 | 240 |
| 1330 - 1345 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 5 | 5 | 112 | 0 | 0 | 117 | 0 | 115 | 1 | 0 | 116 | 238 |
| 1345 - 1400 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 8 | 0 | 9 | 1 | 101 | 1 | 0 | 103 | 0 | 115 | 2 | 0 | 117 | 229 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 4 | 0 | 19 | 0 | **23** | 17 | 440 | 2 | 0 | **459** | 0 | 456 | 5 | 0 | **461** | **943** |
| 1400 - 1415 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 4 | 134 | 0 | 0 | 138 | 0 | 114 | 0 | 0 | 114 | 256 |
| 1415 - 1430 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 7 | 156 | 0 | 0 | 163 | 0 | 122 | 0 | 0 | 122 | 289 |
| 1430 - 1445 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 15 | 0 | 16 | 3 | 150 | 0 | 0 | 153 | 0 | 174 | 4 | 0 | 178 | 347 |
| 1445 - 1500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 3 | 149 | 1 | 0 | 153 | 0 | 154 | 1 | 0 | 155 | 315 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 30 | 0 | **31** | 17 | 589 | 1 | 0 | **607** | 0 | 564 | 5 | 0 | **569** | **1207** |
| 1500 - 1515 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 8 | 0 | 12 | 6 | 152 | 0 | 0 | 158 | 0 | 168 | 1 | 0 | 169 | 339 |
| 1515 - 1530 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 7 | 11 | 154 | 1 | 0 | 166 | 0 | 189 | 0 | 0 | 189 | 362 |
| 1530 - 1545 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 6 | 12 | 190 | 1 | 0 | 203 | 0 | 194 | 4 | 0 | 198 | 408 |
| 1545 - 1600 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 8 | 9 | 174 | 0 | 0 | 183 | 0 | 171 | 1 | 0 | 172 | 363 |
| Hourly Total | 1 | 0 | 0 | 0 | **1** | 5 | 0 | 28 | 0 | **33** | 38 | 670 | 2 | 0 | **710** | 0 | 722 | 6 | 0 | **728** | **1472** |
| 1600 - 1615 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 14 | 0 | 15 | 7 | 152 | 0 | 0 | 159 | 0 | 171 | 3 | 0 | 174 | 349 |
| 1615 - 1630 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 7 | 10 | 173 | 0 | 0 | 183 | 0 | 206 | 3 | 0 | 209 | 399 |
| 1630 - 1645 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 9 | 153 | 0 | 0 | 162 | 0 | 202 | 2 | 0 | 204 | 372 |
| 1645 - 1700 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 4 | 0 | 5 | 8 | 174 | 0 | 0 | 182 | 0 | 207 | 5 | 0 | 212 | 400 |
| Hourly Total | 1 | 0 | 1 | 0 | **2** | 3 | 0 | 30 | 0 | **33** | 34 | 652 | 0 | 0 | **686** | 0 | 786 | 13 | 0 | **799** | **1520** |
| 1700 - 1715 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 5 | 15 | 158 | 0 | 0 | 173 | 0 | 197 | 2 | 0 | 199 | 377 |
| 1715 - 1730 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 14 | 161 | 0 | 0 | 175 | 0 | 138 | 2 | 0 | 140 | 321 |
| 1730 - 1745 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 11 | 132 | 0 | 0 | 143 | 0 | 176 | 1 | 0 | 177 | 325 |
| 1745 - 1800 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 5 | 105 | 0 | 0 | 110 | 0 | 124 | 2 | 0 | 126 | 239 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 3 | 0 | 16 | 0 | **19** | 45 | 556 | 0 | 0 | **601** | 0 | 635 | 7 | 0 | **642** | **1262** |
| 1800 - 1815 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 10 | 87 | 0 | 0 | 97 | 0 | 152 | 0 | 0 | 152 | 252 |
| 1815 - 1830 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 6 | 9 | 76 | 0 | 0 | 85 | 0 | 103 | 2 | 0 | 105 | 196 |
| 1830 - 1845 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 6 | 7 | 67 | 0 | 0 | 74 | 0 | 83 | 3 | 0 | 86 | 166 |
| 1845 - 1900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 5 | 56 | 0 | 0 | 61 | 0 | 61 | 0 | 0 | 61 | 127 |
| Hourly Total | 0 | 0 | 0 | 0 | **0** | 2 | 0 | 18 | 0 | **20** | 31 | 286 | 0 | 0 | **317** | 0 | 399 | 5 | 0 | **404** | **741** |
| Grand Total | 4 | 0 | 2 | 0 | **6** | 59 | 0 | 333 | 0 | **392** | 304 | 6843 | 9 | 1 | **7157** | 0 | 7241 | 55 | 0 | **7296** | **14851** |
| Approach % | 66.67 | 0.00 | 33.33 | 0.00 | - | 15.05 | 0.00 | 84.95 | 0.00 | - | 4.25 | 95.61 | 0.13 | 0.01 | - | 0.00 | 99.25 | 0.75 | 0.00 | - | |
| Intersection % | 0.03 | 0.00 | 0.01 | 0.00 | 0.04 | 0.40 | 0.00 | 2.24 | 0.00 | 2.64 | 2.05 | 46.08 | 0.06 | 0.01 | 48.19 | 0.00 | 48.76 | 0.37 | 0.00 | 49.13 | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.43 | 0.00 | 0.83 | 0.00 | **0.86** | 0.56 | 0.87 | 0.25 | 0.00 | **0.86** | 0.00 | 0.87 | 0.50 | 0.00 | **0.87** | **0.95** |

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning




N

**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 4.**
**Existing Year 2023 Peak Hour Traffic Volumes**

# Peak Hour Turning Movement Count

Columbia, TN

Click here for Map

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, August 22, 2023 | |
|---|---|
| Period | 0600 - 0900 |
| Peak Hour | 0715 - 0815 |

* the Peak Hour Diagram does not include Bikes



**All vehicles**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 0715 - 0730 | 1 | 95 | 24 | - | 0 | 120 | 5 | 68 | 6 | - | 0 | 79 | 7 | 5 | 1 | - | 0 | 13 | 14 | 17 | 20 | - | 0 | 51 | 263 |
| 0730 - 0745 | 3 | 107 | 11 | - | 0 | 121 | 8 | 74 | 7 | - | 0 | 89 | 8 | 12 | 3 | - | 0 | 23 | 25 | 32 | 11 | - | 0 | 68 | 301 |
| 0745 - 0800 | 2 | 125 | 18 | - | 0 | 145 | 9 | 79 | 3 | - | 0 | 91 | 9 | 7 | 1 | - | 0 | 17 | 35 | 27 | 7 | - | 0 | 69 | 322 |
| 0800 - 0815 | 3 | 79 | 14 | - | 0 | 96 | 4 | 86 | 8 | - | 0 | 98 | 4 | 11 | 1 | - | 0 | 16 | 17 | 18 | 8 | - | 0 | 43 | 253 |
| Total | 9 | 406 | 67 | 0 | 0 | 482 | 26 | 307 | 24 | 0 | 0 | 357 | 28 | 35 | 6 | 0 | 0 | 69 | 91 | 94 | 46 | 0 | 0 | 231 | 1139 |
| Approach % | 1.87 | 84.23 | 13.90 | 0.00 | 0.00 | - | 7.28 | 85.99 | 6.72 | 0.00 | 0.00 | - | 40.58 | 50.72 | 8.70 | 0.00 | 0.00 | - | 39.39 | 40.69 | 19.91 | 0.00 | 0.00 | - | |
| PHF | 0.75 | 0.81 | 0.70 | 0.00 | 0.00 | **0.83** | 0.72 | 0.89 | 0.75 | 0.00 | 0.00 | **0.91** | 0.78 | 0.73 | 0.50 | 0.00 | 0.00 | **0.75** | 0.65 | 0.73 | 0.58 | 0.00 | 0.00 | **0.84** | **0.88** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 0715 - 0730 | 1 | 88 | 22 | - | 0 | 111 | 5 | 65 | 6 | - | 0 | 76 | 7 | 5 | 0 | - | 0 | 12 | 14 | 17 | 19 | - | 0 | 50 | 249 |
| 0730 - 0745 | 3 | 99 | 11 | - | 0 | 113 | 8 | 69 | 6 | - | 0 | 83 | 8 | 11 | 3 | - | 0 | 22 | 25 | 32 | 11 | - | 0 | 68 | 286 |
| 0745 - 0800 | 2 | 116 | 18 | - | 0 | 136 | 8 | 75 | 3 | - | 0 | 86 | 9 | 7 | 1 | - | 0 | 17 | 34 | 27 | 7 | - | 0 | 68 | 307 |
| 0800 - 0815 | 3 | 67 | 14 | - | 0 | 84 | 4 | 79 | 7 | - | 0 | 90 | 4 | 10 | 1 | - | 0 | 15 | 17 | 17 | 6 | - | 0 | 40 | 229 |
| Total | 9 | 370 | 65 | 0 | 0 | 444 | 25 | 288 | 22 | 0 | 0 | 335 | 28 | 33 | 5 | 0 | 0 | 66 | 90 | 93 | 43 | 0 | 0 | 226 | 1071 |
| Approach % | 2.03 | 83.33 | 14.64 | 0.00 | 0.00 | - | 7.46 | 85.97 | 6.57 | 0.00 | 0.00 | - | 42.42 | 50.00 | 7.58 | 0.00 | 0.00 | - | 39.82 | 41.15 | 19.03 | 0.00 | 0.00 | - | |
| PHF | 0.75 | 0.80 | 0.74 | 0.00 | 0.00 | **0.82** | 0.78 | 0.91 | 0.79 | 0.00 | 0.00 | **0.93** | 0.78 | 0.75 | 0.42 | 0.00 | 0.00 | **0.75** | 0.66 | 0.73 | 0.57 | 0.00 | 0.00 | **0.83** | **0.87** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 0715 - 0730 | 0 | 5 | 2 | - | 0 | 7 | 0 | 3 | 0 | - | 0 | 3 | 0 | 0 | 1 | - | 0 | 1 | 0 | 0 | 0 | - | 0 | 0 | 11 |
| 0730 - 0745 | 0 | 7 | 0 | - | 0 | 7 | 0 | 4 | 1 | - | 0 | 5 | 0 | 1 | 0 | - | 0 | 1 | 0 | 0 | 0 | - | 0 | 0 | 13 |
| 0745 - 0800 | 0 | 7 | 0 | - | 0 | 7 | 1 | 4 | 0 | - | 0 | 5 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 12 |
| 0800 - 0815 | 0 | 9 | 0 | - | 0 | 9 | 0 | 6 | 1 | - | 0 | 7 | 0 | 1 | 0 | - | 0 | 1 | 0 | 1 | 2 | - | 0 | 3 | 20 |
| Total | 0 | 28 | 2 | 0 | 0 | 30 | 1 | 17 | 2 | 0 | 0 | 20 | 0 | 2 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 0 | 3 | 56 |
| Approach % | 0.00 | 93.33 | 6.67 | 0.00 | 0.00 | - | 5.00 | 85.00 | 10.00 | 0.00 | 0.00 | - | 0.00 | 66.67 | 33.33 | 0.00 | 0.00 | - | 0.00 | 33.33 | 66.67 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.78 | 0.25 | 0.00 | 0.00 | **0.83** | 0.25 | 0.71 | 0.50 | 0.00 | 0.00 | **0.71** | 0.00 | 0.50 | 0.25 | 0.00 | 0.00 | **0.75** | 0.00 | 0.25 | 0.25 | 0.00 | 0.00 | **0.25** | **0.70** |

**Combination Trucks (8-13)**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 0715 - 0730 | 0 | 2 | 0 | - | 0 | 2 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 | - | 0 | 1 | 3 |
| 0730 - 0745 | 0 | 1 | 0 | - | 0 | 1 | 0 | 1 | 0 | - | 0 | 1 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 2 |
| 0745 - 0800 | 0 | 2 | 0 | - | 0 | 2 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 0 | - | 0 | 1 | 3 |
| 0800 - 0815 | 0 | 3 | 0 | - | 0 | 3 | 0 | 1 | 0 | - | 0 | 1 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 4 |
| Total | 0 | 8 | 0 | 0 | 0 | 8 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 12 |
| Approach % | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 50.00 | 0.00 | 50.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.67 | 0.00 | 0.00 | 0.00 | **0.67** | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | **0.50** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.00 | 0.25 | 0.00 | 0.00 | **0.50** | **0.75** |

**Bikes**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 0715 - 0730 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 0730 - 0745 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 0745 - 0800 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 0800 - 0815 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

# Peak Hour Turning Movement Count

Columbia, TN

Click here for Map

Marr Traffic DATA COLLECTION

www.marrtraffic.com

| Tuesday, August 22, 2023 | |
|---|---|
| Period | 1600 - 1800 |
| Peak Hour | 1600 - 1700 |

* the Peak Hour Diagram does not include Bikes



**All vehicles**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 1600 - 1615 | 4 | 74 | 21 | - | 0 | 99 | 6 | 111 | 18 | - | 0 | 135 | 2 | 14 | 1 | - | 0 | 17 | 14 | 3 | 4 | - | 0 | 21 | 272 |
| 1615 - 1630 | 2 | 60 | 20 | - | 0 | 82 | 6 | 99 | 12 | - | 0 | 117 | 2 | 8 | 3 | - | 0 | 13 | 19 | 6 | 8 | - | 0 | 33 | 245 |
| 1630 - 1645 | 2 | 68 | 14 | - | 0 | 84 | 13 | 126 | 13 | - | 0 | 152 | 4 | 6 | 2 | - | 0 | 12 | 15 | 13 | 10 | - | 0 | 38 | 286 |
| 1645 - 1700 | 1 | 74 | 14 | - | 0 | 89 | 10 | 93 | 11 | - | 0 | 114 | 5 | 11 | 0 | - | 0 | 16 | 12 | 5 | 4 | - | 0 | 21 | 240 |
| Total | 9 | 276 | 69 | 0 | 0 | 354 | 35 | 429 | 54 | 0 | 0 | 518 | 13 | 39 | 6 | 0 | 0 | 58 | 60 | 27 | 26 | 0 | 0 | 113 | 1043 |
| Approach % | 2.54 | 77.97 | 19.49 | 0.00 | 0.00 | - | 6.76 | 82.82 | 10.42 | 0.00 | 0.00 | - | 22.41 | 67.24 | 10.34 | 0.00 | 0.00 | - | 53.10 | 23.89 | 23.01 | 0.00 | 0.00 | - | |
| PHF | 0.56 | 0.93 | 0.82 | 0.00 | 0.00 | **0.89** | 0.67 | 0.85 | 0.75 | 0.00 | 0.00 | **0.85** | 0.65 | 0.70 | 0.50 | 0.00 | 0.00 | **0.85** | 0.79 | 0.52 | 0.65 | 0.00 | 0.00 | **0.74** | **0.91** |

**Passenger Vehicles (1-3)**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 1600 - 1615 | 4 | 66 | 19 | - | 0 | 89 | 6 | 109 | 18 | - | 0 | 133 | 2 | 14 | 1 | - | 0 | 17 | 14 | 2 | 4 | - | 0 | 20 | 259 |
| 1615 - 1630 | 2 | 56 | 20 | - | 0 | 78 | 5 | 94 | 11 | - | 0 | 110 | 2 | 8 | 3 | - | 0 | 13 | 16 | 6 | 8 | - | 0 | 30 | 231 |
| 1630 - 1645 | 2 | 67 | 14 | - | 0 | 83 | 13 | 118 | 13 | - | 0 | 144 | 4 | 6 | 2 | - | 0 | 12 | 15 | 13 | 10 | - | 0 | 38 | 277 |
| 1645 - 1700 | 1 | 74 | 14 | - | 0 | 89 | 10 | 88 | 11 | - | 0 | 109 | 5 | 11 | 0 | - | 0 | 16 | 12 | 5 | 4 | - | 0 | 21 | 235 |
| Total | 9 | 263 | 67 | 0 | 0 | 339 | 34 | 409 | 53 | 0 | 0 | 496 | 13 | 39 | 6 | 0 | 0 | 58 | 57 | 26 | 26 | 0 | 0 | 109 | 1002 |
| Approach % | 2.65 | 77.58 | 19.76 | 0.00 | 0.00 | - | 6.85 | 82.46 | 10.69 | 0.00 | 0.00 | - | 22.41 | 67.24 | 10.34 | 0.00 | 0.00 | - | 52.29 | 23.85 | 23.85 | 0.00 | 0.00 | - | |
| PHF | 0.56 | 0.89 | 0.84 | 0.00 | 0.00 | **0.95** | 0.65 | 0.87 | 0.74 | 0.00 | 0.00 | **0.86** | 0.65 | 0.70 | 0.50 | 0.00 | 0.00 | **0.85** | 0.89 | 0.50 | 0.65 | 0.00 | 0.00 | **0.72** | **0.90** |

**Single Unit Trucks (4-7)**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 1600 - 1615 | 0 | 6 | 2 | - | 0 | 8 | 0 | 2 | 0 | - | 0 | 2 | 0 | 0 | 0 | - | 0 | 0 | 0 | 1 | 0 | - | 0 | 1 | 11 |
| 1615 - 1630 | 0 | 3 | 0 | - | 0 | 3 | 1 | 5 | 1 | - | 0 | 7 | 0 | 0 | 0 | - | 0 | 0 | 2 | 0 | 0 | - | 0 | 2 | 12 |
| 1630 - 1645 | 0 | 1 | 0 | - | 0 | 1 | 0 | 7 | 0 | - | 0 | 7 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 8 |
| 1645 - 1700 | 0 | 0 | 0 | - | 0 | 0 | 0 | 2 | 0 | - | 0 | 2 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 2 |
| Total | 0 | 10 | 2 | 0 | 0 | 12 | 1 | 16 | 1 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 3 | 33 |
| Approach % | 0.00 | 83.33 | 16.67 | 0.00 | 0.00 | - | 5.56 | 88.89 | 5.56 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 66.67 | 33.33 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.42 | 0.25 | 0.00 | 0.00 | **0.38** | 0.25 | 0.57 | 0.25 | 0.00 | 0.00 | **0.64** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.25 | 0.00 | 0.00 | 0.00 | **0.38** | **0.69** |

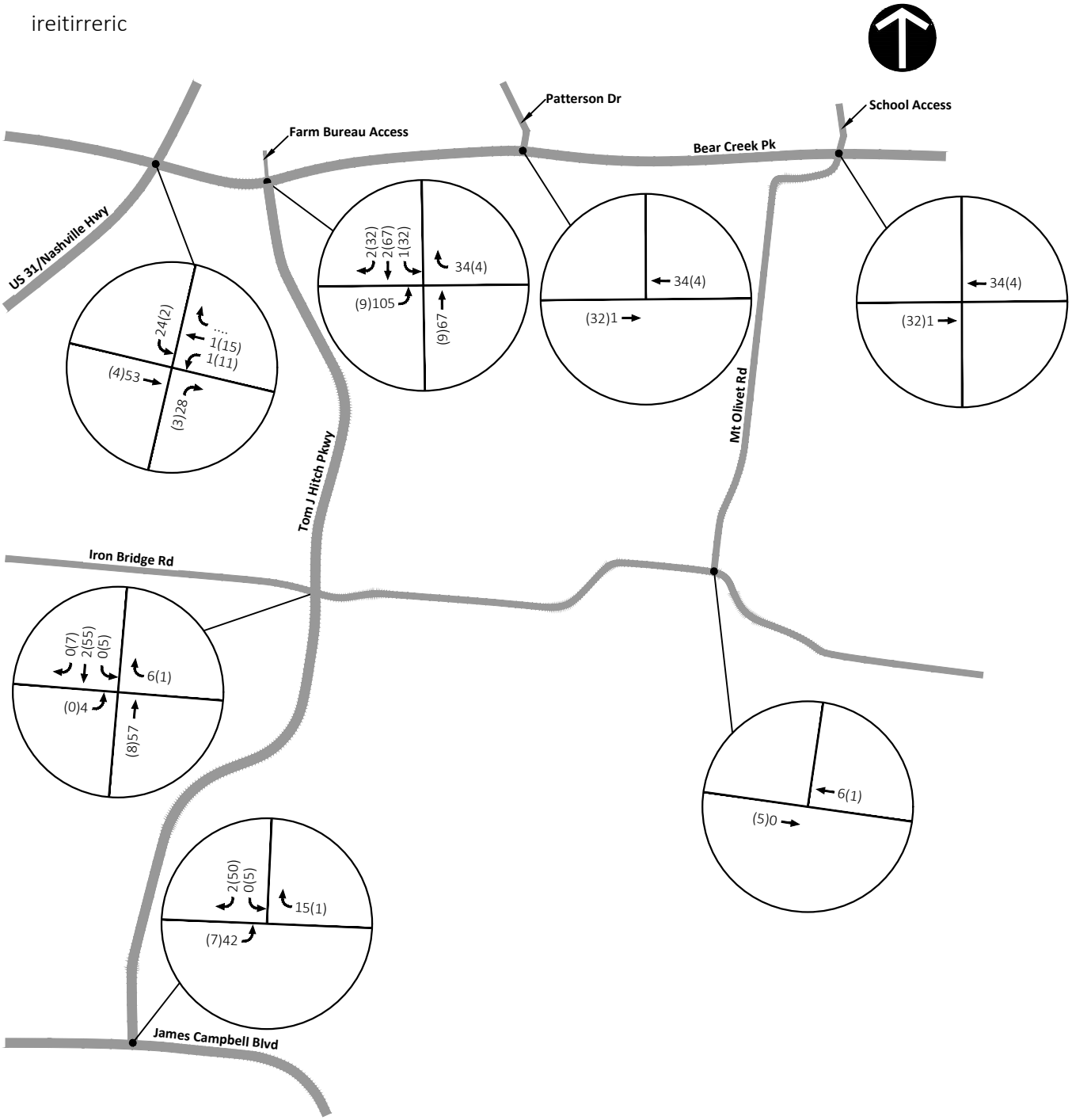
**Combination Trucks (8-13)**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 1600 - 1615 | 0 | 2 | 0 | - | 0 | 2 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 2 |
| 1615 - 1630 | 0 | 1 | 0 | - | 0 | 1 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 0 | - | 0 | 1 | 2 |
| 1630 - 1645 | 0 | 0 | 0 | - | 0 | 0 | 0 | 1 | 0 | - | 0 | 1 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 1 |
| 1645 - 1700 | 0 | 0 | 0 | - | 0 | 0 | 0 | 3 | 0 | - | 0 | 3 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 3 |
| Total | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 8 |
| Approach % | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.38 | 0.00 | 0.00 | 0.00 | **0.38** | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | **0.33** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | **0.25** | **0.67** |

**Bikes**

| | Northbound | | | | | | Southbound | | | | | | Eastbound | | | | | | Westbound | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tom J Hitch Pkwy (South) | | | | | | Tom J Hitch Pkwy (North) | | | | | | Iron Bridge Rd (West) | | | | | | Iron Bridge Rd (East) | | | | | | |
| | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Left | Thru | Right | | U-Turn | App | Int |
| Time | 1.1 | 1.2 | 1.3 | | 1.4 | Total | 1.5 | 1.6 | 1.7 | | 1.8 | Total | 1.9 | 1.10 | 1.11 | | 1.12 | Total | 1.13 | 1.14 | 1.15 | | 1.16 | Total | Total |
| 1600 - 1615 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 1615 - 1630 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 1630 - 1645 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| 1645 - 1700 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approach % | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | |
| PHF | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** | **0.00** |

ireitirreric

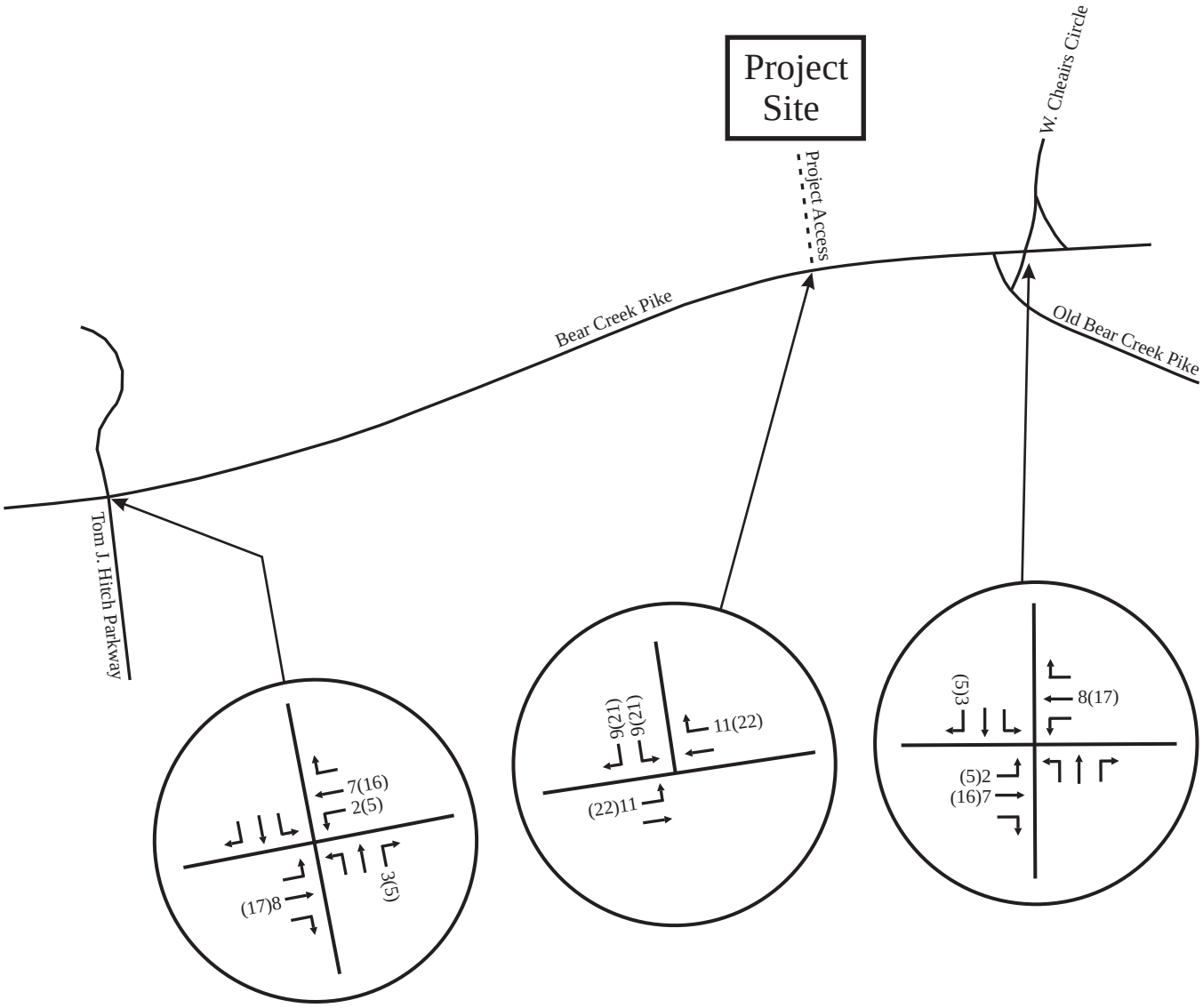



Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

# APPENDIX E
# BACKGROUND PROJECT DATA

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning



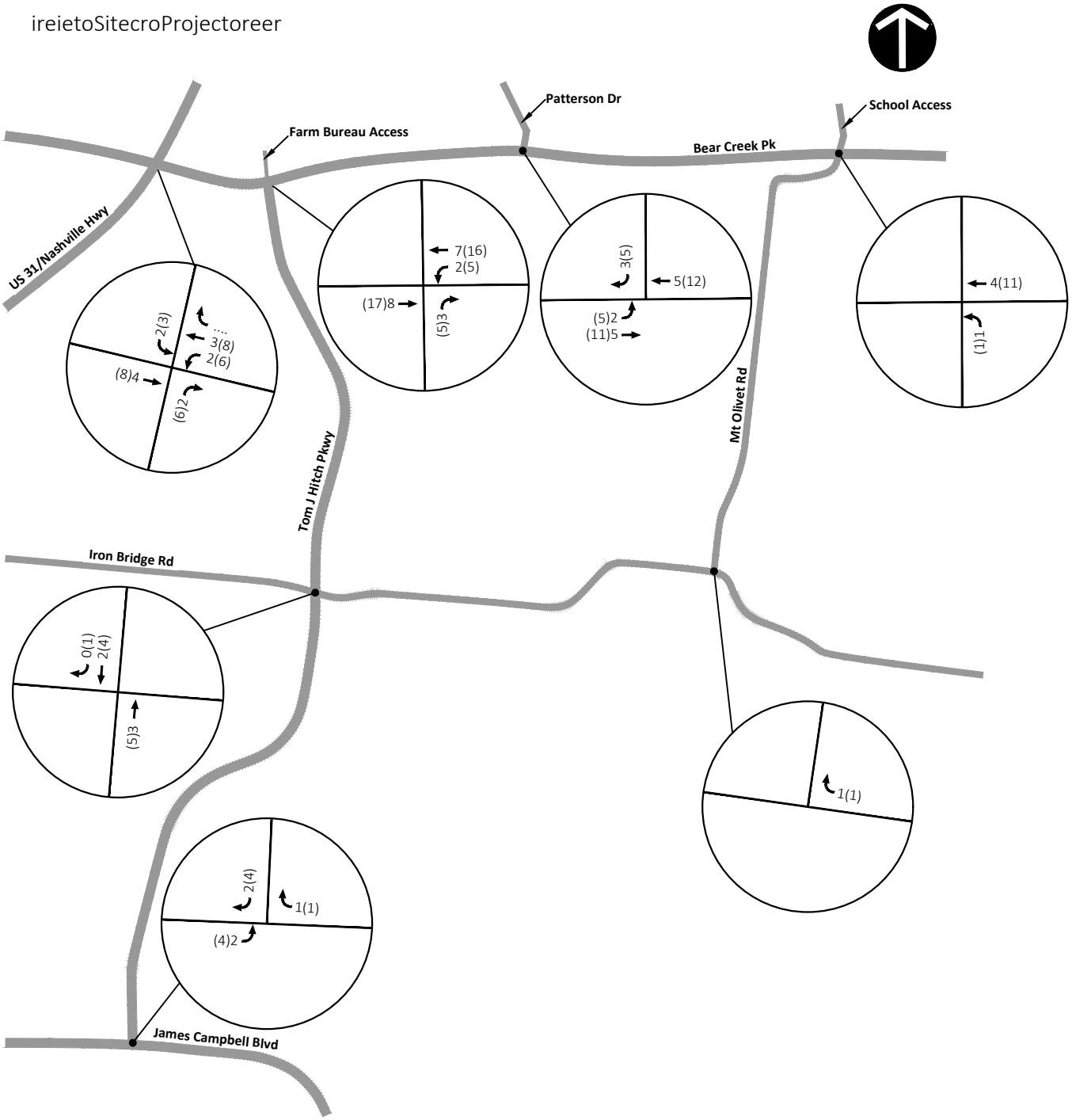

N

**No Scale**

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

**Figure 7.**
**Peak Hour Traffic Volumes Generated by the Proposed Project**

ireietoSitecroProjectoreer




Legend:
XXX - AM Peak Hour Traffic Volumes
(XXX) - PM Peak Hour Traffic Volumes

(Not to Scale)

# APPENDIX F
# TRIP GENERATION CALCULATIONS

# Single-Family Detached Housing
(210)

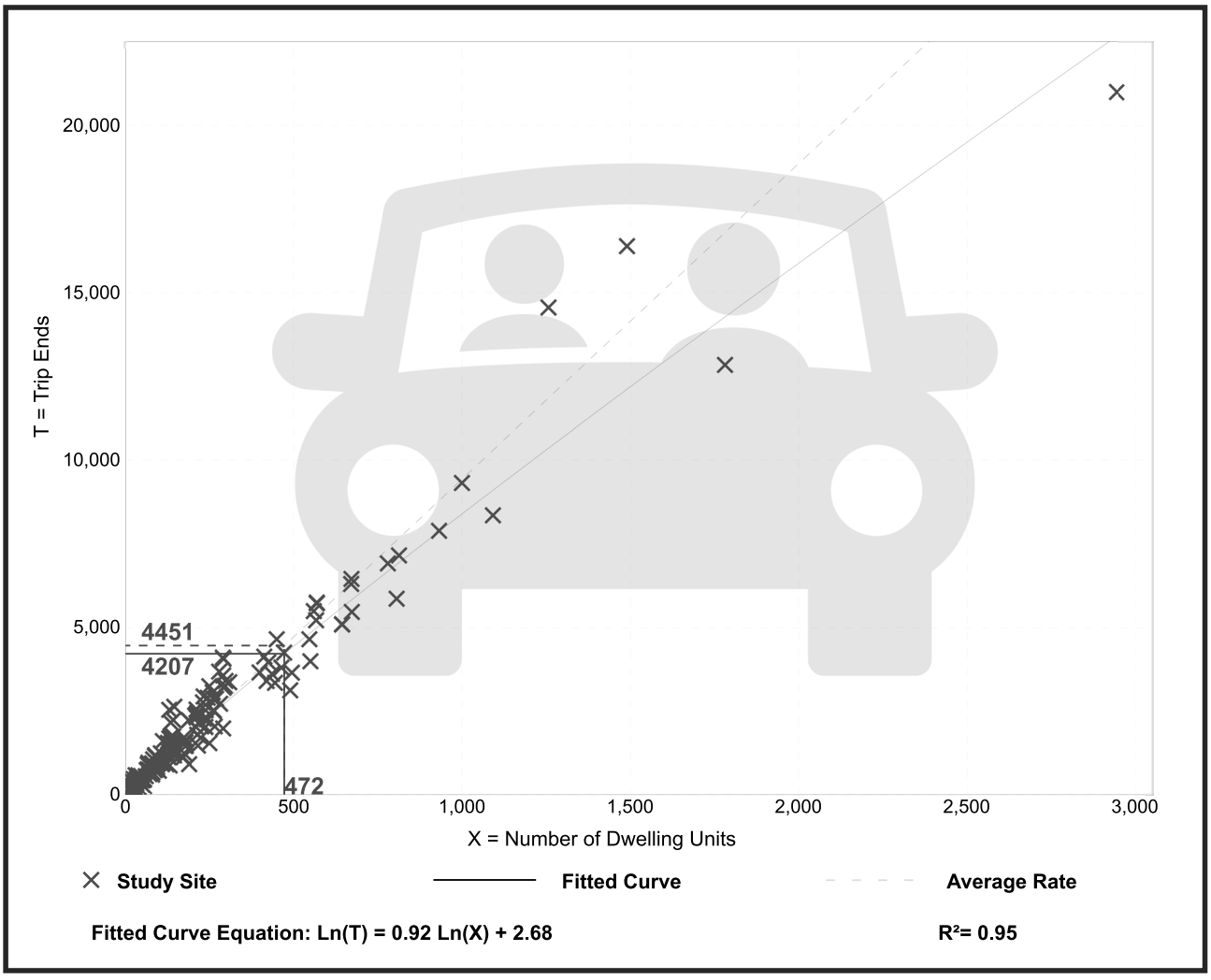
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 9.43 | 4.45 - 22.61 | 2.13 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

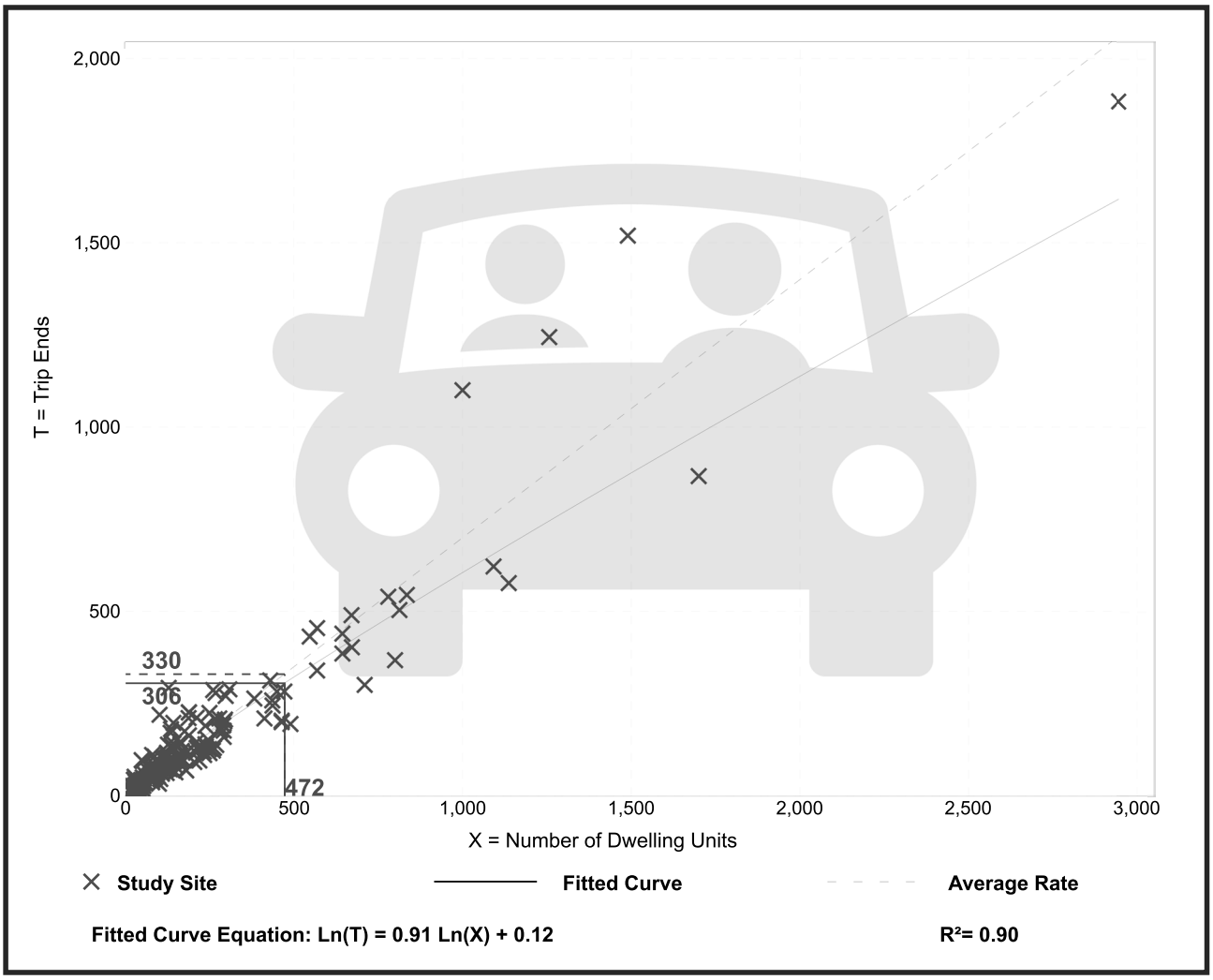
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.70 | 0.27 - 2.27 | 0.24 |

## Data Plot and Equation




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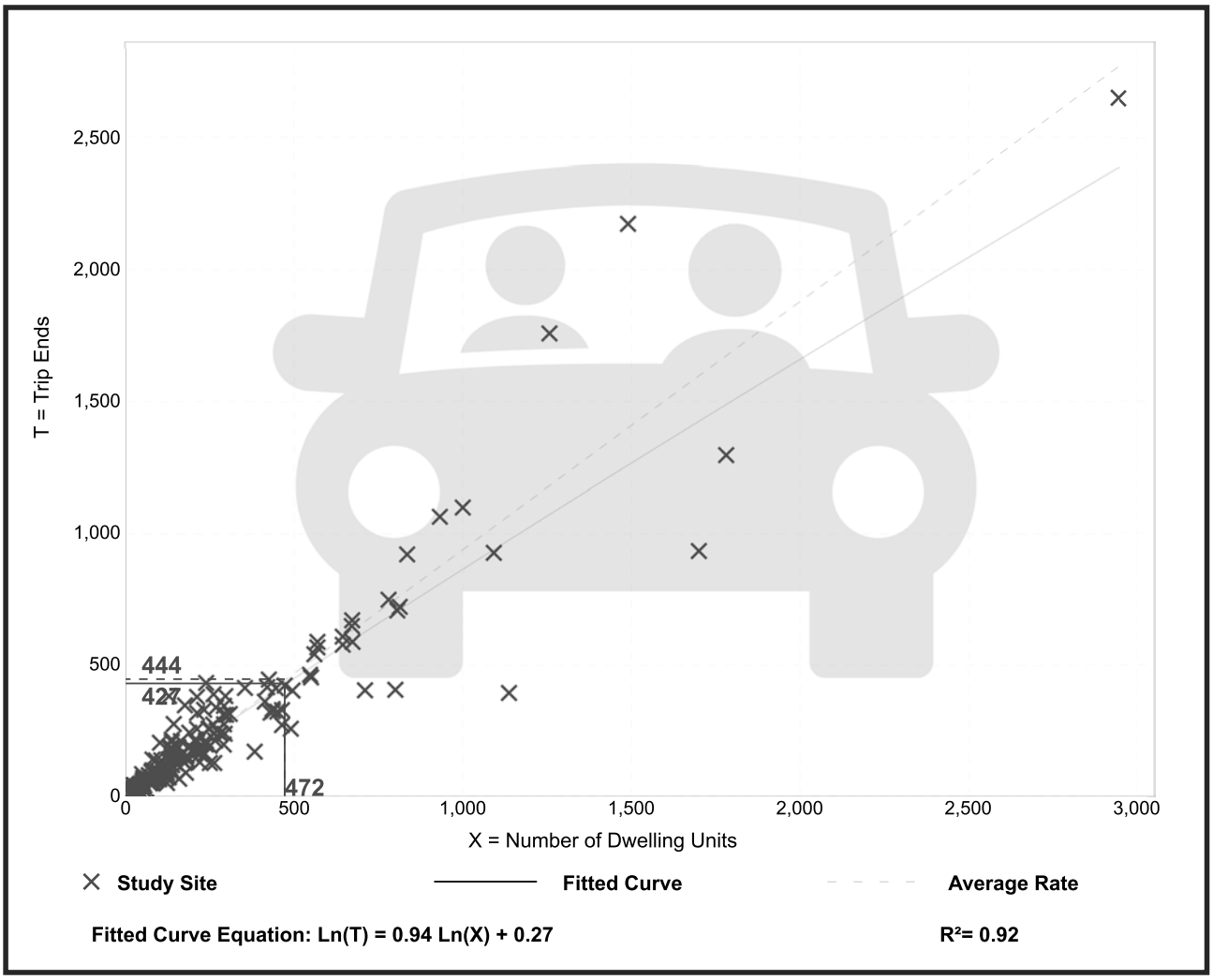
# Single-Family Detached Housing
(210)

| | |
|---|---|
| **Vehicle Trip Ends vs:** | **Dwelling Units** |
| **On a:** | **Weekday,** |
| | **Peak Hour of Adjacent Street Traffic,** |
| | **One Hour Between 4 and 6 p.m.** |
| **Setting/Location:** | **General Urban/Suburban** |
| Number of Studies: | 208 |
| Avg. Num. of Dwelling Units: | 248 |
| Directional Distribution: | 63% entering, 37% exiting |

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.94 | 0.35 - 2.98 | 0.31 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

# Single-Family Attached Housing
(215)

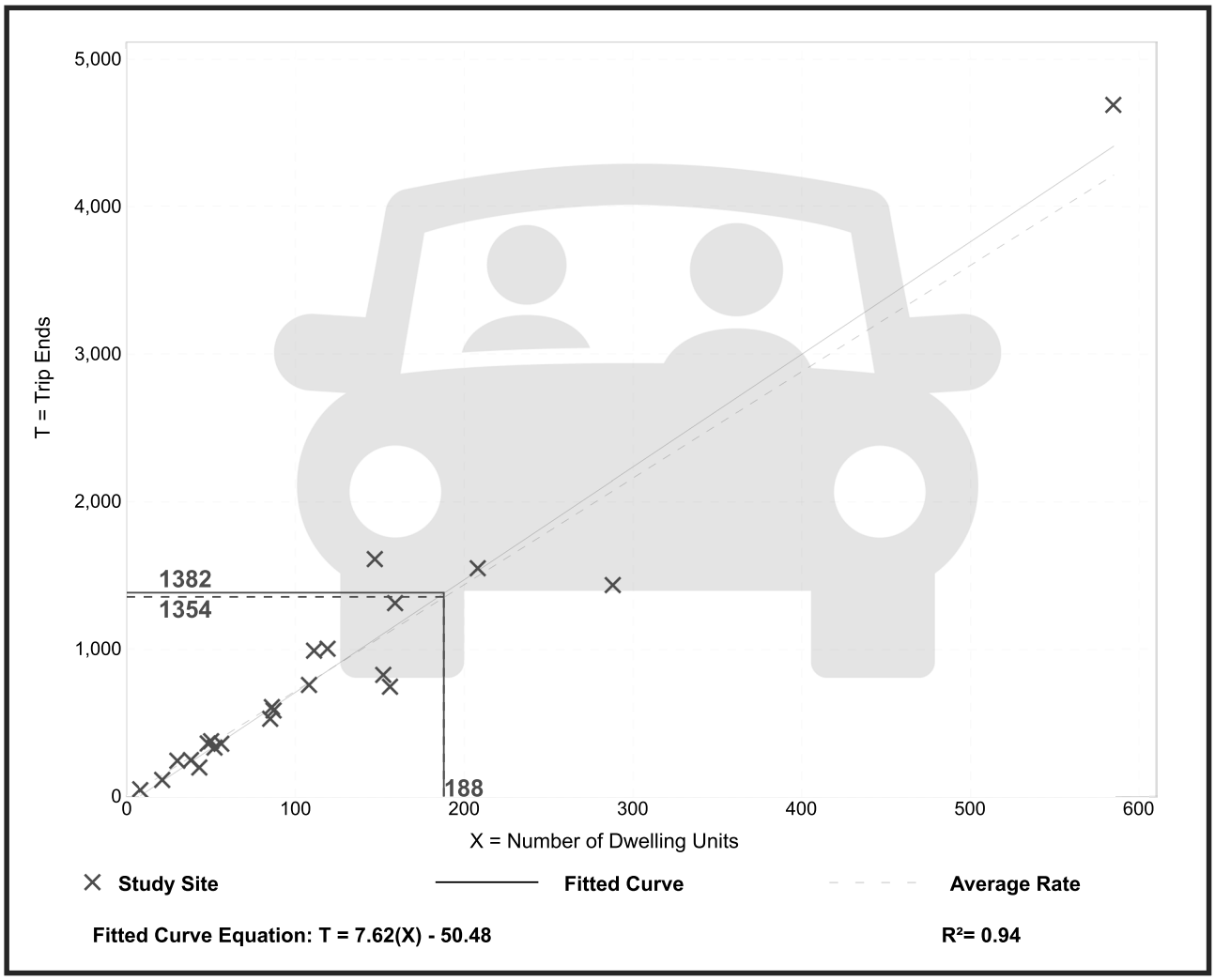
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 22
Avg. Num. of Dwelling Units: 120
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 7.20 | 4.70 - 10.97 | 1.61 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

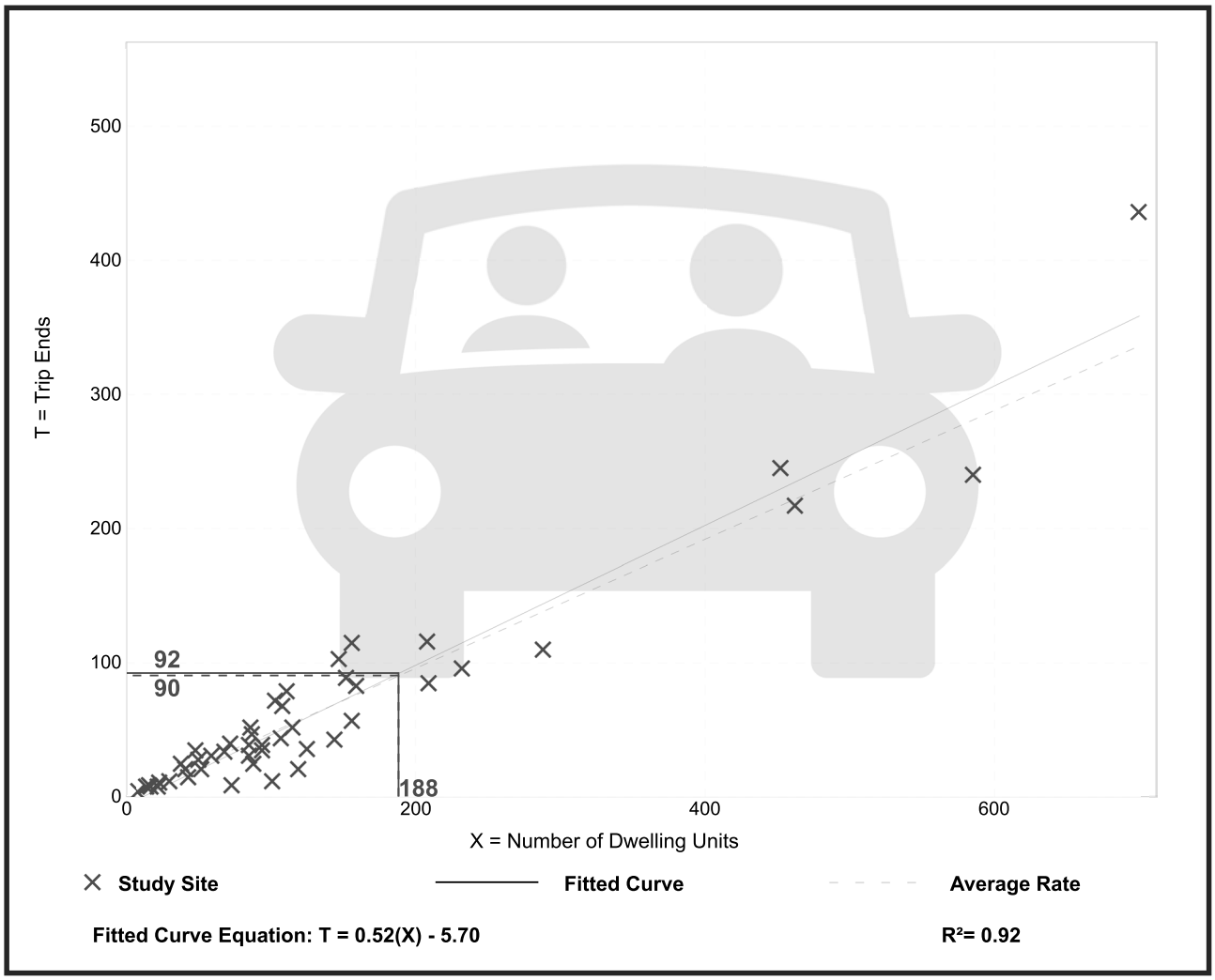
# Single-Family Attached Housing
(215)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.48 | 0.12 - 0.74 | 0.14 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

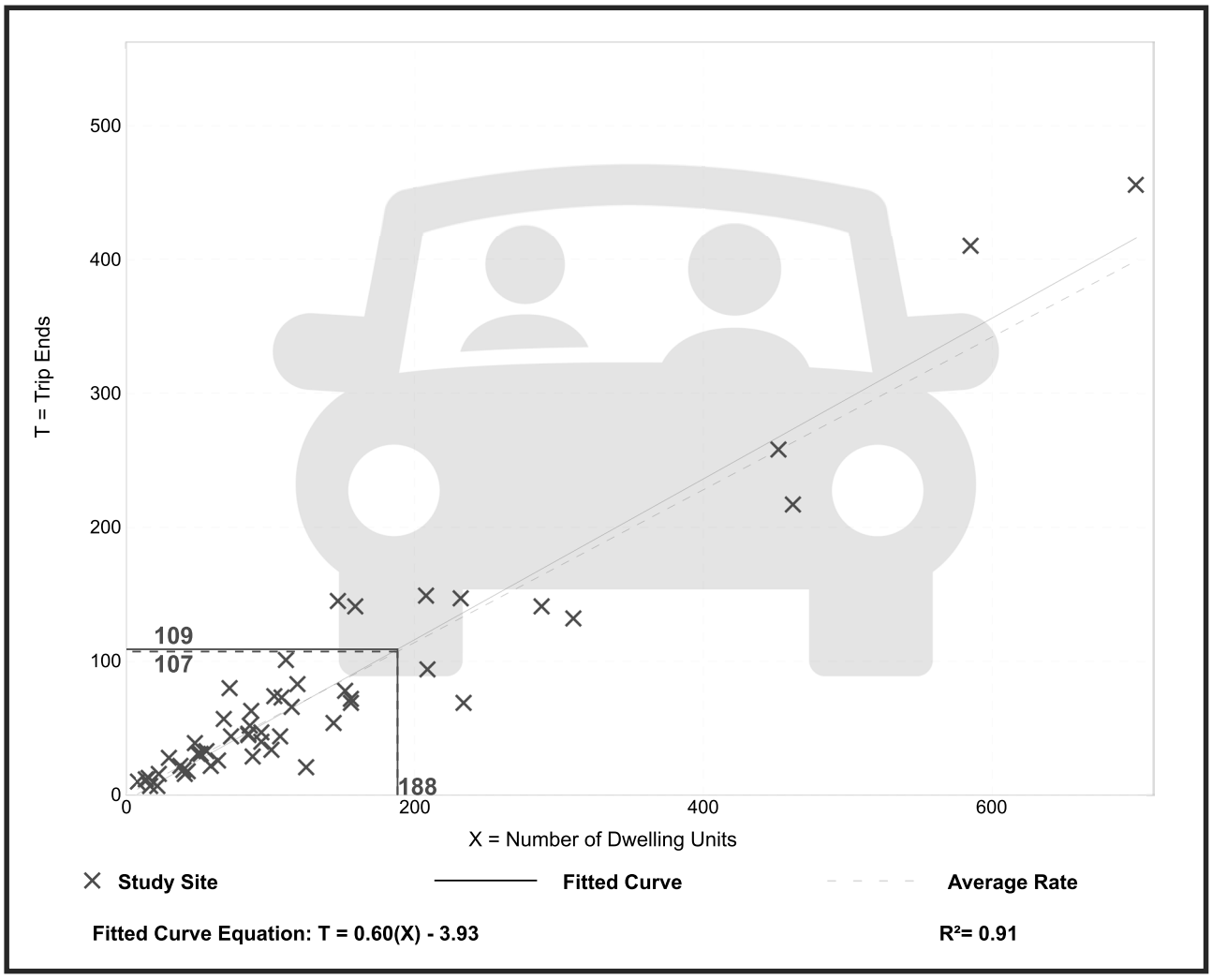
# Single-Family Attached Housing
(215)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 4 and 6 p.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 59% entering, 41% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.57 | 0.17 - 1.25 | 0.18 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

# Senior Adult Housing - Single-Family
(251)

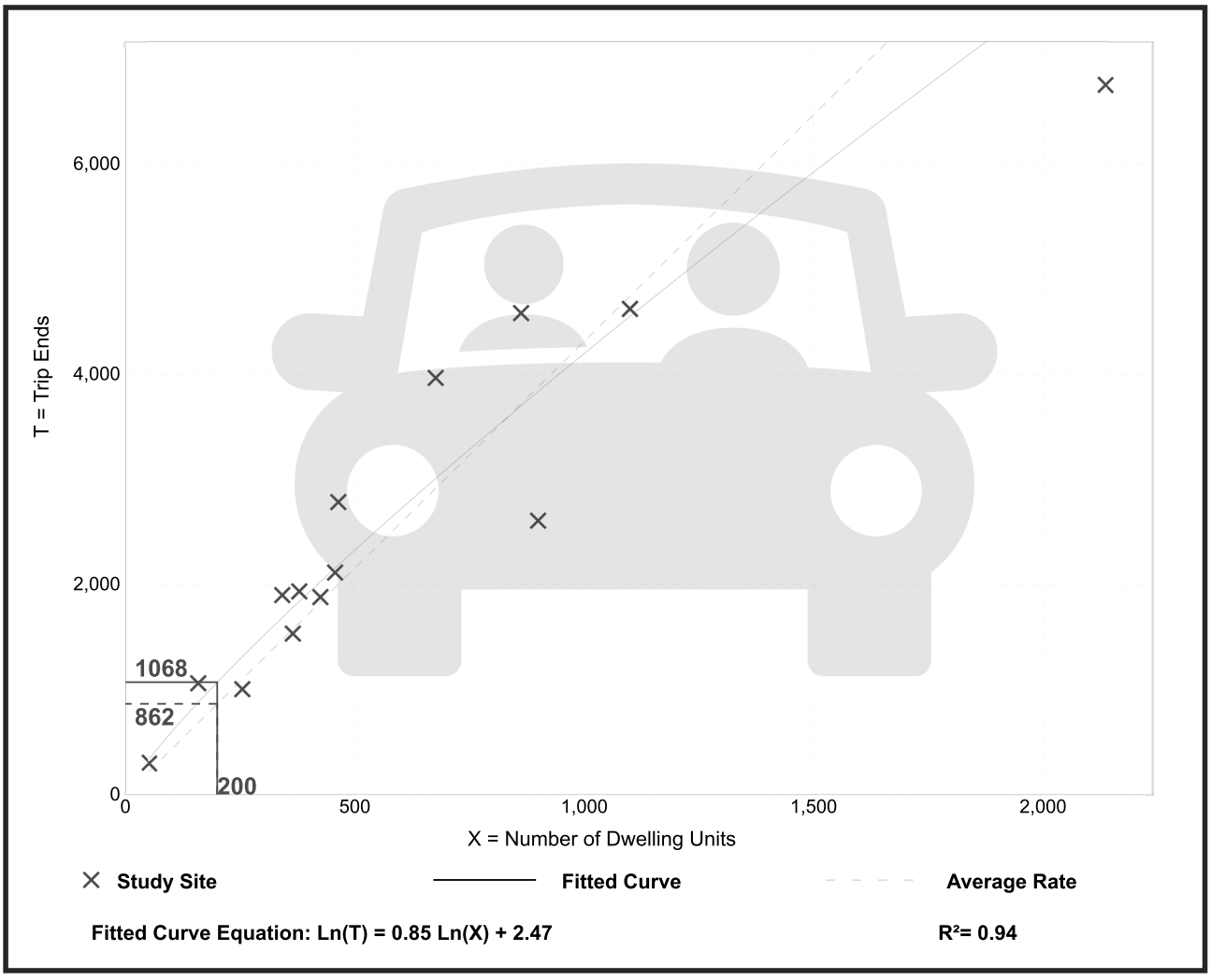
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 15
Avg. Num. of Dwelling Units: 646
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 4.31 | 2.90 - 6.66 | 1.07 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

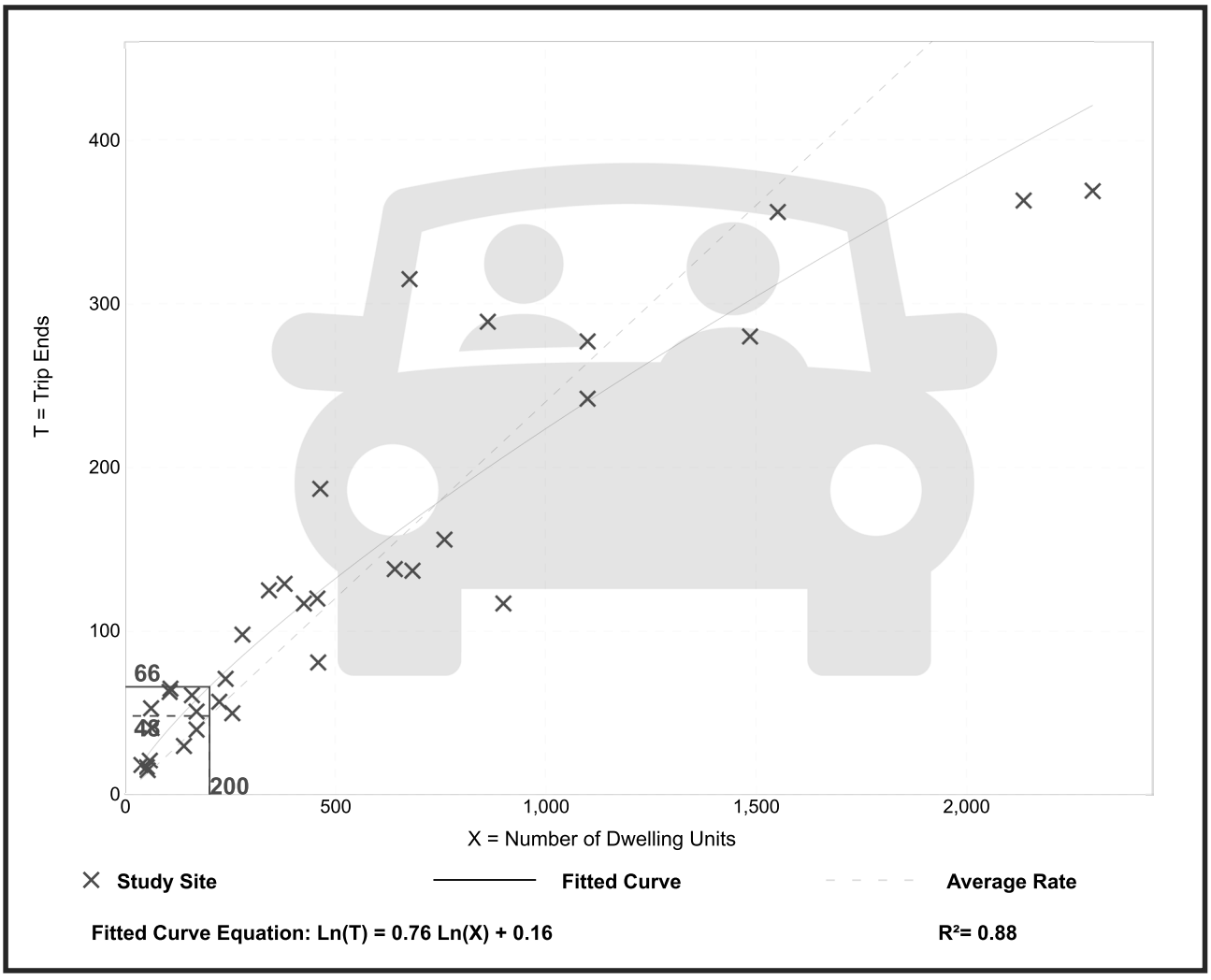
# Senior Adult Housing - Single-Family
(251)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 34
Avg. Num. of Dwelling Units: 557
Directional Distribution: 33% entering, 67% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.24 | 0.13 - 0.84 | 0.10 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

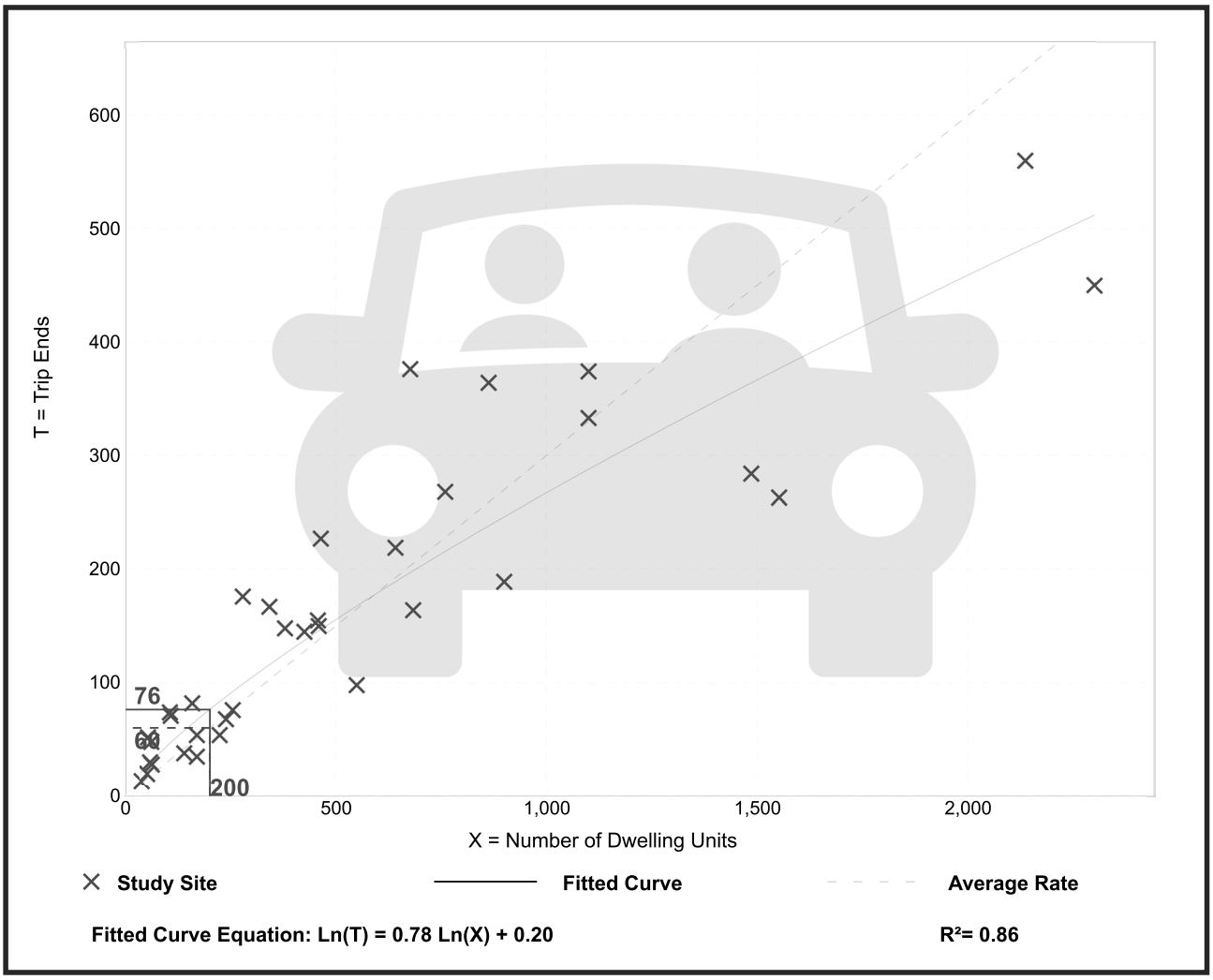
# Senior Adult Housing - Single-Family
(251)

| | |
|---|---|
| **Vehicle Trip Ends vs:** | **Dwelling Units** |
| **On a:** | **Weekday,** |
| | **Peak Hour of Adjacent Street Traffic,** |
| | **One Hour Between 4 and 6 p.m.** |
| **Setting/Location:** | **General Urban/Suburban** |
| Number of Studies: | 35 |
| Avg. Num. of Dwelling Units: | 556 |
| Directional Distribution: | 61% entering, 39% exiting |

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.30 | 0.17 - 0.95 | 0.12 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

# Single-Family Detached Housing
(210)

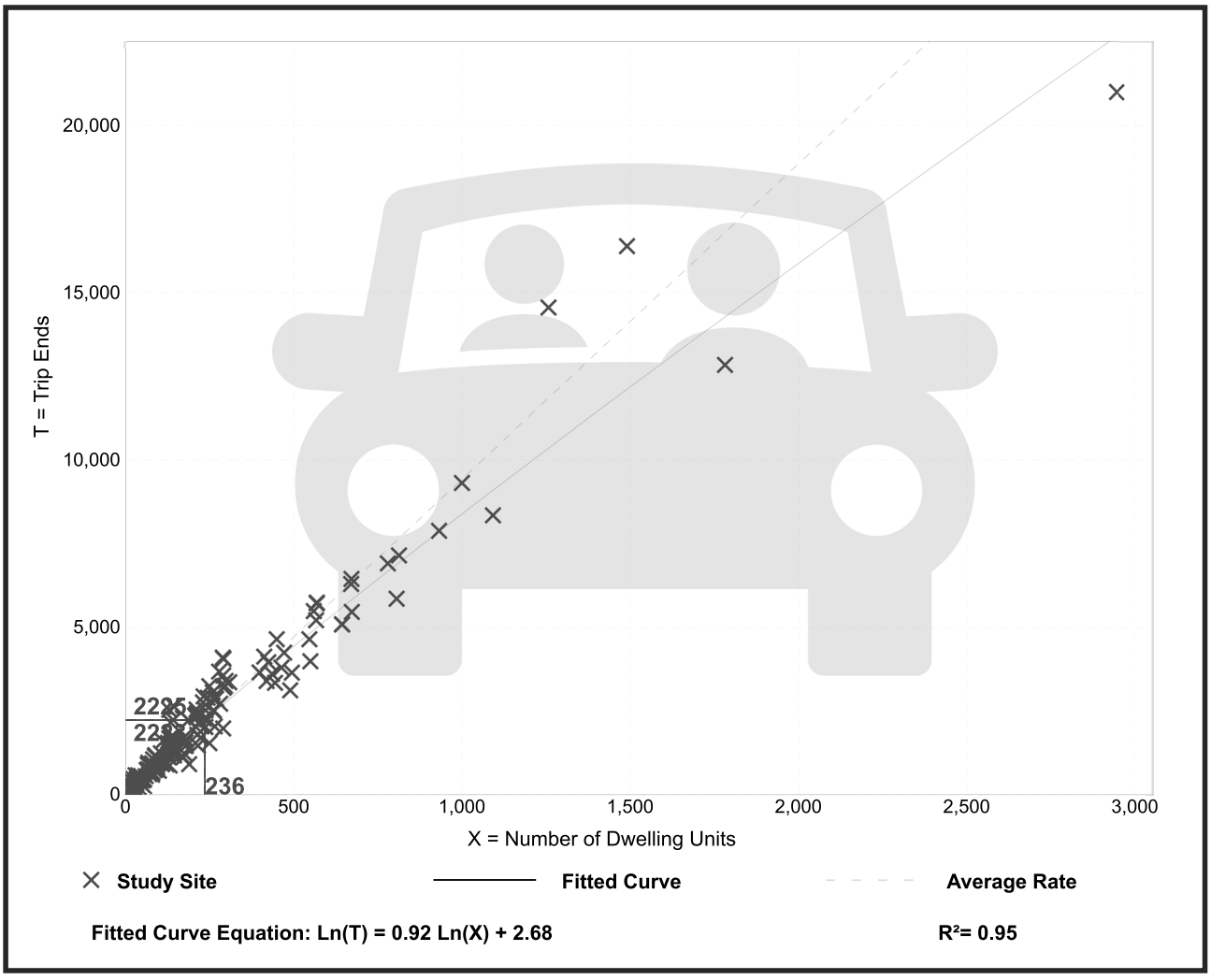
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 9.43 | 4.45 - 22.61 | 2.13 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

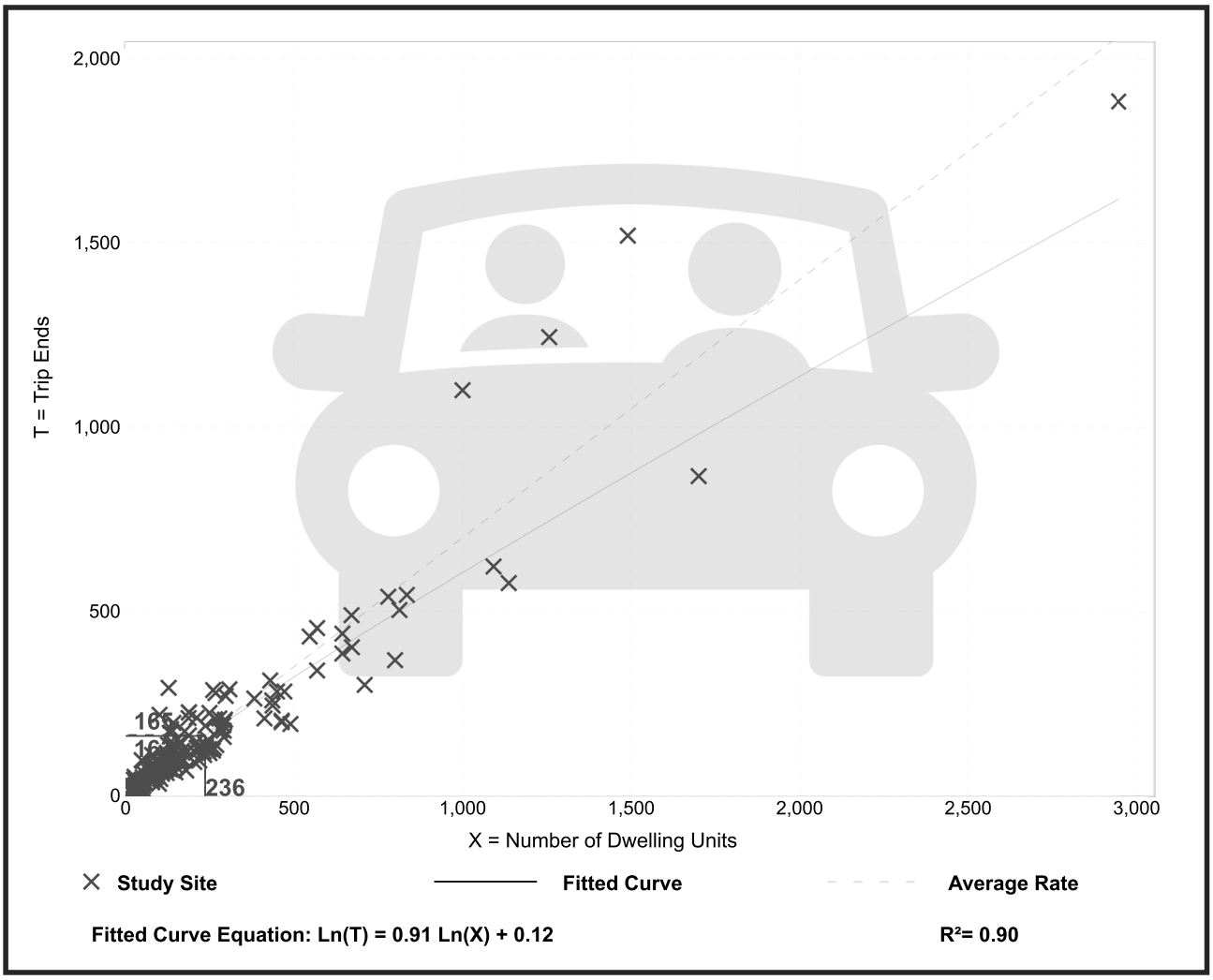
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.70 | 0.27 - 2.27 | 0.24 |

## Data Plot and Equation




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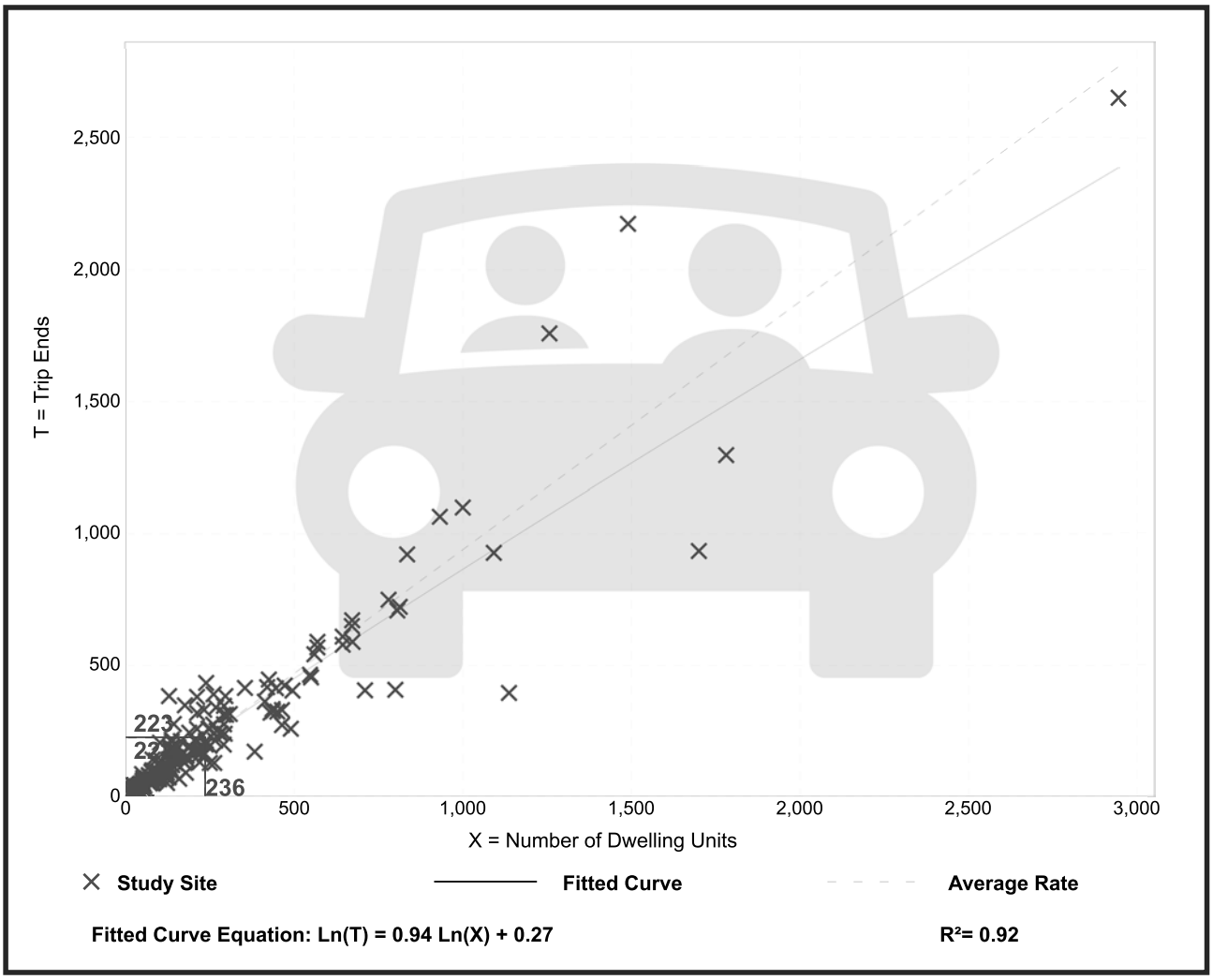
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 4 and 6 p.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.94 | 0.35 - 2.98 | 0.31 |

## Data Plot and Equation




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# Single-Family Attached Housing
(215)

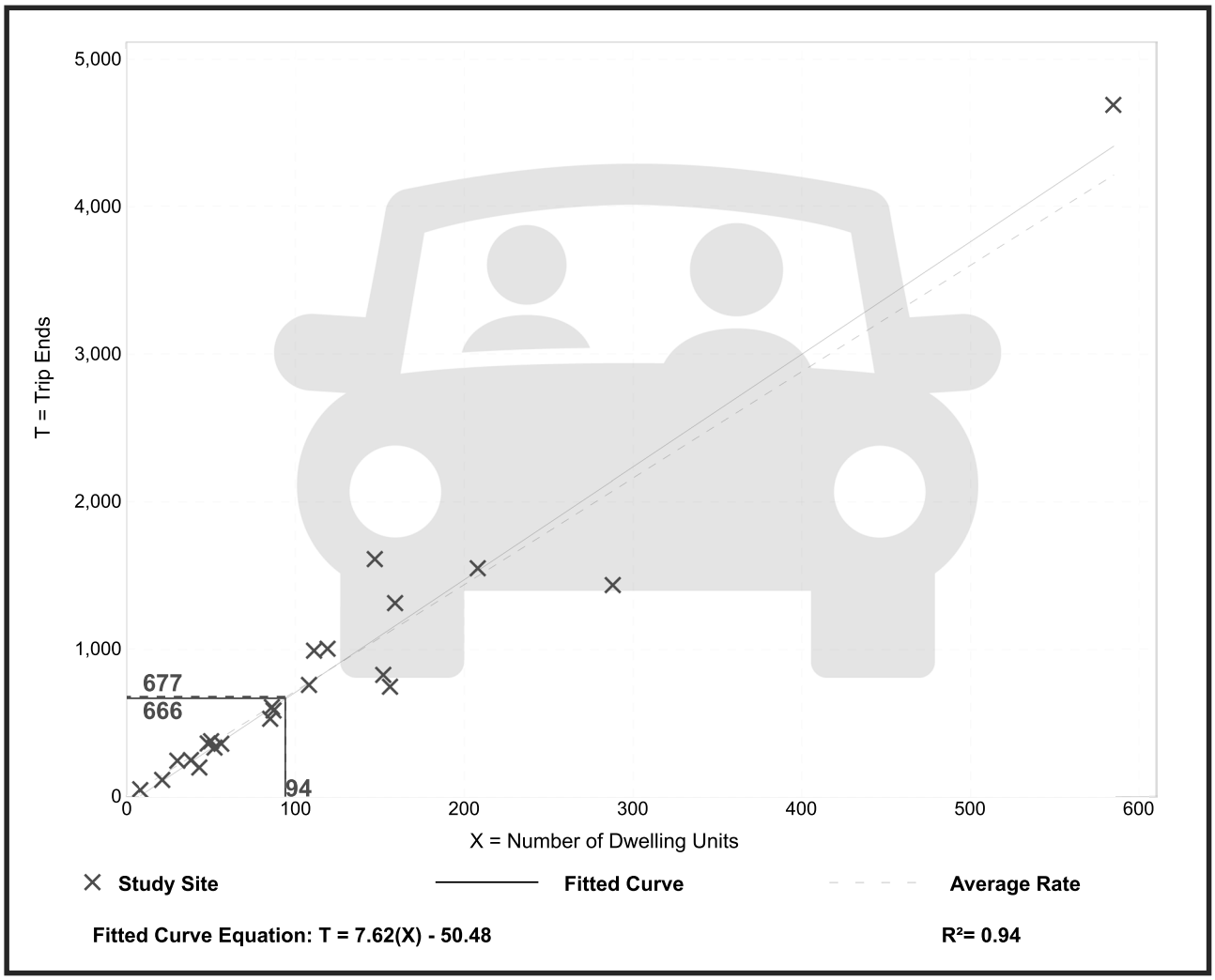
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 22
Avg. Num. of Dwelling Units: 120
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 7.20 | 4.70 - 10.97 | 1.61 |

## Data Plot and Equation




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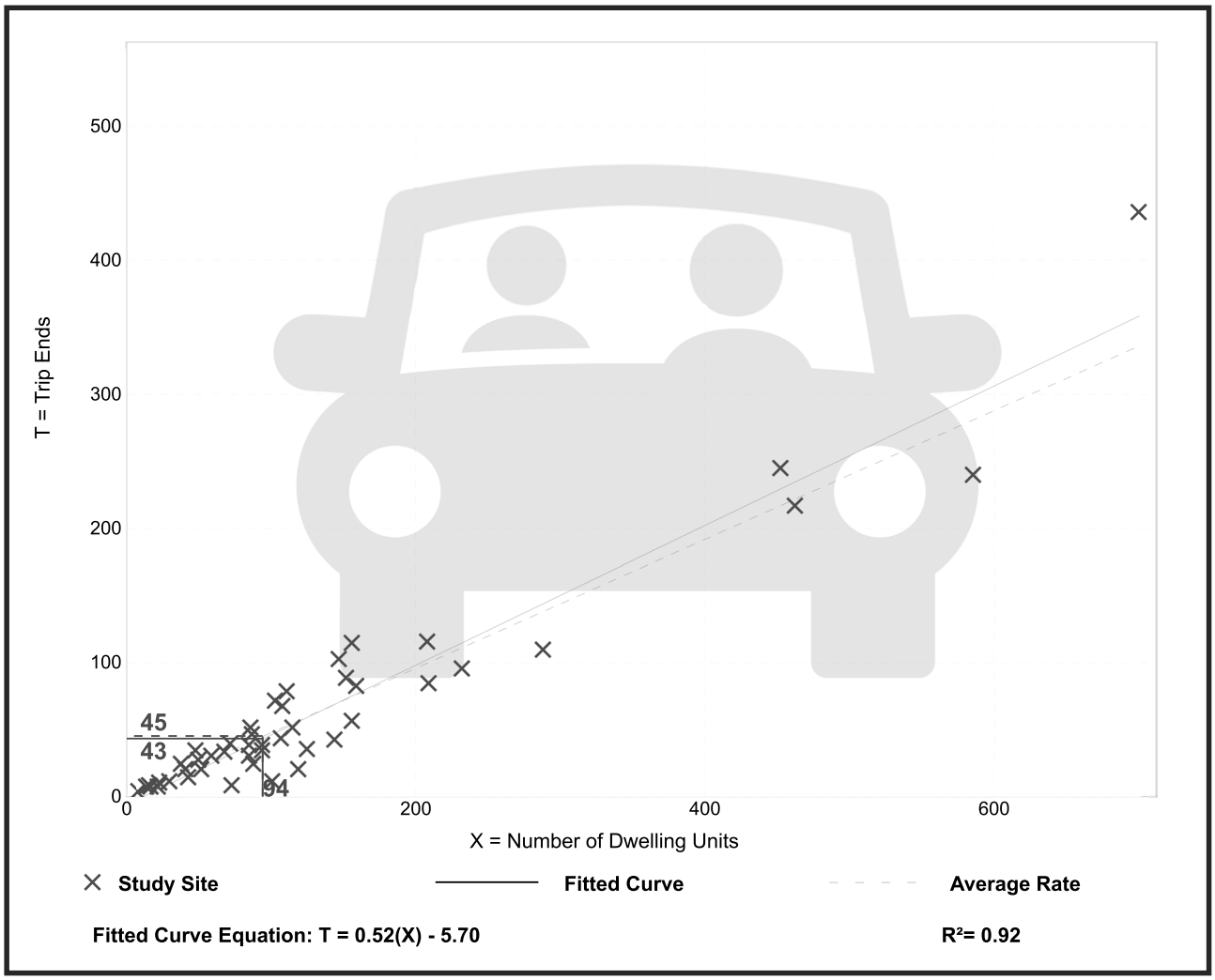
# Single-Family Attached Housing
(215)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.48 | 0.12 - 0.74 | 0.14 |

## Data Plot and Equation




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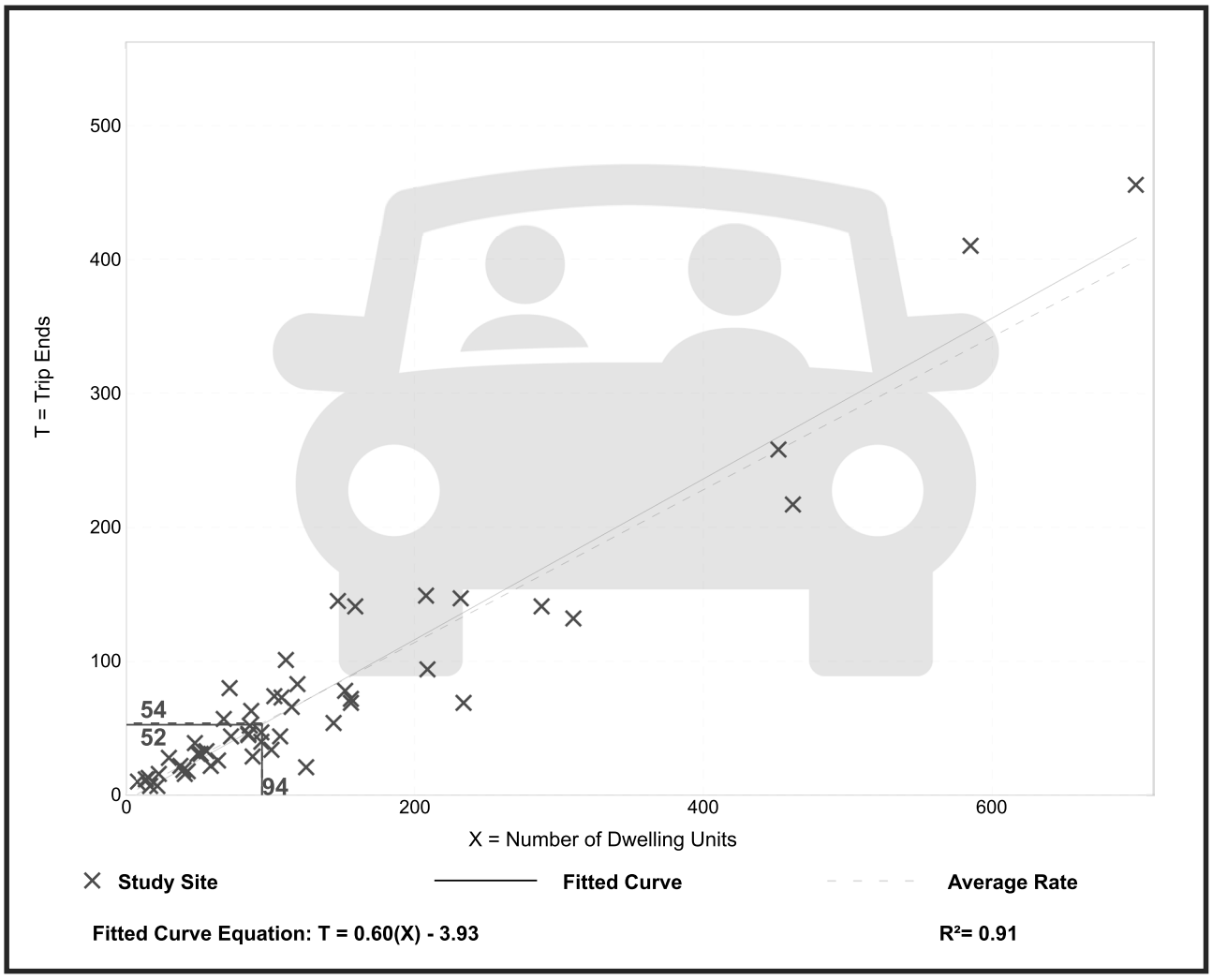
# Single-Family Attached Housing
(215)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 4 and 6 p.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 59% entering, 41% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.57 | 0.17 - 1.25 | 0.18 |

## Data Plot and Equation




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# Day Care Center
(565)

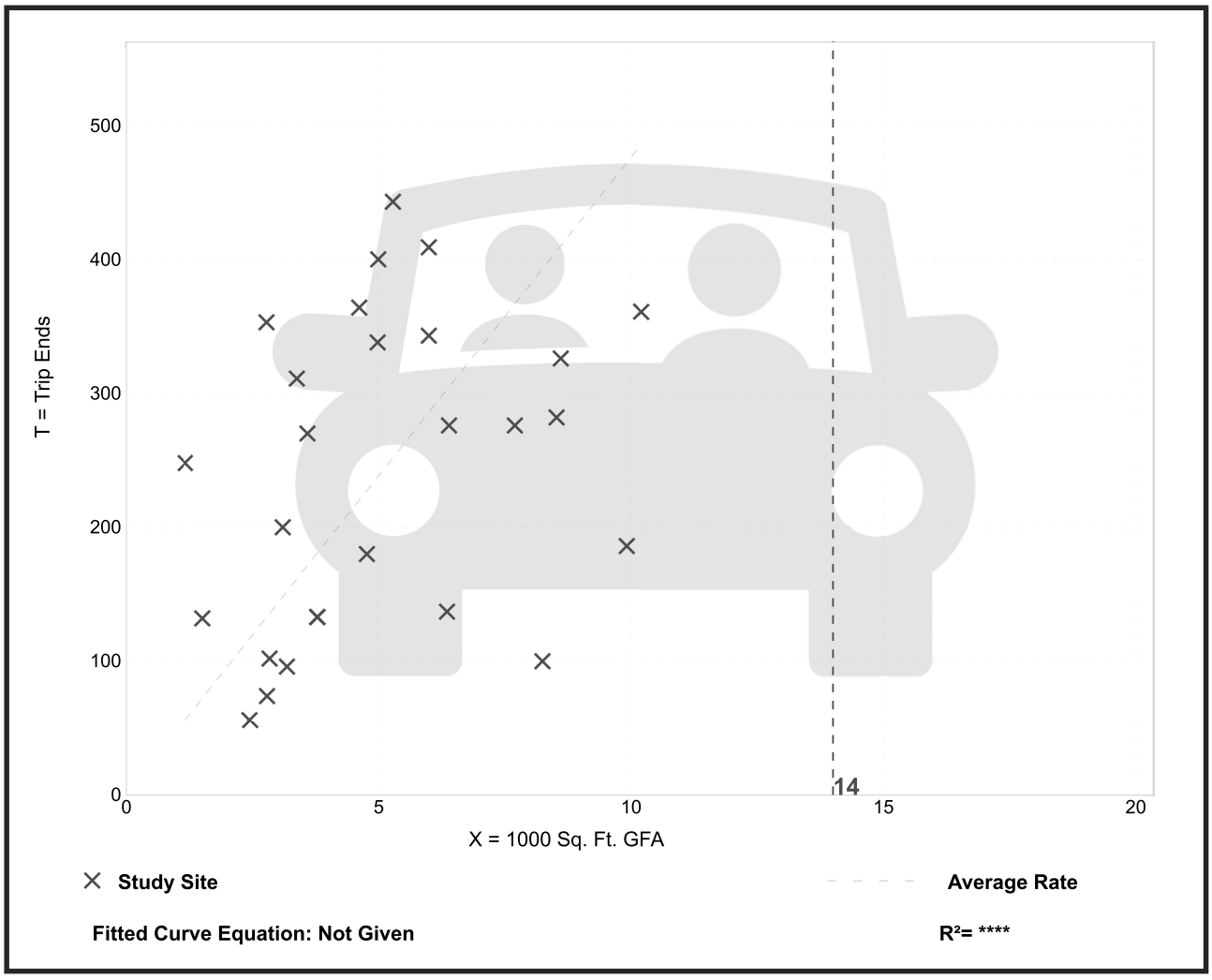
**Vehicle Trip Ends vs:** **1000 Sq. Ft. GFA**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 47.62 | 12.12 - 211.06 | 29.78 |

## Data Plot and Equation




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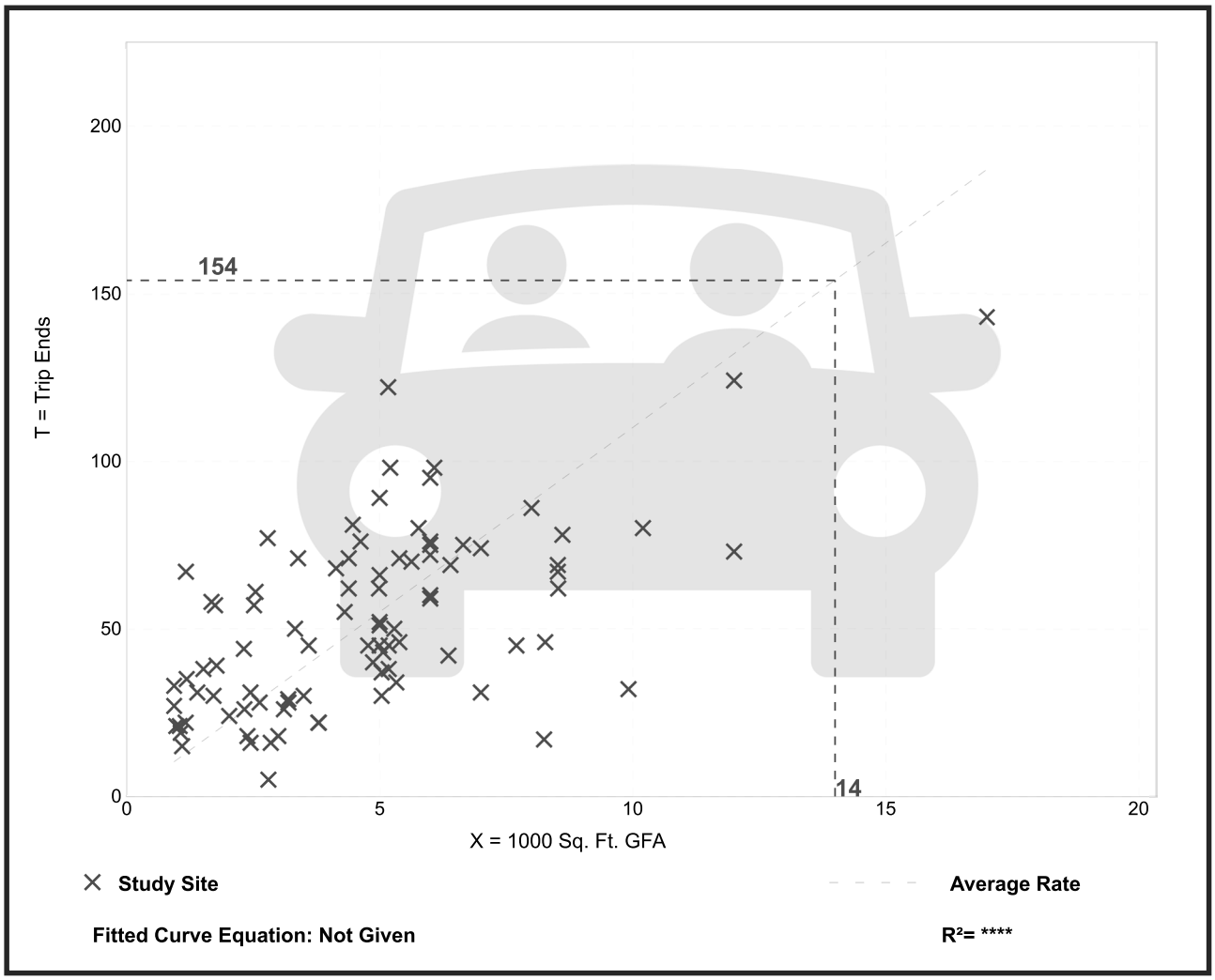
# Day Care Center
(565)

**Vehicle Trip Ends vs:** **1000 Sq. Ft. GFA**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 89
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 53% entering, 47% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 11.00 | 1.79 - 57.02 | 6.08 |

## Data Plot and Equation




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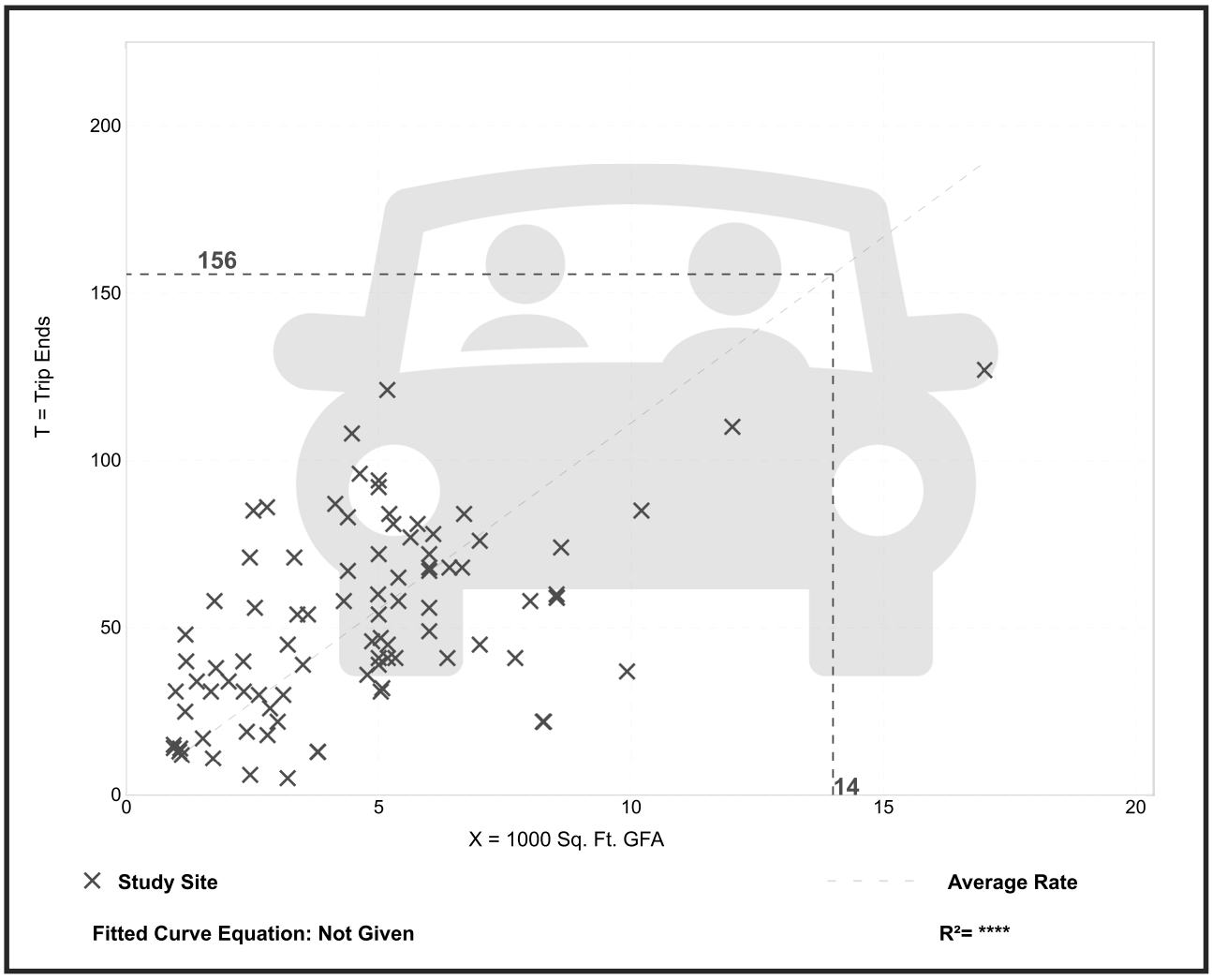
# Day Care Center
(565)

**Vehicle Trip Ends vs:** **1000 Sq. Ft. GFA**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 4 and 6 p.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 90
Avg. 1000 Sq. Ft. GFA: 5
Directional Distribution: 47% entering, 53% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 11.12 | 1.56 - 40.85 | 6.28 |

## Data Plot and Equation




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# Senior Adult Housing - Single-Family
(251)

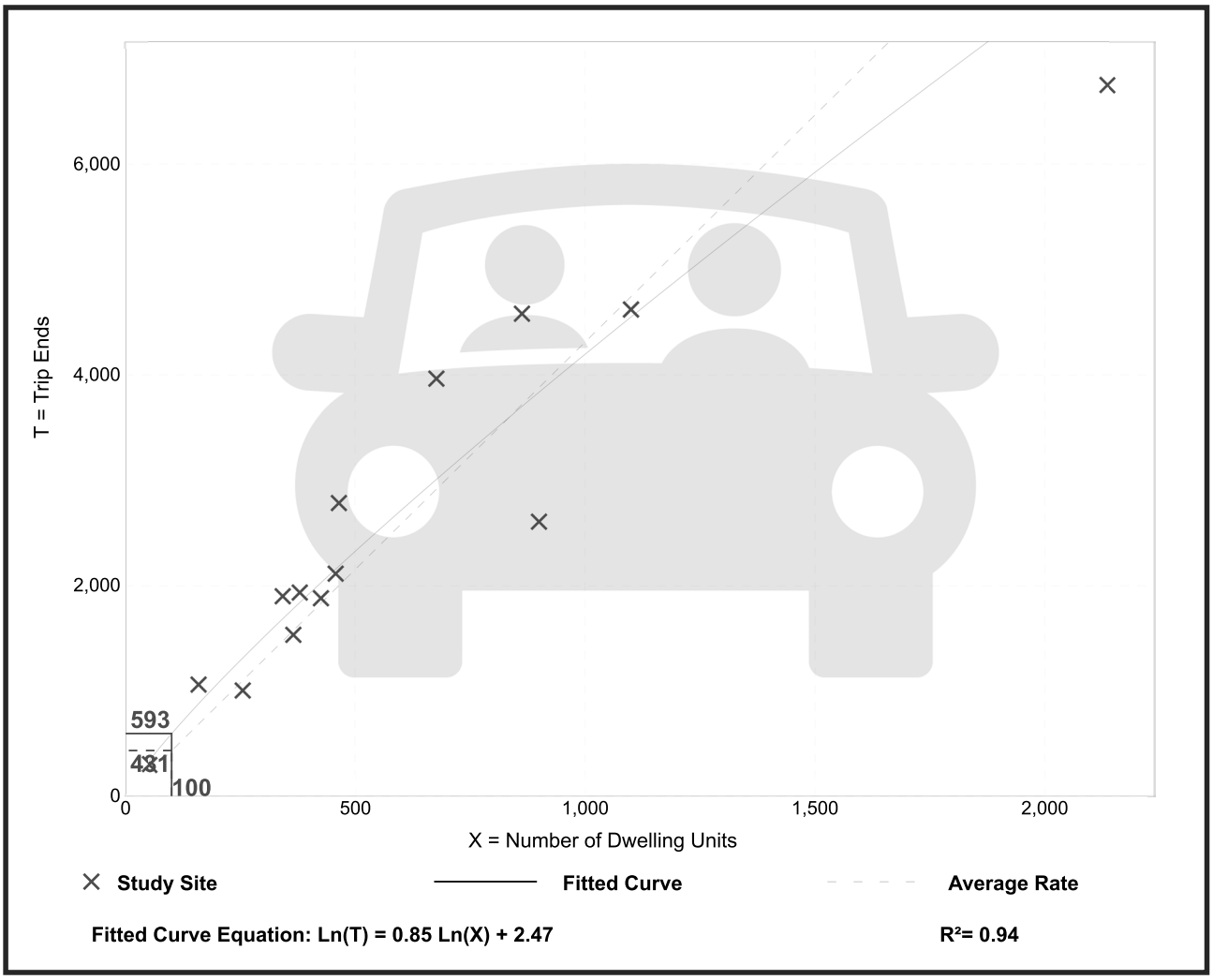
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 15
Avg. Num. of Dwelling Units: 646
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 4.31 | 2.90 - 6.66 | 1.07 |

## Data Plot and Equation




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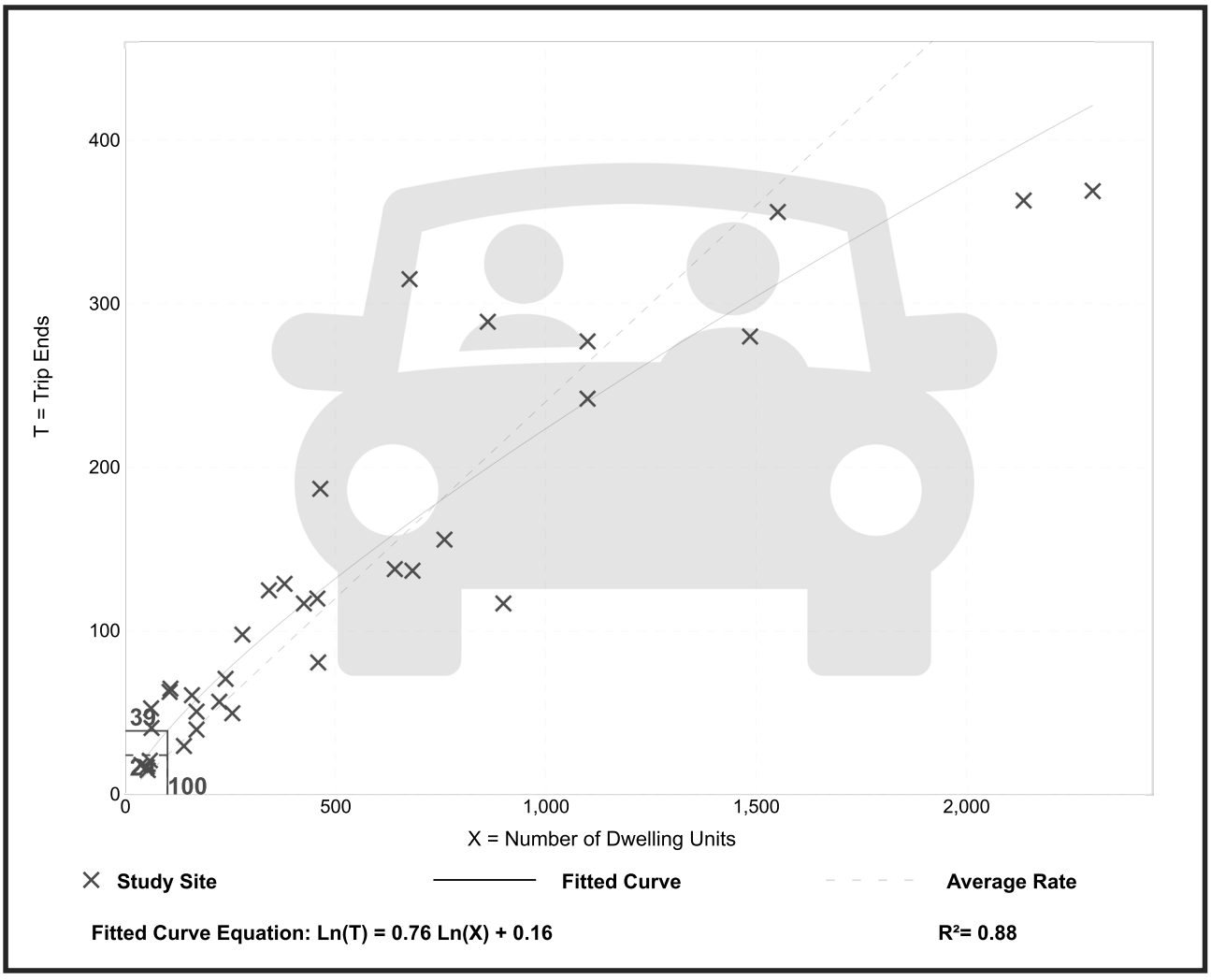
# Senior Adult Housing - Single-Family
(251)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 34
Avg. Num. of Dwelling Units: 557
Directional Distribution: 33% entering, 67% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.24 | 0.13 - 0.84 | 0.10 |

## Data Plot and Equation




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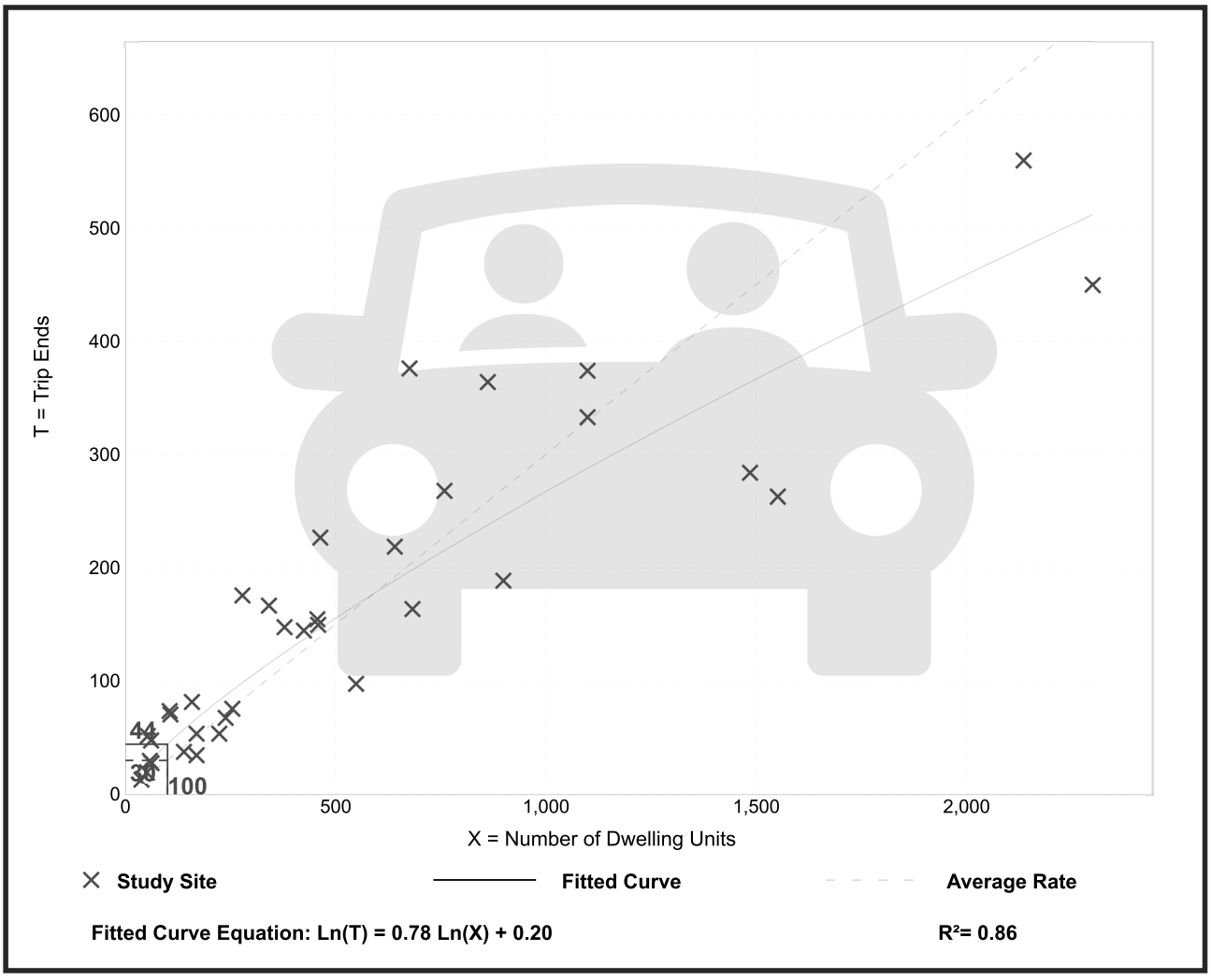
# Senior Adult Housing - Single-Family
(251)

| | |
|---|---|
| **Vehicle Trip Ends vs:** | **Dwelling Units** |
| **On a:** | **Weekday,** |
| | **Peak Hour of Adjacent Street Traffic,** |
| | **One Hour Between 4 and 6 p.m.** |
| **Setting/Location:** | **General Urban/Suburban** |
| Number of Studies: | 35 |
| Avg. Num. of Dwelling Units: | 556 |
| Directional Distribution: | 61% entering, 39% exiting |

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.30 | 0.17 - 0.95 | 0.12 |

## Data Plot and Equation




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# APPENDIX G
# TRAFFIC CALCULATION WORKSHEETS

**Traffic Volume Calculations**
**#1 US 31 S at Bear Creek Pk/US 43**

**AM Peak Hour**

| Condition | Eastbound US 43 | | | Westbound Bear Creek Pk | | | Northbound US 31 S | | | Southbound US 31 S | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 701 | 448 | 35 | 293 | 340 | 290 | 26 | 713 | 238 | 194 | 713 | 684 |
| Adjustment Factor | 1.080 | 1.080 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| 2021 Existing Traffic Volumes (Adjusted) | 757 | 484 | 38 | 316 | 367 | 313 | 28 | 770 | 257 | 210 | 770 | 739 |
| Farm Bureau Traffic | | 53 | | 1 | 1 | | | | 28 | 24 | | |
| 2023 Existing Traffic Volumes | 757 | 537 | 38 | 317 | 368 | 313 | 28 | 770 | 285 | 234 | 770 | 739 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 182 | 129 | 9 | 76 | 88 | 75 | 7 | 185 | 68 | 56 | 185 | 177 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 250 | 177 | 13 | 105 | 121 | 103 | 9 | 254 | 94 | 77 | 254 | 244 |
| Approved Off-Site Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | 4 | | 2 | 3 | 2 | | | 2 | 2 | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 939 | 670 | 47 | 395 | 459 | 390 | 35 | 955 | 355 | 292 | 955 | 916 |
| 2034 Background Traffic Voumes (Full Buildout) | 1007 | 718 | 51 | 424 | 492 | 418 | 37 | 1024 | 381 | 313 | 1024 | 983 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | 10% | | | | | | | 10% | 25% | | |
| Exit | | | | 10% | 10% | 25% | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 37 | 0 | 0 |
| Exit 252 | 0 | 0 | 0 | 25 | 25 | 63 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 15 | 0 | 25 | 25 | 63 | 0 | 0 | 15 | 37 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 939 | 685 | 47 | 420 | 484 | 453 | 35 | 955 | 370 | 329 | 955 | 916 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | 10% | | | | | | | 10% | 25% | | |
| Exit | | | | 10% | 10% | 25% | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 54 | 0 | 0 |
| Exit 444 | 0 | 0 | 0 | 44 | 44 | 111 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 21 | 0 | 44 | 44 | 112 | 0 | 0 | 21 | 54 | 0 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 1007 | 739 | 51 | 468 | 536 | 530 | 37 | 1024 | 402 | 367 | 1024 | 983 |

**PM Peak Hour**

| Condition | Eastbound US 43 | | | Westbound Bear Creek Pk | | | Northbound US 31 S | | | Southbound US 31 S | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 566 | 438 | 48 | 366 | 499 | 184 | 54 | 752 | 382 | 222 | 872 | 739 |
| Adjustment Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 2021 Existing Traffic Volumes (Adjusted) | 566 | 438 | 48 | 366 | 499 | 184 | 54 | 752 | 382 | 222 | 872 | 739 |
| Farm Bureau Traffic | | 4 | | 11 | 15 | 6 | | | 3 | 2 | | |
| 2023 Existing Traffic Volumes | 566 | 442 | 48 | 377 | 514 | 190 | 54 | 752 | 385 | 224 | 872 | 739 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 136 | 106 | 12 | 90 | 123 | 46 | 13 | 180 | 92 | 54 | 209 | 177 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 187 | 146 | 16 | 124 | 170 | 63 | 18 | 248 | 127 | 74 | 288 | 244 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | 8 | | 6 | 8 | 2 | | | 6 | 3 | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 702 | 556 | 60 | 473 | 645 | 238 | 67 | 932 | 483 | 281 | 1081 | 916 |
| 2034 Background Traffic Voumes (Full Buildout) | 753 | 596 | 64 | 507 | 692 | 255 | 72 | 1000 | 518 | 301 | 1160 | 983 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 10% | 0% | 0% | 0% | 0% | 0% | 0% | 10% | 25% | 0% | 0% |
| Exit | 0% | 0% | 0% | 10% | 10% | 25% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 68 | 0 | 0 |
| Exit 204 | 0 | 0 | 0 | 20 | 20 | 51 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 27 | 0 | 20 | 21 | 51 | 0 | 0 | 27 | 68 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 702 | 583 | 60 | 493 | 666 | 289 | 67 | 932 | 510 | 349 | 1081 | 916 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 10% | 0% | 0% | 0% | 0% | 0% | 0% | 10% | 25% | 0% | 0% |
| Exit | 0% | 0% | 0% | 10% | 10% | 25% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 113 | 0 | 0 |
| Exit 316 | 0 | 0 | 0 | 31 | 31 | 79 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 45 | 0 | 31 | 31 | 79 | 0 | 0 | 45 | 113 | 0 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 753 | 641 | 64 | 538 | 723 | 334 | 72 | 1000 | 563 | 414 | 1160 | 983 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#2 Bear Creek Pk & Tom J Hitch Pkwy**

**AM Peak Hour**

| Condition | Eastbound Bear Creek Pk | | | Westbound Bear Creek Pk | | | Northbound Tom J Hitch Pkway | | | Southbound Farm Bureau Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | | 536 | 153 | 182 | 689 | | 313 | | 182 | | | |
| Adjustment Factor | 1.080 | 1.080 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| 2021 Existing Traffic Volumes (Adjusted) | 0 | 579 | 165 | 197 | 744 | 0 | 338 | 0 | 197 | 0 | 0 | 0 |
| Farm Bureau Traffic | 105 | | | | | 34 | | 67 | | 1 | 2 | 2 |
| 2023 Existing Traffic Volumes | 105 | 579 | 165 | 197 | 744 | 34 | 338 | 67 | 197 | 1 | 2 | 2 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0 | 0.24 | 0.24 | 0.24 | 0.24 | 0 | 0.24 | 0 | 0.24 | 0 | 0 | 0 |
| Background Growth Volumes | 0 | 139 | 40 | 47 | 179 | 0 | 81 | 0 | 47 | 0 | 0 | 0 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.00 | 0.33 | 0.33 | 0.33 | 0.33 | 0.00 | 0.33 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 |
| Background Growth Volumes | 0 | 191 | 54 | 65 | 246 | 0 | 112 | 0 | 65 | 0 | 0 | 0 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | 8 | | 2 | 7 | | | | 3 | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 105 | 726 | 205 | 246 | 930 | 34 | 419 | 67 | 247 | 1 | 2 | 2 |
| 2034 Background Traffic Voumes (Full Buildout) | 105 | 778 | 219 | 264 | 997 | 34 | 450 | 67 | 265 | 1 | 2 | 2 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | 45% | | | | | | | 20% | | | |
| Exit | | | | 20% | 45% | | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 0 |
| Exit 252 | 0 | 0 | 0 | 50 | 113 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 67 | 0 | 50 | 113 | 0 | 0 | 0 | 29 | 0 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | 40% | 5% | | | | | | | | | |
| Exit | | | | | 40% | | 5% | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 0 | 87 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 444 | 0 | 0 | 0 | 0 | 178 | 0 | 22 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 85 | 11 | 0 | 178 | 0 | 22 | 0 | 0 | 0 | 0 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |

**PM Peak Hour**

| Condition | Eastbound Bear Creek Pk | | | Westbound Bear Creek Pk | | | Northbound Tom J Hitch Pkway | | | Southbound Farm Bureau Access | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | | 678 | 239 | 266 | 761 | | 175 | | 213 | | | |
| Adjustment Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 2021 Existing Traffic Volumes (Adjusted) | 0 | 678 | 239 | 266 | 761 | 0 | 175 | 0 | 213 | 0 | 0 | 0 |
| Farm Bureau Traffic | 9 | | | | | 4 | | 9 | | 32 | 67 | 32 |
| 2023 Existing Traffic Volumes | 9 | 678 | 239 | 266 | 761 | 4 | 175 | 9 | 213 | 32 | 67 | 32 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0 | 0.24 | 0.24 | 0.24 | 0.24 | 0 | 0.24 | 0 | 0.24 | 0 | 0 | 0 |
| Background Growth Volumes | 0 | 163 | 57 | 64 | 183 | 0 | 42 | 0 | 51 | 0 | 0 | 0 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.00 | 0.33 | 0.33 | 0.33 | 0.33 | 0.00 | 0.33 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 |
| Background Growth Volumes | 0 | 224 | 79 | 88 | 251 | 0 | 58 | 0 | 70 | 0 | 0 | 0 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | 17 | | 5 | 16 | | | | 5 | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 9 | 858 | 296 | 335 | 960 | 4 | 217 | 9 | 269 | 32 | 67 | 32 |
| 2034 Background Traffic Voumes (Full Buildout) | 9 | 919 | 318 | 359 | 1028 | 4 | 233 | 9 | 288 | 32 | 67 | 32 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 45% | 0% | 0% | 0% | 0% | 0% | 0% | 20% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 20% | 45% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 0 | 122 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 |
| Exit 204 | 0 | 0 | 0 | 41 | 92 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 122 | 0 | 41 | 92 | 0 | 0 | 0 | 54 | 0 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 40% | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 40% | 0% | 5% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 0 | 181 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 316 | 0 | 0 | 0 | 0 | 125 | 0 | 16 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 180 | 23 | 0 | 125 | 0 | 16 | 0 | 0 | 0 | 0 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#3 Bear Creek Pk & Patterson Drive/Site Access 1**

**AM Peak Hour**

| Condition | Eastbound Bear Creek Pk | | | Westbound Bear Creek Pk | | | Northbound Site Access 1 | | | Southbound Patterson Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 11 | 694 | | | 798 | 7 | | | | 16 | | 42 |
| Adjustment Factor | 1.080 | 1.080 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| 2021 Existing Traffic Volumes (Adjusted) | 12 | 750 | 0 | 0 | 862 | 8 | 0 | 0 | 0 | 17 | 0 | 45 |
| Farm Bureau Traffic | | 1 | | | 34 | | | | | | | |
| 2023 Existing Traffic Volumes | 12 | 751 | 0 | 0 | 896 | 8 | 0 | 0 | 0 | 17 | 0 | 45 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 3 | 180 | 0 | 0 | 215 | 2 | 0 | 0 | 0 | 4 | 0 | 11 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 4 | 248 | 0 | 0 | 296 | 3 | 0 | 0 | 0 | 6 | 0 | 15 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | 2 | 5 | | | 5 | | | | | | | 3 |
| 2031 Background Traffic Volumes (Phases 1-3) | 17 | 936 | 0 | 0 | 1116 | 10 | 0 | 0 | 0 | 21 | 0 | 59 |
| 2034 Background Traffic Voumes (Full Buildout) | 18 | 1004 | 0 | 0 | 1197 | 11 | 0 | 0 | 0 | 23 | 0 | 63 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | 65% | 30% | | | | | | | 5% | |
| Exit | | | | | | | 65% | 5% | 30% | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 0 | 0 | 96 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Exit 252 | 0 | 0 | 0 | 0 | 0 | 0 | 164 | 13 | 76 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 96 | 44 | 0 | 0 | 163 | 13 | 76 | 0 | 7 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 17 | 936 | 96 | 44 | 1116 | 10 | 163 | 13 | 76 | 21 | 7 | 59 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | 40% | 25% | | | | | | | 5% | |
| Exit | | | | | | | 40% | 5% | 25% | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 0 | 0 | 87 | 54 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 |
| Exit 444 | 0 | 0 | 0 | 0 | 0 | 0 | 178 | 22 | 111 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 85 | 54 | 0 | 0 | 178 | 22 | 111 | 0 | 10 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 18 | 1004 | 85 | 54 | 1197 | 11 | 178 | 22 | 111 | 23 | 10 | 63 |

**PM Peak Hour**

| Condition | Eastbound Bear Creek Pk | | | Westbound Bear Creek Pk | | | Northbound Site Access 1 | | | Southbound Patterson Dr | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 43 | 861 | | | 891 | 15 | | | | 5 | | 36 |
| Adjustment Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 2021 Existing Traffic Volumes (Adjusted) | 43 | 861 | 0 | 0 | 891 | 15 | 0 | 0 | 0 | 5 | 0 | 36 |
| Farm Bureau Traffic | | 32 | | | 4 | | | | | | | |
| 2023 Existing Traffic Volumes | 43 | 893 | 0 | 0 | 895 | 15 | 0 | 0 | 0 | 5 | 0 | 36 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 10 | 214 | 0 | 0 | 215 | 4 | 0 | 0 | 0 | 1 | 0 | 9 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 14 | 295 | 0 | 0 | 295 | 5 | 0 | 0 | 0 | 2 | 0 | 12 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | 5 | 11 | | | 12 | | | | | | | 5 |
| 2031 Background Traffic Volumes (Phases 1-3) | 58 | 1118 | 0 | 0 | 1122 | 19 | 0 | 0 | 0 | 6 | 0 | 50 |
| 2034 Background Traffic Voumes (Full Buildout) | 62 | 1199 | 0 | 0 | 1202 | 20 | 0 | 0 | 0 | 7 | 0 | 53 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 65% | 30% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 65% | 5% | 30% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 0 | 0 | 176 | 81 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Exit 204 | 0 | 0 | 0 | 0 | 0 | 0 | 133 | 10 | 61 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 176 | 81 | 0 | 0 | 133 | 10 | 61 | 0 | 14 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 58 | 1118 | 176 | 81 | 1122 | 19 | 133 | 10 | 61 | 6 | 14 | 50 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 40% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 40% | 5% | 25% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 0 | 0 | 181 | 113 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| Exit 316 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 16 | 79 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 180 | 113 | 0 | 0 | 125 | 16 | 80 | 0 | 23 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 62 | 1199 | 180 | 113 | 1202 | 20 | 125 | 16 | 80 | 7 | 23 | 53 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#4 Bear Creek Pk & Mt Olivet Rd**

**AM Peak Hour**

| Condition | Eastbound Bear Creek Pk | | | Westbound Bear Creek Pk | | | Northbound Mt Olivet Rd | | | Southbound Mt Olivet Rd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 204 | 525 | 28 | 18 | 579 | 32 | 84 | 45 | 28 | 46 | 23 | 170 |
| Adjustment Factor | 1.080 | 1.080 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| 2021 Existing Traffic Volumes (Adjusted) | 220 | 567 | 30 | 19 | 625 | 35 | 91 | 49 | 30 | 50 | 25 | 184 |
| Farm Bureau Traffic | | 1 | | | 34 | | | | | | | |
| 2023 Existing Traffic Volumes | 220 | 568 | 30 | 19 | 659 | 35 | 91 | 49 | 30 | 50 | 25 | 184 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 53 | 136 | 7 | 5 | 158 | 8 | 22 | 12 | 7 | 12 | 6 | 44 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 73 | 187 | 10 | 6 | 217 | 12 | 30 | 16 | 10 | 17 | 8 | 61 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | 4 | | 1 | | | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 273 | 704 | 37 | 24 | 821 | 43 | 114 | 61 | 37 | 62 | 31 | 228 |
| 2034 Background Traffic Voumes (Full Buildout) | 293 | 755 | 40 | 25 | 880 | 47 | 122 | 65 | 40 | 67 | 33 | 245 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | | | 25% | | | | | | | 5% |
| Exit | 5% | 25% | | | | | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Exit 252 | 13 | 63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 13 | 63 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 286 | 767 | 37 | 24 | 858 | 43 | 114 | 61 | 37 | 62 | 31 | 235 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | | 5% | 20% | | | | | | | 5% |
| Exit | 5% | 20% | | | | | | | 5% | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 0 | 0 | 0 | 11 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Exit 444 | 22 | 89 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 |
| Total Assignment | 22 | 89 | 0 | 11 | 43 | 0 | 0 | 0 | 22 | 0 | 0 | 11 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 315 | 844 | 40 | 36 | 923 | 47 | 122 | 65 | 62 | 67 | 33 | 256 |

**PM Peak Hour**

| Condition | Eastbound Bear Creek Pk | | | Westbound Bear Creek Pk | | | Northbound Mt Olivet Rd | | | Southbound Mt Olivet Rd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 28 | 829 | 7 | 23 | 754 | 85 | 53 | 5 | 30 | 11 | 9 | 31 |
| Adjustment Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 2021 Existing Traffic Volumes (Adjusted) | 28 | 829 | 7 | 23 | 754 | 85 | 53 | 5 | 30 | 11 | 9 | 31 |
| Farm Bureau Traffic | | 32 | | | 4 | | | | | | | |
| 2023 Existing Traffic Volumes | 28 | 861 | 7 | 23 | 758 | 85 | 53 | 5 | 30 | 11 | 9 | 31 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 7 | 207 | 2 | 6 | 182 | 20 | 13 | 1 | 7 | 3 | 2 | 7 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 9 | 284 | 2 | 8 | 250 | 28 | 17 | 2 | 10 | 4 | 3 | 10 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | 11 | | 1 | | | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 35 | 1068 | 9 | 29 | 951 | 105 | 67 | 6 | 37 | 14 | 11 | 38 |
| 2034 Background Traffic Voumes (Full Buildout) | 37 | 1145 | 9 | 31 | 1019 | 113 | 71 | 7 | 40 | 15 | 12 | 41 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 0% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 5% |
| Exit | 5% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 0 | 0 | 0 | 0 | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| Exit 204 | 10 | 51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 10 | 51 | 0 | 0 | 67 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 45 | 1119 | 9 | 29 | 1018 | 105 | 67 | 6 | 37 | 14 | 11 | 52 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 0% | 5% | 20% | 0% | 0% | 0% | 0% | 0% | 0% | 5% |
| Exit | 5% | 20% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 0 | 0 | 0 | 23 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| Exit 316 | 16 | 63 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 |
| Total Assignment | 16 | 64 | 0 | 23 | 90 | 0 | 0 | 0 | 16 | 0 | 0 | 23 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 53 | 1209 | 9 | 54 | 1109 | 113 | 71 | 7 | 56 | 15 | 12 | 64 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#5 Tom J Hitch Pkwy & Iron Bridge Rd**

**AM Peak Hour**

| Condition | Eastbound Iron Bridge Rd | | | Westbound Iron Bridge Rd | | | Northbound Tom J Hitch Pkwy | | | Southbound Tom J Hitch Pkwy | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2023 Existing Traffic Volumes | 28 | 35 | 6 | 91 | 94 | 46 | 9 | 406 | 67 | 26 | 307 | 24 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 7 | 8 | 1 | 22 | 23 | 11 | 2 | 97 | 16 | 6 | 74 | 6 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 9 | 12 | 2 | 30 | 31 | 15 | 3 | 134 | 22 | 9 | 101 | 8 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | | | | 3 | | | 2 | |
| 2031 Background Traffic Volumes (Phases 1-3) | 35 | 43 | 7 | 113 | 117 | 57 | 11 | 506 | 83 | 32 | 383 | 30 |
| 2034 Background Traffic Voumes (Full Buildout) | 37 | 47 | 8 | 121 | 125 | 61 | 12 | 543 | 89 | 35 | 410 | 32 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 5% | | | | | | | 15% | | | | |
| Exit | | | | | | | | | | | 15% | 5% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 |
| Exit 252 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 13 |
| Total Assignment | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 38 | 12 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 42 | 43 | 7 | 113 | 117 | 57 | 11 | 528 | 83 | 32 | 421 | 42 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | 5% | | | | | | | 15% | 5% | | |
| Exit | | | | 15% | 5% | 5% | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 11 | 0 | 0 |
| Exit 444 | 0 | 0 | 0 | 67 | 22 | 22 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 11 | 0 | 67 | 22 | 22 | 0 | 0 | 32 | 11 | 0 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 37 | 58 | 8 | 188 | 147 | 83 | 12 | 543 | 121 | 46 | 410 | 32 |

**PM Peak Hour**

| Condition | Eastbound Iron Bridge Rd | | | Westbound Iron Bridge Rd | | | Northbound Tom J Hitch Pkwy | | | Southbound Tom J Hitch Pkwy | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2023 Existing Traffic Volumes | 13 | 39 | 6 | 60 | 27 | 26 | 9 | 276 | 69 | 35 | 429 | 54 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 3 | 9 | 1 | 14 | 6 | 6 | 2 | 66 | 17 | 8 | 103 | 13 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 4 | 13 | 2 | 20 | 9 | 9 | 3 | 91 | 23 | 12 | 142 | 18 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | | | | 5 | | | 4 | 1 |
| 2031 Background Traffic Volumes (Phases 1-3) | 16 | 48 | 7 | 74 | 33 | 32 | 11 | 347 | 86 | 43 | 536 | 68 |
| 2034 Background Traffic Voumes (Full Buildout) | 17 | 52 | 8 | 80 | 36 | 35 | 12 | 372 | 92 | 47 | 575 | 73 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 15% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 15% | 5% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| Exit 204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 10 |
| Total Assignment | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 31 | 10 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 29 | 48 | 7 | 74 | 33 | 32 | 11 | 388 | 86 | 43 | 567 | 78 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 15% | 5% | 0% | 0% |
| Exit | 0% | 0% | 0% | 15% | 5% | 5% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 23 | 0 | 0 |
| Exit 316 | 0 | 0 | 0 | 47 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 22 | 0 | 47 | 16 | 16 | 0 | 0 | 68 | 23 | 0 | 0 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 17 | 74 | 8 | 127 | 52 | 51 | 12 | 372 | 160 | 70 | 575 | 73 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#6 Iron Bridge Rd & Mt Olivet Rd**

**AM Peak Hour**

| Condition | Eastbound Iron Bridge Rd | | | Westbound Iron Bridge Rd | | | Northbound | | | Southbound Mt Olivet Rd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 29 | 26 | | | 107 | 17 | | | | 7 | | 56 |
| Adjustment Factor | 1.080 | 1.080 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| 2021 Existing Traffic Volumes (Adjusted) | 31 | 28 | 0 | 0 | 116 | 18 | 0 | 0 | 0 | 8 | 0 | 60 |
| Farm Bureau Traffic | | | | | 6 | | | | | | | |
| 2023 Existing Traffic Volumes | 31 | 28 | 0 | 0 | 122 | 18 | 0 | 0 | 0 | 8 | 0 | 60 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 7 | 7 | 0 | 0 | 29 | 4 | 0 | 0 | 0 | 2 | 0 | 14 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 10 | 9 | 0 | 0 | 40 | 6 | 0 | 0 | 0 | 3 | 0 | 20 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | | 1 | | | | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 38 | 35 | 0 | 0 | 151 | 23 | 0 | 0 | 0 | 10 | 0 | 74 |
| 2034 Background Traffic Voumes (Full Buildout) | 41 | 37 | 0 | 0 | 162 | 25 | 0 | 0 | 0 | 11 | 0 | 80 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | | | | | | | | | | |
| Exit | | | | | | | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 252 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 38 | 35 | 0 | 0 | 151 | 23 | 0 | 0 | 0 | 10 | 0 | 74 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | | | | | | | | | | 5% |
| Exit | 5% | | | | | | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Exit 444 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 63 | 37 | 0 | 0 | 162 | 25 | 0 | 0 | 0 | 11 | 0 | 91 |

**PM Peak Hour**

| Condition | Eastbound Iron Bridge Rd | | | Westbound Iron Bridge Rd | | | Northbound 0 | | | Southbound Mt Olivet Rd | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 48 | 74 | | | 52 | 6 | | | | 17 | | 45 |
| Adjustment Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 2021 Existing Traffic Volumes (Adjusted) | 48 | 74 | 0 | 0 | 52 | 6 | 0 | 0 | 0 | 17 | 0 | 45 |
| Farm Bureau Traffic | | 5 | | | 1 | | | | | | | |
| 2023 Existing Traffic Volumes | 48 | 79 | 0 | 0 | 53 | 6 | 0 | 0 | 0 | 17 | 0 | 45 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 12 | 19 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 4 | 0 | 11 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 16 | 26 | 0 | 0 | 17 | 2 | 0 | 0 | 0 | 6 | 0 | 15 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | | 1 | | | | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 60 | 98 | 0 | 0 | 66 | 8 | 0 | 0 | 0 | 21 | 0 | 56 |
| 2034 Background Traffic Voumes (Full Buildout) | 64 | 105 | 0 | 0 | 70 | 9 | 0 | 0 | 0 | 23 | 0 | 60 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 60 | 98 | 0 | 0 | 66 | 8 | 0 | 0 | 0 | 21 | 0 | 56 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% |
| Exit | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| Exit 316 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 80 | 105 | 0 | 0 | 70 | 9 | 0 | 0 | 0 | 23 | 0 | 83 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#7 James Campbell Blvd & Tom J Hitch Pkwy**

**AM Peak Hour**

| Condition | Eastbound James Campbell Blvd | | | Westbound James Campbell Blvd | | | Northbound | | | Southbound Tom J Hitch Pkwy | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 251 | 254 | | | 544 | 86 | | | | 20 | | 193 |
| Adjustment Factor | 1.080 | 1.080 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| 2021 Existing Traffic Volumes (Adjusted) | 271 | 274 | 0 | 0 | 588 | 93 | 0 | 0 | 0 | 22 | 0 | 208 |
| Farm Bureau Traffic | 42 | | | | | 15 | | | | | | 2 |
| 2023 Existing Traffic Volumes | 313 | 274 | 0 | 0 | 588 | 108 | 0 | 0 | 0 | 22 | 0 | 210 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 75 | 66 | 0 | 0 | 141 | 26 | 0 | 0 | 0 | 5 | 0 | 50 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 103 | 90 | 0 | 0 | 194 | 36 | 0 | 0 | 0 | 7 | 0 | 69 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | 2 | | | | | 1 | | | | | | 2 |
| 2031 Background Traffic Volumes (Phases 1-3) | 390 | 340 | 0 | 0 | 729 | 135 | 0 | 0 | 0 | 27 | 0 | 262 |
| 2034 Background Traffic Voumes (Full Buildout) | 418 | 364 | 0 | 0 | 782 | 145 | 0 | 0 | 0 | 29 | 0 | 281 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 15% | | | | | | | | | | | |
| Exit | | | | | | | | | | | | 15% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 252 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 |
| Total Assignment | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 412 | 340 | 0 | 0 | 729 | 135 | 0 | 0 | 0 | 27 | 0 | 300 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 15% | | | | | | | | | | | |
| Exit | | | | | | | | | | | | 15% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 444 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| Total Assignment | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 450 | 364 | 0 | 0 | 782 | 145 | 0 | 0 | 0 | 29 | 0 | 348 |

**PM Peak Hour**

| Condition | Eastbound James Campbell Blvd | | | Westbound James Campbell Blvd | | | Northbound 0 | | | Southbound Tom J Hitch Pkwy | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2021 Existing Traffic Volumes (Unadjusted) | 314 | 537 | | | 349 | 44 | | | | 33 | | 342 |
| Adjustment Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 2021 Existing Traffic Volumes (Adjusted) | 314 | 537 | 0 | 0 | 349 | 44 | 0 | 0 | 0 | 33 | 0 | 342 |
| Farm Bureau Traffic | 7 | | | | | 1 | | | | 5 | | 50 |
| 2023 Existing Traffic Volumes | 321 | 537 | 0 | 0 | 349 | 45 | 0 | 0 | 0 | 38 | 0 | 392 |
| 2031 Background Growth (Phases 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 77 | 129 | 0 | 0 | 84 | 11 | 0 | 0 | 0 | 9 | 0 | 94 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 106 | 177 | 0 | 0 | 115 | 15 | 0 | 0 | 0 | 13 | 0 | 129 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | 4 | | | | | 1 | | | | | | 4 |
| 2031 Background Traffic Volumes (Phases 1-3) | 402 | 666 | 0 | 0 | 433 | 57 | 0 | 0 | 0 | 47 | 0 | 490 |
| 2034 Background Traffic Voumes (Full Buildout) | 431 | 714 | 0 | 0 | 464 | 61 | 0 | 0 | 0 | 51 | 0 | 525 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 15% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 15% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| Total Assignment | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 443 | 666 | 0 | 0 | 433 | 57 | 0 | 0 | 0 | 47 | 0 | 521 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 15% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 15% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 316 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 |
| Total Assignment | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 499 | 714 | 0 | 0 | 464 | 61 | 0 | 0 | 0 | 51 | 0 | 572 |

**Adjusted for rounding errors.*

**Traffic Volume Calculations**
**#8 Iron Bridge Rd & Site Access 2**

**AM Peak Hour**

| Condition | Eastbound Iron Bridge Rd | | | Westbound Iron Bridge Rd | | | Northbound | | | Southbound Site Access 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2023 Existing Traffic Volumes | | 128 | | | 231 | | | | | | | |
| 2031 Background Growth (Phase 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 0 | 31 | 0 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 0 | 42 | 0 | 0 | 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | | | | | | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 0 | 159 | 0 | 0 | 286 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 Background Traffic Voumes (Full Buildout) | 0 | 170 | 0 | 0 | 307 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | | | | | | | | | | | | |
| Exit | | | | | | | | | | | | |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 147 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 252 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 0 | 159 | 0 | 0 | 286 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 25% | | | | | 5% | | | | | | |
| Exit | | | | | | | | | | 5% | | 25% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 214 | 54 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 444 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 111 |
| Total Assignment | 54 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 22 | 0 | 111 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 54 | 170 | 0 | 0 | 307 | 11 | 0 | 0 | 0 | 22 | 0 | 111 |

**PM Peak Hour**

| Condition | Eastbound Iron Bridge Rd | | | Westbound Iron Bridge Rd | | | Northbound 0 | | | Southbound Site Access 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| 2023 Existing Traffic Volumes | | 143 | | | 113 | | | | | | | |
| 2031 Background Growth (Phase 1-3) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 8 Years) | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Background Growth Volumes | 0 | 34 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 Background Growth (Full Buildout) | | | | | | | | | | | | |
| Growth Rate (3% Annual for 11 Years) | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Background Growth Volumes | 0 | 47 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Approved Developments: | | | | | | | | | | | | |
| Dollar General Assignment | | | | | | | | | | | | |
| 2031 Background Traffic Volumes (Phases 1-3) | 0 | 177 | 0 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 Background Traffic Voumes (Full Buildout) | 0 | 190 | 0 | 0 | 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Site Traffic (Phase 1-3) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 271 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 204 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Assignment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2031 Total Projected Traffic Volumes (Phase 1-3) | 0 | 177 | 0 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Site Traffic (Full Buildout) | | | | | | | | | | | | |
| Directional Distribution | | | | | | | | | | | | |
| Enter | 25% | 0% | 0% | 0% | 0% | 5% | 0% | 0% | 0% | 0% | 0% | 0% |
| Exit | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 0% | 25% |
| Traffic Assignment | | | | | | | | | | | | |
| Enter 452 | 113 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit 316 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 79 |
| Total Assignment | 113 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 16 | 0 | 79 |
| 2034 Total Projected Traffic Volumes (Full Buildout) | 113 | 190 | 0 | 0 | 150 | 23 | 0 | 0 | 0 | 16 | 0 | 79 |

**Adjusted for rounding errors.*

# APPENDIX H
# CAPACITY ANALYSIS WORKSHEETS

| AM PEAK HOUR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Intersection | Control | Turning Movement | Level of Service (Delay in sec/veh) | | | | | | |
| | | | 2023 Existing | 2031 | | | 2034 | | |
| | | | | Background | Projected | Projected w/ Imps | Background | Projected | Projected w/ Imps |
| Nashville Hwy & US 43/Bear Creek Pk | Signal | EB Left Turn | F (88.2) | F (169.7) | F (173.2) | F (140.8) | F (210.2) | F (213.2) | F (195.5) |
| | | EB Through/Right Turn | E (59.7) | E (72.3) | E (76.6) | E (55.9) | F (86.0) | F (94.8) | E (64.0) |
| | | WB Left Turn | F (100.2) | E (60.9) | E (62.1) | E (57.5) | E (62.2) | E (65.3) | E (67.7) |
| | | WB Through/Right Turn | F (92.3) | -- | -- | -- | -- | -- | -- |
| | | WB Through | -- | E (63.4) | E (64.9) | E (62.2) | E (65.3) | E (69.7) | E (63.7) |
| | | WB Right Turn | -- | F (99.1) | F (163.4) | F (237.0) | F (124.1) | F (272.9) | F (287.7) |
| | | NB Left Turn | D (42.3) | D (43.9) | D (44.6) | C (33.1) | D (46.0) | D (46.3) | D (42.5) |
| | | NB Through | E (69.7) | F (113.4) | F (121.2) | E (74.0) | F (149.8) | F (154.8) | F (147.3) |
| | | NB Right Turn | D (46.5) | F (46.0) | D (47.0) | D (35.6) | D (47.1) | D (48.6) | D (44.8) |
| | | SB Left Turn | F (116.5) | F (89.5) | F (98.8) | F (217.6) | F (95.2) | F (119.7) | F (191.8) |
| | | SB Through | D (44.9) | D (51.7) | D (51.7) | D (44.9) | E (56.6) | E (55.9) | E (60.7) |
| | | SB Right Turn | D (51.0) | F (129.2) | F (129.3) | F (100.0) | F (184.4) | F (182.8) | F (182.3) |
| | | **Overall Intersection** | **E (70.5)** | **F (97.2)** | **F (104.0)** | **F (95.0)** | **F (120.8)** | **F (134.3)** | **F (132.2)** |
| Bear Creek Pk & Tom J Hitch Pkwy/ Farm Bureau Access | Signal | EB Left Turn | C (26.6) | D (45.8) | E (58.9) | F (92.1) | E (58.9) | E (58.9) | F (92.9) |
| | | EB Through/Right Turn | D (48.5) | F (98.7) | F (128.6) | F (145.0) | F (129.4) | F (176.7) | F (179.4) |
| | | WB Left Turn | E (69.1) | F (257.8) | F (379.3) | F (189.6) | F (301.7) | F (301.7) | F (235.1) |
| | | WB Through | C (34.2) | E (55.2) | F (98.3) | F (75.9) | F (80.5) | F (156.1) | F (140.9) |
| | | WB Right Turn | B (15.9) | B (14.9) | B (15.4) | B (12.9) | B (15.4) | B (15.4) | B (13.8) |
| | | NB Left Turn | E (58.9) | F (120.1) | F (120.1) | F (168.4) | F (147.2) | F (167.8) | F (195.7) |
| | | NB Through/Right Turn | E (56.1) | F (87.0) | F (109.4) | -- | F (100.3) | F (100.3) | -- |
| | | NB Through | -- | -- | -- | D (49.7) | -- | -- | D (48.0) |
| | | NB Right Turn | -- | -- | -- | D (44.0) | -- | -- | D (45.3) |
| | | SB Left Turn | E (66.3) | E (71.9) | E (72.0) | E (68.0) | E (72.0) | E (72.0) | E (68.0) |
| | | SB Through | E (66.7) | E (72.1) | E (72.1) | E (68.3) | E (72.1) | E (72.1) | E (68.3) |
| | | SB Right Turn | E (66.7) | E (72.2) | E (72.2) | E (68.4) | E (72.2) | E (72.2) | E (68.4) |
| | | **Overall Intersection** | **D (46.7)** | **F (97.3)** | **F (135.3)** | **F (116.2)** | **F (124.4)** | **F (165.7)** | **F (155.9)** |
| Bear Creek Pk & Patterson Dr/ Site Access 1 | TWSC | EB Left Turn | B (10.3) | B (11.7) | B (11.7) | -- | B (12.3) | B (12.3) | -- |
| | | WB Left Turn | -- | -- | B (11.4) | -- | -- | B (11.9) | -- |
| | | NB Left Turn | -- | -- | F (600+) | -- | -- | F (600+) | -- |
| | | NB Through/Right Turn | -- | -- | F (115.1) | -- | -- | F (444.3) | -- |
| | | SB Approach | E (40.9) | F (138.6) | F (600+) | -- | F (255.3) | F (600+) | -- |
| | Signal | EB Left Turn | -- | -- | -- | E (58.7) | -- | -- | E (74.3) |
| | | EB Through | -- | -- | -- | C (34.4) | -- | -- | D (50.4) |
| | | EB Right Turn | -- | -- | -- | B (10.3) | -- | -- | B (10.5) |
| | | WB Left Turn | -- | -- | -- | C (25.1) | -- | -- | C (30.8) |
| | | WB Through | -- | -- | -- | C (25.7) | -- | -- | F (43.0) |
| | | WB Right Turn | -- | -- | -- | A (5.9) | -- | -- | A (6.0) |
| | | NB Left Turn | -- | -- | -- | D (52.1) | -- | -- | E (56.0) |
| | | NB Through/Right Turn | -- | -- | -- | D (51.3) | -- | -- | E (59.3) |
| | | SB Left Turn | -- | -- | -- | D (49.0) | -- | -- | D (48.9) |
| | | SB Through/Right Turn | -- | -- | -- | E (68.9) | -- | -- | E (71.9) |
| | | **Overall Intersection** | **--** | **--** | **--** | **C (32.3)** | **--** | **--** | **D (46.9)** |
| Bear Creek Pk & Mt Olivet Rd/School Access | Signal | EB Left Turn | C (29.9) | F (112.8) | F (129.3) | F (87.6) | F (139.4) | F (173.0) | F (116.2) |
| | | EB Through/Right Turn | B (18.5) | C (27.4) | C (33.7) | B (16.7) | C (32.7) | F (53.6) | B (19.1) |
| | | WB Left Turn | B (14.4) | C (20.1) | C (22.3) | B (15.0) | C (22.0) | C (26.8) | B (17.5) |
| | | WB Through/Right Turn | D (35.5) | F (121.7) | F (142.5) | F (62.3) | F (158.1) | F (182.9) | F (79.7) |
| | | NB Left Turn | D (42.3) | E (67.7) | E (72.8) | F (99.7) | F (96.6) | F (118.4) | F (187.4) |
| | | NB Through/Right Turn | C (28.6) | C (32.5) | C (32.5) | D (49.7) | C (32.7) | C (33.3) | E (60.2) |
| | | SB Left Turn | C (31.4) | D (36.7) | D (36.7) | -- | D (37.2) | D (38.6) | -- |
| | | SB Through/Right Turn | C (33.0) | D (41.8) | D (42.8) | -- | D (44.6) | D (46.8) | -- |
| | | SB Through/Left Turn | -- | -- | -- | E (66.0) | -- | -- | F (85.8) |
| | | SB Right Turn | -- | -- | -- | D (50.6) | -- | -- | E (58.3) |
| | | **Overall Intersection** | **C (29.2)** | **E (74.2)** | **F (85.3)** | **D (50.6)** | **F (93.5)** | **F (112.1)** | **E (66.0)** |
| Tom J Hitch Pkwy & Iron Bridge Rd | Signal | EB Left Turn | C (24.5) | C (26.5) | C (26.8) | -- | C (27.3) | C (29.8) | -- |
| | | EB Through/Right Turn | C (20.1) | C (20.4) | C (20.4) | -- | C (20.7) | C (21.1) | -- |
| | | WB Left Turn | C (22.8) | C (24.0) | C (24.0) | -- | C (24.7) | D (35.1) | -- |
| | | WB Through/Right Turn | C (23.3) | C (27.7) | C (27.7) | -- | C (30.5) | D (52.1) | -- |
| | | NB Left Turn | A (7.8) | A (8.2) | A (8.4) | -- | A (8.3) | A (8.4) | -- |
| | | NB Through | B (13.0) | B (16.1) | B (16.9) | -- | B (17.7) | B (18.3) | -- |
| | | SB Left Turn | A (8.0) | A (9.0) | A (9.3) | -- | A (9.5) | A (9.7) | -- |
| | | SB Through | B (10.3) | B (11.5) | B (12.3) | -- | B (12.0) | B (11.9) | -- |
| | | **Overall Intersection** | **B (14.8)** | **B (17.2)** | **B (17.6)** | **--** | **B (18.5)** | **C (23.8)** | **--** |
| Iron Bridge Rd & Mt Olivet Rd | TWSC | EB Left Turn | A (7.6) | A (7.7) | A (7.7) | -- | A (7.7) | A (7.7) | -- |
| | | SB Approach | A (9.4) | A (9.7) | A (9.7) | -- | A (9.9) | B (10.0) | -- |
| James Campbell Blvd & Tom J Hitch Pkwy | TWSC | EB Left Turn | B (12.0) | C (16.5) | C (17.4) | -- | C (19.9) | C (22.1) | -- |
| | | SB Left Turn | F (82.6) | F (414.0) | F (496.8) | -- | F (600+) | F (600+) | -- |
| | | SB Right Turn | C (19.3) | E (35.7) | E (47.3) | -- | F (51.5) | F (96.1) | -- |
| | Signal | EB Left Turn | -- | -- | -- | D (36.4) | -- | -- | D (50.7) |
| | | EB Through | -- | -- | -- | A (3.3) | -- | -- | A (3.0) |
| | | WB Through | -- | -- | -- | C (24.4) | -- | -- | C (33.7) |
| | | WB Right Turn | -- | -- | -- | B (10.9) | -- | -- | B (12.8) |
| | | SB Left Turn | -- | -- | -- | C (34.4) | -- | -- | D (39.8) |
| | | SB Right Turn | -- | -- | -- | D (37.3) | -- | -- | D (39.2) |
| | | **Overall Intersection** | **--** | **--** | **--** | **C (24.4)** | **--** | **--** | **C (31.6)** |
| Iron Bridge Rd & Site Access 2 | TWSC | EB Left Turn | -- | -- | -- | -- | -- | A (8.1) | -- |
| | | SB Approach | -- | -- | -- | -- | -- | B (12.4) | -- |

Note: HCM 6th Edition results reported above for all intersections, with one exception. HCM 2000 results reported for intersection of Nashville Highway and US 43/Bear Creek Pike.

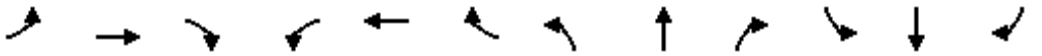
| PM PEAK HOUR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Intersection | Control | Turning Movement | Level of Service (Delay in sec/veh) | | | | | | |
| | | | 2023 Existing | 2031 | | | 2034 | | |
| | | | | Background | Projected | Projected w/ Imps | Background | Projected | Projected w/ Imps |
| Nashville Hwy & US 43/Bear Creek Pk | Signal | EB Left Turn | E (59.7) | E (68.2) | E (68.2) | F (93.3) | E (73.5) | E (73.5) | F (117.1) |
| | | EB Through/Right Turn | E (55.4) | E (60.1) | E (61.8) | E (58.2) | E (61.9) | E (65.3) | E (68.6) |
| | | WB Left Turn | F (98.5) | E (62.3) | E (63.0) | E (58.7) | E (64.6) | E (66.7) | F (80.5) |
| | | WB Through/Right Turn | E (75.0) | -- | -- | -- | -- | -- | -- |
| | | WB Through | -- | E (77.2) | F (80.7) | F (95.5) | F (89.6) | F (101.1) | F (116.3) |
| | | WB Right Turn | -- | E (55.6) | E (58.3) | D (46.8) | E (57.0) | E (64.3) | E (61.6) |
| | | NB Left Turn | D (40.7) | E (61.6) | E (62.7) | D (35.2) | E (74.5) | E (74.0) | D (53.3) |
| | | NB Through | E (58.3) | E (74.5) | F (85.9) | D (51.4) | F (100.0) | F (116.6) | E (71.9) |
| | | NB Right Turn | D (44.2) | D (47.7) | D (50.8) | D (35.2) | D (50.7) | E (56.7) | D (48.1) |
| | | SB Left Turn | E (64.4) | F (83.9) | F (94.6) | F (99.8) | F (86.8) | F (129.7) | F (109.9) |
| | | SB Through | D (43.7) | E (55.4) | E (55.7) | D (39.6) | E (65.3) | E (65.3) | D (47.1) |
| | | SB Right Turn | D (44.9) | F (97.2) | F (98.5) | E (78.3) | F (143.7) | F (144.2) | F (108.1) |
| | | **Overall Intersection** | **E (58.1)** | **E (69.4)** | **E (72.6)** | **E (64.1)** | **F (84.1)** | **F (90.7)** | **F (81.9)** |
| Bear Creek Pk & Tom J Hitch Pkwy/ Farm Bureau Access | Signal | EB Left Turn | B (16.2) | C (25.9) | D (36.6) | B (18.4) | C (32.2) | D (39.0) | C (25.2) |
| | | EB Through/Right Turn | D (49.3) | F (151.9) | F (225.6) | F (161.0) | F (199.6) | F (295.0) | F (213.4) |
| | | WB Left Turn | F (135.1) | F (390.1) | F (509.3) | F (202.7) | F (456.2) | F (456.2) | F (275.4) |
| | | WB Through | F (18.4) | C (31.9) | E (51.6) | C (19.7) | D (42.6) | F (71.8) | C (28.4) |
| | | WB Right Turn | A (9.6) | B (11.5) | B (13.0) | A (6.4) | B (12.2) | B (12.2) | A (6.8) |
| | | NB Left Turn | D (53.3) | D (54.0) | D (52.1) | F (195.6) | D (54.2) | E (56.1) | F (219.9) |
| | | NB Through/Right Turn | E (77.2) | F (90.1) | F (109.9) | -- | F (93.7) | F (93.7) | -- |
| | | NB Through | -- | -- | -- | E (62.2) | -- | -- | E (60.9) |
| | | NB Right Turn | -- | -- | -- | F (76.8) | -- | -- | E (74.3) |
| | | SB Left Turn | E (60.3) | E (63.1) | E (61.7) | E (66.1) | E (63.6) | E (64.2) | E (65.7) |
| | | SB Through | E (66.2) | E (67.9) | E (65.2) | F (118.5) | E (68.1) | E (70.0) | F (106.5) |
| | | SB Right Turn | E (63.8) | E (65.9) | E (63.7) | E (74.3) | E (66.2) | E (67.9) | E (73.3) |
| | | **Overall Intersection** | **D (52.4)** | **F (123.6)** | **F (173.5)** | **F (112.6)** | **F (152.6)** | **F (198.0)** | **F (144.7)** |
| Bear Creek Pk & Patterson Dr/ Site Access 1 | TWSC | EB Left Turn | B (10.2) | B (11.7) | B (11.7) | -- | B (12.3) | B (12.3) | -- |
| | | WB Left Turn | -- | -- | B (13.4) | -- | -- | C (15.1) | -- |
| | | NB Left Turn | -- | -- | F (600+) | -- | -- | F (600+) | -- |
| | | NB Through/Right Turn | -- | -- | F (192.1) | -- | -- | F (600+) | -- |
| | | SB Approach | C (24.5) | E (46.9) | F (600+) | -- | F (68.4) | F (600+) | -- |
| | Signal | EB Left Turn | -- | -- | -- | C (32.5) | -- | -- | D (43.9) |
| | | EB Through | -- | -- | -- | C (29.3) | -- | -- | D (41.1) |
| | | EB Right Turn | -- | -- | -- | A (8.4) | -- | -- | A (8.5) |
| | | WB Left Turn | -- | -- | -- | C (28.2) | -- | -- | E (55.4) |
| | | WB Through | -- | -- | -- | B (12.5) | -- | -- | B (14.6) |
| | | WB Right Turn | -- | -- | -- | A (4.0) | -- | -- | A (4.0) |
| | | NB Left Turn | -- | -- | -- | F (89.5) | -- | -- | F (90.2) |
| | | NB Through/Right Turn | -- | -- | -- | F (88.2) | -- | -- | F (126.4) |
| | | SB Left Turn | -- | -- | -- | D (54.3) | -- | -- | D (54.7) |
| | | SB Through/Right Turn | -- | -- | -- | F (104.0) | -- | -- | F (127.4) |
| | | **Overall Intersection** | **--** | **--** | **--** | **C (27.5)** | **--** | **--** | **D (36.3)** |
| Bear Creek Pk & Mt Olivet Rd/School Access | Signal | EB Left Turn | B (10.1) | B (17.4) | C (20.4) | C (27.4) | C (20.3) | C (20.5) | D (35.9) |
| | | EB Through/Right Turn | B (15.7) | C (29.5) | D (40.2) | C (34.5) | F (46.2) | F (79.4) | D (37.1) |
| | | WB Left Turn | B (10.2) | B (17.1) | C (20.4) | C (24.6) | C (20.4) | C (20.5) | C (34.0) |
| | | WB Through/Right Turn | B (15.8) | C (30.3) | F (48.0) | D (39.8) | F (47.7) | F (87.3) | D (41.6) |
| | | NB Left Turn | C (28.3) | D (35.9) | D (37.1) | D (43.4) | D (36.7) | D (37.6) | D (54.2) |
| | | NB Through/Right Turn | C (26.6) | C (32.8) | C (33.1) | D (40.2) | C (33.3) | C (33.5) | D (51.2) |
| | | SB Left Turn | C (26.8) | C (33.4) | C (33.8) | -- | C (34.0) | C (34.5) | -- |
| | | SB Through/Right Turn | C (26.8) | C (33.0) | C (34.0) | -- | C (33.5) | C (34.0) | -- |
| | | SB Through/Left Turn | -- | -- | -- | D (48.3) | | | E (58.9) |
| | | SB Right Turn | -- | -- | -- | D (53.3) | | | F (86.0) |
| | | **Overall Intersection** | **B (16.4)** | **C (29.9)** | **D (42.7)** | **D (37.5)** | **D (45.3)** | **E (77.0)** | **D (41.1)** |
| Tom J Hitch Pkwy & Iron Bridge Rd | Signal | EB Left Turn | B (18.6) | B (19.0) | B (19.2) | -- | B (19.2) | C (20.4) | -- |
| | | EB Through/Right Turn | B (17.9) | B (18.1) | B (18.1) | -- | B (18.2) | B (18.8) | -- |
| | | WB Left Turn | B (19.2) | B (19.8) | B (19.8) | -- | C (20.1) | C (22.3) | -- |
| | | WB Through/Right Turn | B (18.1) | B (18.3) | B (18.3) | -- | B (18.5) | B (19.4) | -- |
| | | NB Left Turn | A (8.6) | A (9.4) | A (9.6) | -- | A (9.7) | A (10.0) | -- |
| | | NB Through | B (11.1) | B (12.6) | B (13.4) | -- | B (13.2) | B (13.9) | -- |
| | | SB Left Turn | A (7.7) | A (8.1) | A (8.3) | -- | A (8.3) | A (8.5) | -- |
| | | SB Through | B (12.2) | A (14.9) | B (16.0) | -- | B (16.3) | B (16.1) | -- |
| | | **Overall Intersection** | **B (12.8)** | **B (14.6)** | **B (15.4)** | **--** | **B (15.5)** | **B (16.1)** | **--** |
| Iron Bridge Rd & Mt Olivet Rd | TWSC | EB Left Turn | A (7.4) | A (7.5) | A (7.5) | -- | A (7.5) | A (7.5) | -- |
| | | SB Approach | A (9.3) | A (9.6) | A (9.6) | -- | A (9.7) | A (9.8) | -- |
| James Campbell Blvd & Tom J Hitch Pkwy | TWSC | EB Left Turn | A (9.5) | B (10.8) | B (11.3) | -- | B (11.5) | B (12.4) | -- |
| | | SB Left Turn | F (90.9) | F (437.1) | F (580.4) | -- | F (600+) | F (600+) | -- |
| | | SB Right Turn | C (18.6) | E (38.2) | E (46.7) | -- | F (57.5) | F (80.5) | -- |
| | Signal | EB Left Turn | -- | -- | -- | B (13.6) | -- | -- | B (16.0) |
| | | EB Through | -- | -- | -- | A (7.3) | -- | -- | A (7.1) |
| | | WB Through | -- | -- | -- | C (20.7) | -- | -- | C (23.5) |
| | | WB Right Turn | -- | -- | -- | B (12.7) | -- | -- | B (13.2) |
| | | SB Left Turn | -- | -- | -- | C (23.6) | -- | -- | C (24.8) |
| | | SB Right Turn | -- | -- | -- | F (77.9) | -- | -- | F (101.0) |
| | | **Overall Intersection** | **--** | **--** | **--** | **C (28.7)** | **--** | **--** | **D (35.5)** |
| Iron Bridge Rd & Site Access 2 | TWSC | EB Left Turn | -- | -- | -- | -- | -- | A (7.8) | -- |
| | | SB Approach | -- | -- | -- | -- | -- | B (10.8) | -- |

Note: HCM 6th Edition results reported above for all intersections, with one exception. HCM 2000 results reported for intersection of Nashville Highway and US 43/Bear Creek Pike.

INTERSECTION CAPACITY ANALYSIS: INTERSECTION OF BEAR CREEK PIKE AND TOM J HITCH PARKWAY
WITH FUTURE IMPROVEMENTS BY OTHERS

| AM PEAK HOUR | | | | |
|---|---|---|---|---|
| **Turning Movement** | **Level of Service (Delay in sec/veh)** | | | |
| | **2031** | | **2034** | |
| | **AM** | **PM** | **AM** | **PM** |
| EB Left Turn | E (67.2) | C (20.2) | F (109.2) | C (25.2) |
| EB Through | D (53.4) | F (65.4) | E (57.7) | F (85.1) |
| EB Right Turn | A (9.8) | B (14.6) | A (8.5) | B (13.2) |
| WB Left Turn | E (79.1) | F (120.4) | F (108.1) | F (160.5) |
| WB Through | F (62.3) | C (21.0) | F (100.2) | C (28.4) |
| WB Right Turn | B (11.3) | A (6.7) | B (10.7) | A (6.8) |
| NB Left Turn | E (76.2) | F (96.9) | F (99.7) | F (116.8) |
| NB Right Turn | D (43.4) | E (67.9) | D (47.4) | E (69.8) |
| SB Left Turn | E (72.3) | E (71.7) | E (72.6) | E (72.0) |
| SB Through | E (73.9) | F (101.6) | E (74.2) | F (106.5) |
| SB Right Turn | E (75.2) | E (72.8) | E (75.6) | E (73.3) |
| **Overall Intersection** | **E (58.3)** | **E (56.3)** | **E (79.3)** | **E (68.8)** |
| Note: HCM 6th Edition results reported above. | | | | |

# 2023 EXISTING CONDITIONS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 757 | 537 | 38 | 317 | 368 | 313 | 28 | 770 | 285 | 234 | 770 | 739 |
| Future Volume (vph) | 757 | 537 | 38 | 317 | 368 | 313 | 28 | 770 | 285 | 234 | 770 | 739 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3504 | | 1770 | 3295 | | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.23 | 1.00 | 1.00 | 0.08 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3504 | | 1770 | 3295 | | 420 | 3539 | 1583 | 148 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 860 | 610 | 43 | 360 | 418 | 356 | 32 | 875 | 324 | 266 | 875 | 840 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 94 | 0 | 0 | 0 | 235 | 0 | 0 | 400 |
| Lane Group Flow (vph) | 860 | 650 | 0 | 360 | 680 | 0 | 32 | 875 | 89 | 266 | 875 | 440 |
| Turn Type | Split | NA | | Split | NA | | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | 4 |
| Actuated Green, G (s) | 42.0 | 42.0 | | 35.0 | 35.0 | | 49.2 | 45.2 | 45.2 | 70.2 | 61.2 | 61.2 |
| Effective Green, g (s) | 42.0 | 42.0 | | 35.0 | 35.0 | | 49.2 | 45.2 | 45.2 | 70.2 | 61.2 | 61.2 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | | 0.30 | 0.27 | 0.27 | 0.42 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 872 | 890 | | 375 | 698 | | 157 | 968 | 433 | 259 | 1311 | 586 |
| v/s Ratio Prot | c0.25 | 0.19 | | 0.20 | c0.21 | | 0.00 | 0.25 | | c0.12 | 0.25 | |
| v/s Ratio Perm | | | | | | | 0.06 | | 0.06 | c0.31 | | 0.28 |
| v/c Ratio | 0.99 | 0.73 | | 0.96 | 0.97 | | 0.20 | 0.90 | 0.20 | 1.03 | 0.67 | 0.75 |
| Uniform Delay, d1 | 61.3 | 56.4 | | 64.4 | 64.7 | | 42.1 | 57.9 | 46.2 | 53.4 | 43.5 | 45.3 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 26.9 | 3.3 | | 35.8 | 27.7 | | 0.2 | 11.8 | 0.3 | 63.1 | 1.4 | 5.7 |
| Delay (s) | 88.2 | 59.7 | | 100.2 | 92.3 | | 42.3 | 69.7 | 46.5 | 116.5 | 44.9 | 51.0 |
| Level of Service | F | E | | F | F | | D | E | D | F | D | D |
| Approach Delay (s) | | 75.9 | | | 94.8 | | | 62.9 | | | 57.1 | |
| Approach LOS | | E | | | F | | | E | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 70.5 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.02 | | |
| Actuated Cycle Length (s) | 165.2 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 95.2% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 579 | 165 | 197 | 744 | 34 | 338 | 67 | 197 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 579 | 165 | 197 | 744 | 34 | 338 | 67 | 197 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 651 | 185 | 221 | 836 | 37 | 380 | 73 | 221 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 236 | 702 | 199 | 243 | 1010 | 856 | 477 | 102 | 309 | 103 | 89 | 76 |
| Arrive On Green | 0.04 | 0.50 | 0.50 | 0.08 | 0.54 | 0.54 | 0.20 | 0.25 | 0.25 | 0.00 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1401 | 398 | 1781 | 1870 | 1585 | 1781 | 409 | 1238 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 836 | 221 | 836 | 37 | 380 | 0 | 294 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1799 | 1781 | 1870 | 1585 | 1781 | 0 | 1647 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 4.6 | 0.0 | 63.6 | 10.3 | 54.5 | 1.6 | 29.2 | 0.0 | 23.9 | 0.1 | 0.1 | 0.2 |
| Cycle Q Clear(g_c), s | 4.6 | 0.0 | 63.6 | 10.3 | 54.5 | 1.6 | 29.2 | 0.0 | 23.9 | 0.1 | 0.1 | 0.2 |
| Prop In Lane | 1.00 | | 0.22 | 1.00 | | 1.00 | 1.00 | | 0.75 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 236 | 0 | 901 | 243 | 1010 | 856 | 477 | 0 | 411 | 103 | 89 | 76 |
| V/C Ratio(X) | 0.48 | 0.00 | 0.93 | 0.91 | 0.83 | 0.04 | 0.80 | 0.00 | 0.71 | 0.01 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 321 | 0 | 1019 | 259 | 1060 | 898 | 477 | 0 | 411 | 402 | 375 | 318 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 26.1 | 0.0 | 34.1 | 37.9 | 28.1 | 15.9 | 50.4 | 0.0 | 50.3 | 66.3 | 66.6 | 66.6 |
| Incr Delay (d2), s/veh | 0.6 | 0.0 | 14.4 | 31.1 | 6.1 | 0.0 | 8.5 | 0.0 | 5.8 | 0.0 | 0.1 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.3 | 0.0 | 38.7 | 15.3 | 32.8 | 1.0 | 19.8 | 0.0 | 15.5 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 26.6 | 0.0 | 48.5 | 69.1 | 34.2 | 15.9 | 58.9 | 0.0 | 56.1 | 66.3 | 66.7 | 66.7 |
| LnGrp LOS | C | A | D | E | C | B | E | A | E | E | E | E |
| Approach Vol, veh/h | | 950 | | | 1094 | | | 674 | | | 5 | |
| Approach Delay, s/veh | | 45.9 | | | 40.6 | | | 57.7 | | | 66.6 | |
| Approach LOS | | D | | | D | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 18.7 | 80.3 | 35.0 | 12.6 | 13.0 | 86.1 | 5.4 | 42.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 12.3 | 65.6 | 31.2 | 2.2 | 6.6 | 56.5 | 2.1 | 25.9 |
| Green Ext Time (p_c), s | 0.0 | 7.9 | 0.0 | 0.0 | 0.1 | 9.9 | 0.0 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 46.7 |
| HCM 6th LOS | D |

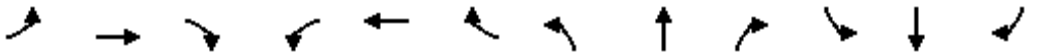
| Intersection | |
|---|---|
| Int Delay, s/veh | 1.6 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 12 | 751 | 896 | 8 | 17 | 45 |
| Future Vol, veh/h | 12 | 751 | 896 | 8 | 17 | 45 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 205 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 834 | 996 | 9 | 19 | 50 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1005 | 0 | - | 0 | 1861 | 1001 |
| Stage 1 | - | - | - | - | 1001 | - |
| Stage 2 | - | - | - | - | 860 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 689 | - | - | - | 80 | 295 |
| Stage 1 | - | - | - | - | 355 | - |
| Stage 2 | - | - | - | - | 414 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 689 | - | - | - | 78 | 295 |
| Mov Cap-2 Maneuver | - | - | - | - | 78 | - |
| Stage 1 | - | - | - | - | 348 | - |
| Stage 2 | - | - | - | - | 414 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.2 | 0 | 40.9 |
| HCM LOS | | | E |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 689 | - | - | - | 167 |
| HCM Lane V/C Ratio | 0.019 | - | - | - | 0.413 |
| HCM Control Delay (s) | 10.3 | - | - | - | 40.9 |
| HCM Lane LOS | B | - | - | - | E |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 1.8 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 220 | 568 | 30 | 19 | 659 | 35 | 91 | 49 | 30 | 50 | 25 | 184 |
| Future Volume (veh/h) | 220 | 568 | 30 | 19 | 659 | 35 | 91 | 49 | 30 | 50 | 25 | 184 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 247 | 638 | 34 | 21 | 740 | 39 | 102 | 55 | 34 | 56 | 28 | 207 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 292 | 938 | 50 | 322 | 817 | 43 | 206 | 261 | 161 | 340 | 46 | 343 |
| Arrive On Green | 0.09 | 0.53 | 0.53 | 0.02 | 0.46 | 0.46 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| Sat Flow, veh/h | 1781 | 1760 | 94 | 1781 | 1761 | 93 | 1145 | 1081 | 669 | 1308 | 192 | 1422 |
| Grp Volume(v), veh/h | 247 | 0 | 672 | 21 | 0 | 779 | 102 | 0 | 89 | 56 | 0 | 235 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1853 | 1781 | 0 | 1854 | 1145 | 0 | 1750 | 1308 | 0 | 1614 |
| Q Serve(g_s), s | 6.4 | 0.0 | 24.9 | 0.6 | 0.0 | 36.4 | 8.1 | 0.0 | 3.8 | 3.3 | 0.0 | 12.1 |
| Cycle Q Clear(g_c), s | 6.4 | 0.0 | 24.9 | 0.6 | 0.0 | 36.4 | 20.2 | 0.0 | 3.8 | 7.1 | 0.0 | 12.1 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.38 | 1.00 | | 0.88 |
| Lane Grp Cap(c), veh/h | 292 | 0 | 988 | 322 | 0 | 860 | 206 | 0 | 423 | 340 | 0 | 390 |
| V/C Ratio(X) | 0.85 | 0.00 | 0.68 | 0.07 | 0.00 | 0.91 | 0.50 | 0.00 | 0.21 | 0.16 | 0.00 | 0.60 |
| Avail Cap(c_a), veh/h | 386 | 0 | 988 | 539 | 0 | 971 | 278 | 0 | 533 | 422 | 0 | 492 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.0 | 0.0 | 16.0 | 14.4 | 0.0 | 23.2 | 40.5 | 0.0 | 28.4 | 31.2 | 0.0 | 31.5 |
| Incr Delay (d2), s/veh | 9.9 | 0.0 | 2.5 | 0.0 | 0.0 | 12.3 | 1.8 | 0.0 | 0.2 | 0.2 | 0.0 | 1.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 5.3 | 0.0 | 14.2 | 0.4 | 0.0 | 22.9 | 4.3 | 0.0 | 2.9 | 1.9 | 0.0 | 8.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 29.9 | 0.0 | 18.5 | 14.4 | 0.0 | 35.5 | 42.3 | 0.0 | 28.6 | 31.4 | 0.0 | 33.0 |
| LnGrp LOS | C | A | B | B | A | D | D | A | C | C | A | C |
| Approach Vol, veh/h | | 919 | | | 800 | | | 191 | | | 291 | |
| Approach Delay, s/veh | | 21.6 | | | 35.0 | | | 35.9 | | | 32.7 | |
| Approach LOS | | C | | | C | | | D | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.6 | 55.9 | | 29.1 | 15.1 | 49.4 | | 29.1 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.6 | 26.9 | | 14.1 | 8.4 | 38.4 | | 22.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 6.3 | | 1.1 | 0.2 | 5.0 | | 0.4 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 29.2 | |
| HCM 6th LOS | | C | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 35 | 6 | 91 | 94 | 46 | 9 | 406 | 67 | 26 | 307 | 24 |
| Future Volume (veh/h) | 28 | 35 | 6 | 91 | 94 | 46 | 9 | 406 | 67 | 26 | 307 | 24 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 33 | 42 | 7 | 108 | 112 | 55 | 11 | 483 | 0 | 31 | 365 | 0 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 235 | 274 | 46 | 333 | 207 | 102 | 530 | 887 | | 453 | 925 | |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.01 | 0.47 | 0.00 | 0.03 | 0.49 | 0.00 |
| Sat Flow, veh/h | 1218 | 1563 | 260 | 1356 | 1184 | 582 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 33 | 0 | 49 | 108 | 0 | 167 | 11 | 483 | 0 | 31 | 365 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1218 | 0 | 1823 | 1356 | 0 | 1766 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 1.4 | 0.0 | 1.3 | 4.2 | 0.0 | 4.9 | 0.2 | 10.4 | 0.0 | 0.5 | 7.0 | 0.0 |
| Cycle Q Clear(g_c), s | 6.3 | 0.0 | 1.3 | 5.5 | 0.0 | 4.9 | 0.2 | 10.4 | 0.0 | 0.5 | 7.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.14 | 1.00 | | 0.33 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 235 | 0 | 319 | 333 | 0 | 309 | 530 | 887 | | 453 | 925 | |
| V/C Ratio(X) | 0.14 | 0.00 | 0.15 | 0.32 | 0.00 | 0.54 | 0.02 | 0.54 | | 0.07 | 0.39 | |
| Avail Cap(c_a), veh/h | 236 | 0 | 320 | 334 | 0 | 310 | 661 | 887 | | 549 | 925 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 24.3 | 0.0 | 19.9 | 22.2 | 0.0 | 21.4 | 7.8 | 10.6 | 0.0 | 8.0 | 9.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 0.2 | 0.6 | 0.0 | 1.9 | 0.0 | 2.4 | 0.0 | 0.1 | 1.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.7 | 0.0 | 0.9 | 2.2 | 0.0 | 3.4 | 0.1 | 6.4 | 0.0 | 0.2 | 4.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 24.5 | 0.0 | 20.1 | 22.8 | 0.0 | 23.3 | 7.8 | 13.0 | 0.0 | 8.0 | 10.3 | 0.0 |
| LnGrp LOS | C | A | C | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | 82 | | | 275 | | | 494 | | | 396 | |
| Approach Delay, s/veh | | 21.9 | | | 23.1 | | | 12.9 | | | 10.1 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 7.9 | 33.0 | | 16.0 | 6.8 | 34.1 | | 16.0 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 27.0 | | 10.0 | 5.0 | 27.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 12.4 | | 8.3 | 2.2 | 9.0 | | 7.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.6 | | 0.0 | 0.0 | 1.2 | | 0.2 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 14.8 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.3 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 31 | 28 | 122 | 18 | 8 | 60 |
| Future Vol, veh/h | 31 | 28 | 122 | 18 | 8 | 60 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 32 | 29 | 127 | 19 | 8 | 63 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 146 | 0 | - | 0 | 230 | 137 |
| Stage 1 | - | - | - | - | 137 | - |
| Stage 2 | - | - | - | - | 93 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1436 | - | - | - | 758 | 911 |
| Stage 1 | - | - | - | - | 890 | - |
| Stage 2 | - | - | - | - | 931 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1436 | - | - | - | 741 | 911 |
| Mov Cap-2 Maneuver | - | - | - | - | 741 | - |
| Stage 1 | - | - | - | - | 870 | - |
| Stage 2 | - | - | - | - | 931 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4 | 0 | 9.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1436 | - | - | - | 887 |
| HCM Lane V/C Ratio | 0.022 | - | - | - | 0.08 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 9.4 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

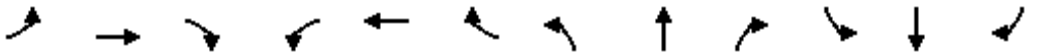
| Intersection | |
|---|---|
| Int Delay, s/veh | 6.4 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 313 | 274 | 588 | 108 | 22 | 210 |
| Future Vol, veh/h | 313 | 274 | 588 | 108 | 22 | 210 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 340 | 298 | 639 | 117 | 24 | 228 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 756 | 0 | - | 0 | 1617 | 639 |
| Stage 1 | - | - | - | - | 639 | - |
| Stage 2 | - | - | - | - | 978 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 855 | - | - | - | 114 | 476 |
| Stage 1 | - | - | - | - | 526 | - |
| Stage 2 | - | - | - | - | 364 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 855 | - | - | - | 69 | 476 |
| Mov Cap-2 Maneuver | - | - | - | - | 69 | - |
| Stage 1 | - | - | - | - | 317 | - |
| Stage 2 | - | - | - | - | 364 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 6.4 | 0 | 25.3 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 855 | - | - | - | 69 | 476 |
| HCM Lane V/C Ratio | 0.398 | - | - | - | 0.347 | 0.48 |
| HCM Control Delay (s) | 12 | - | - | - | 82.6 | 19.3 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 1.9 | - | - | - | 1.3 | 2.6 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 566 | 442 | 48 | 377 | 514 | 190 | 54 | 752 | 385 | 224 | 872 | 739 |
| Future Volume (vph) | 566 | 442 | 48 | 377 | 514 | 190 | 54 | 752 | 385 | 224 | 872 | 739 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 0.96 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3487 | | 1770 | 3396 | | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.20 | 1.00 | 1.00 | 0.11 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3487 | | 1770 | 3396 | | 367 | 3539 | 1583 | 199 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 596 | 465 | 51 | 397 | 541 | 200 | 57 | 792 | 405 | 236 | 918 | 778 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 22 | 0 | 0 | 0 | 294 | 0 | 0 | 381 |
| Lane Group Flow (vph) | 596 | 511 | 0 | 397 | 719 | 0 | 57 | 792 | 111 | 236 | 918 | 397 |
| Turn Type | Split | NA | | Split | NA | | pm+pt | NA | Perm | pm+pt | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | 4 |
| Actuated Green, G (s) | 35.5 | 35.5 | | 35.3 | 35.3 | | 46.0 | 42.1 | 42.1 | 65.4 | 56.5 | 56.5 |
| Effective Green, g (s) | 35.5 | 35.5 | | 35.3 | 35.3 | | 46.0 | 42.1 | 42.1 | 65.4 | 56.5 | 56.5 |
| Actuated g/C Ratio | 0.23 | 0.23 | | 0.23 | 0.23 | | 0.30 | 0.27 | 0.27 | 0.42 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 790 | 802 | | 405 | 777 | | 144 | 966 | 432 | 270 | 1296 | 580 |
| v/s Ratio Prot | c0.17 | 0.15 | | c0.22 | 0.21 | | 0.01 | 0.22 | | c0.10 | 0.26 | |
| v/s Ratio Perm | | | | | | | 0.11 | | 0.07 | c0.27 | | 0.25 |
| v/c Ratio | 0.75 | 0.64 | | 0.98 | 0.92 | | 0.40 | 0.82 | 0.26 | 0.87 | 0.71 | 0.68 |
| Uniform Delay, d1 | 55.3 | 53.5 | | 59.1 | 58.2 | | 40.1 | 52.5 | 43.8 | 39.7 | 41.8 | 41.3 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 4.4 | 1.9 | | 39.4 | 16.9 | | 0.7 | 5.8 | 0.4 | 24.7 | 1.9 | 3.6 |
| Delay (s) | 59.7 | 55.4 | | 98.5 | 75.0 | | 40.7 | 58.3 | 44.2 | 64.4 | 43.7 | 44.9 |
| Level of Service | E | E | | F | E | | D | E | D | E | D | D |
| Approach Delay (s) | | 57.7 | | | 83.2 | | | 53.0 | | | 46.7 | |
| Approach LOS | | E | | | F | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 58.1 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.89 | | |
| Actuated Cycle Length (s) | 154.2 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 88.8% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 678 | 239 | 266 | 761 | 4 | 175 | 9 | 213 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 678 | 239 | 266 | 761 | 4 | 175 | 9 | 213 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 699 | 246 | 274 | 785 | 4 | 180 | 10 | 220 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 327 | 731 | 257 | 248 | 1189 | 1008 | 294 | 11 | 244 | 118 | 149 | 126 |
| Arrive On Green | 0.01 | 0.55 | 0.55 | 0.09 | 0.64 | 0.64 | 0.11 | 0.16 | 0.16 | 0.03 | 0.08 | 0.08 |
| Sat Flow, veh/h | 1781 | 1322 | 465 | 1781 | 1870 | 1585 | 1781 | 69 | 1526 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 945 | 274 | 785 | 4 | 180 | 0 | 230 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1787 | 1781 | 1870 | 1585 | 1781 | 0 | 1596 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 0.0 | 72.5 | 13.6 | 38.1 | 0.1 | 13.0 | 0.0 | 20.5 | 2.6 | 5.4 | 3.0 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 72.5 | 13.6 | 38.1 | 0.1 | 13.0 | 0.0 | 20.5 | 2.6 | 5.4 | 3.0 |
| Prop In Lane | 1.00 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 0.96 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 327 | 0 | 988 | 248 | 1189 | 1008 | 294 | 0 | 255 | 118 | 149 | 126 |
| V/C Ratio(X) | 0.03 | 0.00 | 0.96 | 1.11 | 0.66 | 0.00 | 0.61 | 0.00 | 0.90 | 0.30 | 0.49 | 0.28 |
| Avail Cap(c_a), veh/h | 474 | 0 | 1027 | 248 | 1189 | 1008 | 471 | 0 | 380 | 377 | 380 | 322 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 16.2 | 0.0 | 30.6 | 46.9 | 16.5 | 9.6 | 51.7 | 0.0 | 59.6 | 59.2 | 63.7 | 62.6 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 18.6 | 88.2 | 1.8 | 0.0 | 1.5 | 0.0 | 17.6 | 1.0 | 2.5 | 1.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 43.5 | 22.2 | 22.1 | 0.1 | 9.7 | 0.0 | 14.3 | 2.2 | 4.8 | 2.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.2 | 0.0 | 49.3 | 135.1 | 18.4 | 9.6 | 53.3 | 0.0 | 77.2 | 60.3 | 66.2 | 63.8 |
| LnGrp LOS | B | A | D | F | B | A | D | A | E | E | E | E |
| Approach Vol, veh/h | | 955 | | | 1063 | | | 410 | | | 143 | |
| Approach Delay, s/veh | | 48.9 | | | 48.4 | | | 66.7 | | | 64.1 | |
| Approach LOS | | D | | | D | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 30.0 | 86.9 | 20.6 | 17.1 | 8.1 | 98.8 | 9.0 | 28.7 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 74.5 | 15.0 | 7.4 | 2.4 | 40.1 | 4.6 | 22.5 |
| Green Ext Time (p_c), s | 0.0 | 5.5 | 0.4 | 0.3 | 0.0 | 10.1 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 52.4 |
| HCM 6th LOS | D |

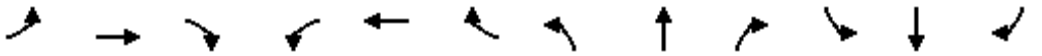
| Intersection | |
|---|---|
| Int Delay, s/veh | 0.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 43 | 893 | 895 | 15 | 5 | 36 |
| Future Vol, veh/h | 43 | 893 | 895 | 15 | 5 | 36 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 205 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 98 | 98 | 98 | 98 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 44 | 911 | 913 | 15 | 5 | 37 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 928 | 0 | - | 0 | 1920 | 921 |
| Stage 1 | - | - | - | - | 921 | - |
| Stage 2 | - | - | - | - | 999 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 737 | - | - | - | 74 | 328 |
| Stage 1 | - | - | - | - | 388 | - |
| Stage 2 | - | - | - | - | 356 | - |
| Platoon blocked, % | | | - | - | | |
| Mov Cap-1 Maneuver | 737 | - | - | - | 70 | 328 |
| Mov Cap-2 Maneuver | - | - | - | - | 70 | - |
| Stage 1 | - | - | - | - | 365 | - |
| Stage 2 | - | - | - | - | 356 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.5 | 0 | 24.5 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 737 | - | - | - | 226 |
| HCM Lane V/C Ratio | 0.06 | - | - | - | 0.185 |
| HCM Control Delay (s) | 10.2 | - | - | - | 24.5 |
| HCM Lane LOS | B | - | - | - | C |
| HCM 95th %tile Q(veh) | 0.2 | - | - | - | 0.7 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 28 | 861 | 7 | 23 | 758 | 85 | 53 | 5 | 30 | 11 | 9 | 31 |
| Future Volume (veh/h) | 28 | 861 | 7 | 23 | 758 | 85 | 53 | 5 | 30 | 11 | 9 | 31 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 29 | 879 | 7 | 23 | 773 | 87 | 54 | 5 | 31 | 11 | 9 | 32 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 287 | 1055 | 8 | 275 | 932 | 105 | 222 | 23 | 142 | 226 | 37 | 131 |
| Arrive On Green | 0.03 | 0.57 | 0.57 | 0.03 | 0.56 | 0.56 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Sat Flow, veh/h | 1781 | 1853 | 15 | 1781 | 1651 | 186 | 1366 | 225 | 1394 | 1372 | 360 | 1280 |
| Grp Volume(v), veh/h | 29 | 0 | 886 | 23 | 0 | 860 | 54 | 0 | 36 | 11 | 0 | 41 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1837 | 1366 | 0 | 1619 | 1372 | 0 | 1640 |
| Q Serve(g_s), s | 0.4 | 0.0 | 24.4 | 0.3 | 0.0 | 24.1 | 2.4 | 0.0 | 1.3 | 0.5 | 0.0 | 1.4 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 24.4 | 0.3 | 0.0 | 24.1 | 3.8 | 0.0 | 1.3 | 1.8 | 0.0 | 1.4 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.10 | 1.00 | | 0.86 | 1.00 | | 0.78 |
| Lane Grp Cap(c), veh/h | 287 | 0 | 1064 | 275 | 0 | 1037 | 222 | 0 | 165 | 226 | 0 | 167 |
| V/C Ratio(X) | 0.10 | 0.00 | 0.83 | 0.08 | 0.00 | 0.83 | 0.24 | 0.00 | 0.22 | 0.05 | 0.00 | 0.25 |
| Avail Cap(c_a), veh/h | 613 | 0 | 1455 | 610 | 0 | 1431 | 702 | 0 | 734 | 708 | 0 | 743 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 10.1 | 0.0 | 11.1 | 10.1 | 0.0 | 11.2 | 27.8 | 0.0 | 25.9 | 26.7 | 0.0 | 26.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 4.6 | 0.0 | 0.0 | 4.6 | 0.6 | 0.0 | 0.7 | 0.1 | 0.0 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.2 | 0.0 | 11.7 | 0.1 | 0.0 | 11.6 | 1.4 | 0.0 | 0.9 | 0.3 | 0.0 | 1.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 10.1 | 0.0 | 15.7 | 10.2 | 0.0 | 15.8 | 28.3 | 0.0 | 26.6 | 26.8 | 0.0 | 26.8 |
| LnGrp LOS | B | A | B | B | A | B | C | A | C | C | A | C |
| Approach Vol, veh/h | | 915 | | | 883 | | | 90 | | | 52 | |
| Approach Delay, s/veh | | 15.5 | | | 15.6 | | | 27.6 | | | 26.8 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.2 | 41.8 | | 12.9 | 8.5 | 41.5 | | 12.9 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.3 | 26.4 | | 3.8 | 2.4 | 26.1 | | 5.8 | | | | |
| Green Ext Time (p_c), s | 0.0 | 9.4 | | 0.1 | 0.0 | 9.1 | | 0.3 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 16.4 | |
| HCM 6th LOS | | B | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 13 | 39 | 6 | 60 | 27 | 26 | 9 | 276 | 69 | 35 | 429 | 54 |
| Future Volume (veh/h) | 13 | 39 | 6 | 60 | 27 | 26 | 9 | 276 | 69 | 35 | 429 | 54 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 14 | 41 | 6 | 62 | 28 | 27 | 9 | 288 | 0 | 36 | 447 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 346 | 287 | 42 | 355 | 157 | 152 | 432 | 804 | | 566 | 855 | |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.01 | 0.43 | 0.00 | 0.04 | 0.46 | 0.00 |
| Sat Flow, veh/h | 1349 | 1595 | 233 | 1359 | 875 | 844 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 14 | 0 | 47 | 62 | 0 | 55 | 9 | 288 | 0 | 36 | 447 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1349 | 0 | 1828 | 1359 | 0 | 1719 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.5 | 0.0 | 1.1 | 2.1 | 0.0 | 1.4 | 0.1 | 5.3 | 0.0 | 0.6 | 8.7 | 0.0 |
| Cycle Q Clear(g_c), s | 1.8 | 0.0 | 1.1 | 3.2 | 0.0 | 1.4 | 0.1 | 5.3 | 0.0 | 0.6 | 8.7 | 0.0 |
| Prop In Lane | 1.00 | | 0.13 | 1.00 | | 0.49 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 346 | 0 | 329 | 355 | 0 | 309 | 432 | 804 | | 566 | 855 | |
| V/C Ratio(X) | 0.04 | 0.00 | 0.14 | 0.17 | 0.00 | 0.18 | 0.02 | 0.36 | | 0.06 | 0.52 | |
| Avail Cap(c_a), veh/h | 367 | 0 | 357 | 377 | 0 | 336 | 585 | 804 | | 670 | 855 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 18.6 | 0.0 | 17.7 | 19.0 | 0.0 | 17.8 | 8.6 | 9.8 | 0.0 | 7.7 | 9.9 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 0.2 | 0.2 | 0.0 | 0.3 | 0.0 | 1.2 | 0.0 | 0.0 | 2.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.2 | 0.0 | 0.7 | 1.0 | 0.0 | 0.9 | 0.1 | 3.2 | 0.0 | 0.3 | 5.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 18.6 | 0.0 | 17.9 | 19.2 | 0.0 | 18.1 | 8.6 | 11.1 | 0.0 | 7.7 | 12.2 | 0.0 |
| LnGrp LOS | B | A | B | B | A | B | A | B | | A | B | |
| Approach Vol, veh/h | | 61 | | | 117 | | | 297 | | | 483 | |
| Approach Delay, s/veh | | 18.0 | | | 18.7 | | | 11.0 | | | 11.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.0 | 28.0 | | 15.2 | 6.6 | 29.4 | | 15.2 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 22.0 | | 10.0 | 5.0 | 22.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.8 | 7.3 | | 3.8 | 2.1 | 10.7 | | 5.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.8 | | 0.1 | 0.0 | 1.3 | | 0.1 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 12.8 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 48 | 79 | 53 | 6 | 17 | 45 |
| Future Vol, veh/h | 48 | 79 | 53 | 6 | 17 | 45 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 50 | 82 | 55 | 6 | 18 | 47 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 61 | 0 | - | 0 | 240 | 58 |
| Stage 1 | - | - | - | - | 58 | - |
| Stage 2 | - | - | - | - | 182 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1542 | - | - | - | 748 | 1008 |
| Stage 1 | - | - | - | - | 965 | - |
| Stage 2 | - | - | - | - | 849 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1542 | - | - | - | 723 | 1008 |
| Mov Cap-2 Maneuver | - | - | - | - | 723 | - |
| Stage 1 | - | - | - | - | 932 | - |
| Stage 2 | - | - | - | - | 849 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 2.8 | 0 | 9.3 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1542 | - | - | - | 910 |
| HCM Lane V/C Ratio | 0.032 | - | - | - | 0.071 |
| HCM Control Delay (s) | 7.4 | 0 | - | - | 9.3 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.2 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 8.2 |

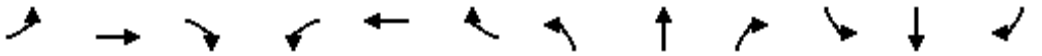
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 321 | 537 | 349 | 45 | 38 | 392 |
| Future Vol, veh/h | 321 | 537 | 349 | 45 | 38 | 392 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 341 | 571 | 371 | 48 | 40 | 417 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 419 | 0 | - | 0 | 1624 | 371 |
| Stage 1 | - | - | - | - | 371 | - |
| Stage 2 | - | - | - | - | 1253 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1140 | - | - | - | 113 | 675 |
| Stage 1 | - | - | - | - | 698 | - |
| Stage 2 | - | - | - | - | 269 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1140 | - | - | - | 79 | 675 |
| Mov Cap-2 Maneuver | - | - | - | - | 79 | - |
| Stage 1 | - | - | - | - | 489 | - |
| Stage 2 | - | - | - | - | 269 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 3.6 | 0 | 25 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1140 | - | - | - | 79 | 675 |
| HCM Lane V/C Ratio | 0.3 | - | - | - | 0.512 | 0.618 |
| HCM Control Delay (s) | 9.5 | - | - | - | 90.9 | 18.6 |
| HCM Lane LOS | A | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 1.3 | - | - | - | 2.2 | 4.3 |

# 2031 BACKGROUND CONDITIONS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 939 | 670 | 47 | 395 | 459 | 390 | 35 | 955 | 355 | 292 | 955 | 916 |
| Future Volume (vph) | 939 | 670 | 47 | 395 | 459 | 390 | 35 | 955 | 355 | 292 | 955 | 916 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3505 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.11 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3505 | | 3433 | 3539 | 1583 | 198 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 1067 | 761 | 53 | 449 | 522 | 443 | 40 | 1085 | 403 | 332 | 1085 | 1041 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 130 | 0 | 0 | 289 | 0 | 0 | 380 |
| Lane Group Flow (vph) | 1067 | 811 | 0 | 449 | 522 | 313 | 40 | 1085 | 114 | 332 | 1085 | 661 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 42.0 | 42.0 | | 34.6 | 34.6 | 34.6 | 50.5 | 46.5 | 46.5 | 18.4 | 60.9 | 60.9 |
| Effective Green, g (s) | 42.0 | 42.0 | | 34.6 | 34.6 | 34.6 | 50.5 | 46.5 | 46.5 | 18.4 | 60.9 | 60.9 |
| Actuated g/C Ratio | 0.26 | 0.26 | | 0.21 | 0.21 | 0.21 | 0.31 | 0.28 | 0.28 | 0.11 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 876 | 894 | | 722 | 744 | 332 | 99 | 1000 | 447 | 383 | 1310 | 586 |
| v/s Ratio Prot | c0.31 | 0.23 | | 0.13 | 0.15 | | 0.01 | 0.31 | | c0.10 | 0.31 | |
| v/s Ratio Perm | | | | | | c0.20 | 0.11 | | 0.07 | | | c0.42 |
| v/c Ratio | 1.22 | 0.91 | | 0.62 | 0.70 | 0.94 | 0.40 | 1.08 | 0.25 | 0.87 | 0.83 | 1.13 |
| Uniform Delay, d1 | 61.2 | 59.4 | | 59.0 | 60.2 | 64.0 | 43.0 | 59.0 | 45.6 | 71.8 | 47.0 | 51.8 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 108.5 | 12.9 | | 1.9 | 3.2 | 35.1 | 1.0 | 54.4 | 0.4 | 17.7 | 4.7 | 77.4 |
| Delay (s) | 169.7 | 72.3 | | 60.9 | 63.4 | 99.1 | 43.9 | 113.4 | 46.0 | 89.5 | 51.7 | 129.2 |
| Level of Service | F | E | | E | E | F | D | F | D | F | D | F |
| Approach Delay (s) | | 127.6 | | | 73.8 | | | 93.8 | | | 89.6 | |
| Approach LOS | | F | | | E | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 97.2 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.12 | | |
| Actuated Cycle Length (s) | 164.5 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 93.4% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 726 | 205 | 246 | 930 | 34 | 419 | 67 | 247 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 726 | 205 | 246 | 930 | 34 | 419 | 67 | 247 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 816 | 230 | 276 | 1045 | 37 | 471 | 73 | 278 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 136 | 740 | 209 | 199 | 1069 | 906 | 444 | 79 | 301 | 71 | 83 | 70 |
| Arrive On Green | 0.04 | 0.53 | 0.53 | 0.09 | 0.57 | 0.57 | 0.19 | 0.23 | 0.23 | 0.00 | 0.04 | 0.04 |
| Sat Flow, veh/h | 1781 | 1404 | 396 | 1781 | 1870 | 1585 | 1781 | 340 | 1297 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 1046 | 276 | 1045 | 37 | 471 | 0 | 351 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1799 | 1781 | 1870 | 1585 | 1781 | 0 | 1637 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 4.6 | 0.0 | 83.1 | 13.6 | 85.5 | 1.6 | 29.8 | 0.0 | 33.0 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 4.6 | 0.0 | 83.1 | 13.6 | 85.5 | 1.6 | 29.8 | 0.0 | 33.0 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 0.22 | 1.00 | | 1.00 | 1.00 | | 0.79 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 136 | 0 | 949 | 199 | 1069 | 906 | 444 | 0 | 380 | 71 | 83 | 70 |
| V/C Ratio(X) | 0.84 | 0.00 | 1.10 | 1.38 | 0.98 | 0.04 | 1.06 | 0.00 | 0.92 | 0.01 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 214 | 0 | 949 | 199 | 1069 | 906 | 444 | 0 | 380 | 349 | 349 | 296 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 37.2 | 0.0 | 37.3 | 56.9 | 32.8 | 14.8 | 60.2 | 0.0 | 59.1 | 71.8 | 72.0 | 72.0 |
| Incr Delay (d2), s/veh | 8.6 | 0.0 | 61.5 | 200.9 | 22.4 | 0.0 | 59.9 | 0.0 | 27.9 | 0.0 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.6 | 0.0 | 67.5 | 28.9 | 53.3 | 1.0 | 16.1 | 0.0 | 22.9 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 45.8 | 0.0 | 98.7 | 257.8 | 55.2 | 14.9 | 120.1 | 0.0 | 87.0 | 71.9 | 72.1 | 72.2 |
| LnGrp LOS | D | A | F | F | E | B | F | A | F | E | E | E |
| Approach Vol, veh/h | | 1160 | | | 1358 | | | 822 | | | 5 | |
| Approach Delay, s/veh | | 93.5 | | | 95.3 | | | 106.0 | | | 72.1 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 20.0 | 90.0 | 35.0 | 12.6 | 13.1 | 96.9 | 5.4 | 42.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 31.8 | 2.2 | 6.6 | 87.5 | 2.1 | 35.0 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 97.3 |
| HCM 6th LOS | F |

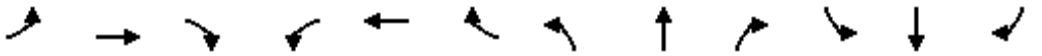
| Intersection | |
|---|---|
| Int Delay, s/veh | 5.2 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 17 | 936 | 1116 | 10 | 21 | 59 |
| Future Vol, veh/h | 17 | 936 | 1116 | 10 | 21 | 59 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 205 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 19 | 1040 | 1240 | 11 | 23 | 66 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1251 | 0 | - | 0 | 2324 | 1246 |
| Stage 1 | - | - | - | - | 1246 | - |
| Stage 2 | - | - | - | - | 1078 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 556 | - | - | - | 41 | 212 |
| Stage 1 | - | - | - | - | 271 | - |
| Stage 2 | - | - | - | - | 327 | - |
| Platoon blocked, % | | | - | - | | |
| Mov Cap-1 Maneuver | 556 | - | - | - | 40 | 212 |
| Mov Cap-2 Maneuver | - | - | - | - | 40 | - |
| Stage 1 | - | - | - | - | 262 | - |
| Stage 2 | - | - | - | - | 327 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.2 | 0 | 138.6 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 556 | - | - | - | 100 |
| HCM Lane V/C Ratio | 0.034 | - | - | - | 0.889 |
| HCM Control Delay (s) | 11.7 | - | - | - | 138.6 |
| HCM Lane LOS | B | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 5.1 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 273 | 704 | 37 | 24 | 821 | 43 | 114 | 61 | 37 | 62 | 31 | 228 |
| Future Volume (veh/h) | 273 | 704 | 37 | 24 | 821 | 43 | 114 | 61 | 37 | 62 | 31 | 228 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 307 | 791 | 42 | 27 | 922 | 48 | 128 | 69 | 42 | 70 | 35 | 256 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 284 | 955 | 51 | 223 | 785 | 41 | 170 | 282 | 172 | 333 | 50 | 368 |
| Arrive On Green | 0.12 | 0.54 | 0.54 | 0.03 | 0.45 | 0.45 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 |
| Sat Flow, veh/h | 1781 | 1760 | 93 | 1781 | 1762 | 92 | 1088 | 1089 | 663 | 1282 | 194 | 1420 |
| Grp Volume(v), veh/h | 307 | 0 | 833 | 27 | 0 | 970 | 128 | 0 | 111 | 70 | 0 | 291 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1854 | 1781 | 0 | 1854 | 1088 | 0 | 1751 | 1282 | 0 | 1615 |
| Q Serve(g_s), s | 13.5 | 0.0 | 41.1 | 0.9 | 0.0 | 49.0 | 10.6 | 0.0 | 5.5 | 5.0 | 0.0 | 17.9 |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 41.1 | 0.9 | 0.0 | 49.0 | 28.5 | 0.0 | 5.5 | 10.5 | 0.0 | 17.9 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.38 | 1.00 | | 0.88 |
| Lane Grp Cap(c), veh/h | 284 | 0 | 1006 | 223 | 0 | 826 | 170 | 0 | 454 | 333 | 0 | 418 |
| V/C Ratio(X) | 1.08 | 0.00 | 0.83 | 0.12 | 0.00 | 1.17 | 0.75 | 0.00 | 0.24 | 0.21 | 0.00 | 0.70 |
| Avail Cap(c_a), veh/h | 284 | 0 | 1006 | 396 | 0 | 826 | 170 | 0 | 454 | 333 | 0 | 418 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.2 | 0.0 | 20.9 | 20.0 | 0.0 | 30.5 | 50.7 | 0.0 | 32.2 | 36.4 | 0.0 | 36.8 |
| Incr Delay (d2), s/veh | 76.6 | 0.0 | 6.5 | 0.1 | 0.0 | 91.2 | 17.0 | 0.0 | 0.3 | 0.3 | 0.0 | 5.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 14.4 | 0.0 | 23.6 | 0.6 | 0.0 | 56.7 | 7.8 | 0.0 | 4.3 | 2.9 | 0.0 | 12.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 112.8 | 0.0 | 27.4 | 20.1 | 0.0 | 121.7 | 67.7 | 0.0 | 32.5 | 36.7 | 0.0 | 41.8 |
| LnGrp LOS | F | A | C | C | A | F | E | A | C | D | A | D |
| Approach Vol, veh/h | | 1140 | | | 997 | | | 239 | | | 361 | |
| Approach Delay, s/veh | | 50.4 | | | 119.0 | | | 51.4 | | | 40.8 | |
| Approach LOS | | D | | | F | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.3 | 65.7 | | 35.0 | 20.0 | 55.0 | | 35.0 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 43.1 | | 19.9 | 15.5 | 51.0 | | 30.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.4 | | 1.1 | 0.0 | 0.0 | | 0.0 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 74.2 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 35 | 43 | 7 | 113 | 117 | 57 | 11 | 506 | 83 | 32 | 383 | 30 |
| Future Volume (veh/h) | 35 | 43 | 7 | 113 | 117 | 57 | 11 | 506 | 83 | 32 | 383 | 30 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 42 | 51 | 8 | 135 | 139 | 68 | 13 | 602 | 0 | 38 | 456 | 0 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 202 | 276 | 43 | 323 | 207 | 101 | 465 | 882 | | 377 | 925 | |
| Arrive On Green | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.02 | 0.47 | 0.00 | 0.04 | 0.49 | 0.00 |
| Sat Flow, veh/h | 1175 | 1578 | 248 | 1344 | 1186 | 580 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 42 | 0 | 59 | 135 | 0 | 207 | 13 | 602 | 0 | 38 | 456 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1175 | 0 | 1826 | 1344 | 0 | 1766 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 2.0 | 0.0 | 1.6 | 5.5 | 0.0 | 6.3 | 0.2 | 14.4 | 0.0 | 0.6 | 9.3 | 0.0 |
| Cycle Q Clear(g_c), s | 8.3 | 0.0 | 1.6 | 7.0 | 0.0 | 6.3 | 0.2 | 14.4 | 0.0 | 0.6 | 9.3 | 0.0 |
| Prop In Lane | 1.00 | | 0.14 | 1.00 | | 0.33 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 202 | 0 | 319 | 323 | 0 | 308 | 465 | 882 | | 377 | 925 | |
| V/C Ratio(X) | 0.21 | 0.00 | 0.19 | 0.42 | 0.00 | 0.67 | 0.03 | 0.68 | | 0.10 | 0.49 | |
| Avail Cap(c_a), veh/h | 202 | 0 | 319 | 323 | 0 | 308 | 592 | 882 | | 462 | 925 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 26.0 | 0.0 | 20.2 | 23.2 | 0.0 | 22.1 | 8.1 | 11.8 | 0.0 | 8.9 | 9.7 | 0.0 |
| Incr Delay (d2), s/veh | 0.5 | 0.0 | 0.3 | 0.9 | 0.0 | 5.6 | 0.0 | 4.3 | 0.0 | 0.1 | 1.9 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.9 | 0.0 | 1.1 | 2.8 | 0.0 | 4.9 | 0.1 | 8.9 | 0.0 | 0.3 | 5.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 26.5 | 0.0 | 20.4 | 24.0 | 0.0 | 27.7 | 8.2 | 16.1 | 0.0 | 9.0 | 11.5 | 0.0 |
| LnGrp LOS | C | A | C | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | 101 | | | 342 | | | 615 | | | 494 | |
| Approach Delay, s/veh | | 22.9 | | | 26.2 | | | 15.9 | | | 11.3 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.3 | 33.0 | | 16.0 | 6.9 | 34.3 | | 16.0 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.3 | 27.0 | | 10.0 | 5.0 | 27.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.6 | 16.4 | | 10.3 | 2.2 | 11.3 | | 9.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.9 | | 0.0 | 0.0 | 1.5 | | 0.1 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 17.2 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.3 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 38 | 35 | 151 | 23 | 10 | 74 |
| Future Vol, veh/h | 38 | 35 | 151 | 23 | 10 | 74 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 40 | 36 | 157 | 24 | 10 | 77 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 181 | 0 | - | 0 | 285 | 169 |
| Stage 1 | - | - | - | - | 169 | - |
| Stage 2 | - | - | - | - | 116 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1394 | - | - | - | 705 | 875 |
| Stage 1 | - | - | - | - | 861 | - |
| Stage 2 | - | - | - | - | 909 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1394 | - | - | - | 685 | 875 |
| Mov Cap-2 Maneuver | - | - | - | - | 685 | - |
| Stage 1 | - | - | - | - | 836 | - |
| Stage 2 | - | - | - | - | 909 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4 | 0 | 9.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1394 | - | - | - | 847 |
| HCM Lane V/C Ratio | 0.028 | - | - | - | 0.103 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 14.3 |

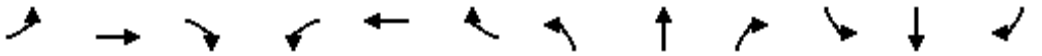
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 390 | 340 | 729 | 135 | 27 | 262 |
| Future Vol, veh/h | 390 | 340 | 729 | 135 | 27 | 262 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 424 | 370 | 792 | 147 | 29 | 285 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 939 | 0 | - | 0 | 2010 | 792 |
| Stage 1 | - | - | - | - | 792 | - |
| Stage 2 | - | - | - | - | 1218 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 730 | - | - | - | 65 | 389 |
| Stage 1 | - | - | - | - | 446 | - |
| Stage 2 | - | - | - | - | 280 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 730 | - | - | - | ~ 27 | 389 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 27 | - |
| Stage 1 | - | - | - | - | 187 | - |
| Stage 2 | - | - | - | - | 280 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 8.8 | 0 | 71 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 730 | - | - | - | 27 | 389 |
| HCM Lane V/C Ratio | 0.581 | - | - | - | 1.087 | 0.732 |
| HCM Control Delay (s) | 16.5 | - | - | - | $ 414 | 35.7 |
| HCM Lane LOS | C | - | - | - | F | E |
| HCM 95th %tile Q(veh) | 3.8 | - | - | - | 3.5 | 5.7 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 702 | 556 | 60 | 473 | 645 | 238 | 67 | 932 | 483 | 281 | 1081 | 916 |
| Future Volume (vph) | 702 | 556 | 60 | 473 | 645 | 238 | 67 | 932 | 483 | 281 | 1081 | 916 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3488 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.08 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3488 | | 3433 | 3539 | 1583 | 156 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 739 | 585 | 63 | 498 | 679 | 251 | 71 | 981 | 508 | 296 | 1138 | 964 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 135 | 0 | 0 | 315 | 0 | 0 | 365 |
| Lane Group Flow (vph) | 739 | 643 | 0 | 498 | 679 | 116 | 71 | 981 | 193 | 296 | 1138 | 599 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 40.8 | 40.8 | | 34.8 | 34.8 | 34.8 | 52.7 | 47.7 | 47.7 | 17.4 | 60.1 | 60.1 |
| Effective Green, g (s) | 40.8 | 40.8 | | 34.8 | 34.8 | 34.8 | 52.7 | 47.7 | 47.7 | 17.4 | 60.1 | 60.1 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.32 | 0.29 | 0.29 | 0.11 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 855 | 869 | | 729 | 752 | 336 | 99 | 1031 | 461 | 364 | 1299 | 581 |
| v/s Ratio Prot | c0.22 | 0.18 | | 0.15 | c0.19 | | 0.02 | 0.28 | | c0.09 | 0.32 | |
| v/s Ratio Perm | | | | | | 0.07 | 0.21 | | 0.12 | | | c0.38 |
| v/c Ratio | 0.86 | 0.74 | | 0.68 | 0.90 | 0.34 | 0.72 | 0.95 | 0.42 | 0.81 | 0.88 | 1.03 |
| Uniform Delay, d1 | 58.8 | 56.6 | | 59.4 | 62.8 | 54.8 | 43.1 | 56.9 | 46.8 | 71.6 | 48.3 | 51.8 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 9.4 | 3.6 | | 2.9 | 14.4 | 0.8 | 18.5 | 17.6 | 0.8 | 12.3 | 7.1 | 45.4 |
| Delay (s) | 68.2 | 60.1 | | 62.3 | 77.2 | 55.6 | 61.6 | 74.5 | 47.7 | 83.9 | 55.4 | 97.2 |
| Level of Service | E | E | | E | E | E | E | E | D | F | E | F |
| Approach Delay (s) | | 64.4 | | | 68.2 | | | 65.2 | | | 75.8 | |
| Approach LOS | | E | | | E | | | E | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 69.4 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.96 | | |
| Actuated Cycle Length (s) | 163.7 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 92.9% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 858 | 296 | 335 | 960 | 4 | 217 | 9 | 269 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 858 | 296 | 335 | 960 | 4 | 217 | 9 | 269 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 885 | 305 | 345 | 990 | 4 | 224 | 10 | 277 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 169 | 715 | 246 | 203 | 1149 | 974 | 343 | 11 | 297 | 109 | 173 | 146 |
| Arrive On Green | 0.01 | 0.54 | 0.54 | 0.09 | 0.61 | 0.61 | 0.13 | 0.19 | 0.19 | 0.03 | 0.09 | 0.09 |
| Sat Flow, veh/h | 1781 | 1330 | 458 | 1781 | 1870 | 1585 | 1781 | 56 | 1538 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 1190 | 345 | 990 | 4 | 224 | 0 | 287 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1788 | 1781 | 1870 | 1585 | 1781 | 0 | 1594 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 0.0 | 83.1 | 13.6 | 67.1 | 0.2 | 17.1 | 0.0 | 27.4 | 2.7 | 5.7 | 3.2 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 83.1 | 13.6 | 67.1 | 0.2 | 17.1 | 0.0 | 27.4 | 2.7 | 5.7 | 3.2 |
| Prop In Lane | 1.00 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 0.97 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 169 | 0 | 961 | 203 | 1149 | 974 | 343 | 0 | 308 | 109 | 173 | 146 |
| V/C Ratio(X) | 0.06 | 0.00 | 1.24 | 1.70 | 0.86 | 0.00 | 0.65 | 0.00 | 0.93 | 0.32 | 0.42 | 0.24 |
| Avail Cap(c_a), veh/h | 306 | 0 | 961 | 203 | 1149 | 974 | 461 | 0 | 355 | 350 | 356 | 301 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.9 | 0.0 | 35.7 | 56.1 | 24.4 | 11.5 | 52.4 | 0.0 | 61.3 | 61.9 | 66.3 | 65.1 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 116.2 | 333.9 | 7.4 | 0.0 | 1.6 | 0.0 | 28.7 | 1.2 | 1.6 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 91.6 | 41.0 | 38.7 | 0.1 | 12.2 | 0.0 | 19.2 | 2.3 | 5.1 | 2.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.9 | 0.0 | 151.9 | 390.1 | 31.9 | 11.5 | 54.0 | 0.0 | 90.1 | 63.1 | 67.9 | 65.9 |
| LnGrp LOS | C | A | F | F | C | B | D | A | F | E | E | E |
| Approach Vol, veh/h | | 1200 | | | 1339 | | | 511 | | | 143 | |
| Approach Delay, s/veh | | 150.8 | | | 124.1 | | | 74.3 | | | 66.2 | |
| Approach LOS | | F | | | F | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 30.0 | 90.0 | 24.7 | 19.9 | 8.1 | 101.9 | 9.1 | 35.5 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 19.1 | 7.7 | 2.4 | 69.1 | 4.7 | 29.4 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.4 | 0.3 | 0.0 | 8.3 | 0.1 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 123.6 |
| HCM 6th LOS | F |

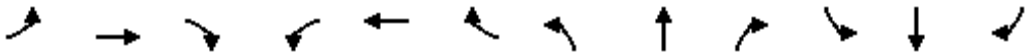
| Intersection | |
|---|---|
| Int Delay, s/veh | 1.4 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 58 | 1118 | 1122 | 19 | 6 | 50 |
| Future Vol, veh/h | 58 | 1118 | 1122 | 19 | 6 | 50 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 205 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 98 | 98 | 98 | 98 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 59 | 1141 | 1145 | 19 | 6 | 51 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1164 | 0 | - | 0 | 2414 | 1155 |
| Stage 1 | - | - | - | - | 1155 | - |
| Stage 2 | - | - | - | - | 1259 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 600 | - | - | - | 36 | 240 |
| Stage 1 | - | - | - | - | 300 | - |
| Stage 2 | - | - | - | - | 267 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 600 | - | - | - | 32 | 240 |
| Mov Cap-2 Maneuver | - | - | - | - | 32 | - |
| Stage 1 | - | - | - | - | 271 | - |
| Stage 2 | - | - | - | - | 267 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.6 | 0 | 46.9 |
| HCM LOS | | | E |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 600 | - | - | - | 141 |
| HCM Lane V/C Ratio | 0.099 | - | - | - | 0.405 |
| HCM Control Delay (s) | 11.7 | - | - | - | 46.9 |
| HCM Lane LOS | B | - | - | - | E |
| HCM 95th %tile Q(veh) | 0.3 | - | - | - | 1.8 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 35 | 1068 | 9 | 29 | 951 | 105 | 67 | 6 | 37 | 14 | 11 | 38 |
| Future Volume (veh/h) | 35 | 1068 | 9 | 29 | 951 | 105 | 67 | 6 | 37 | 14 | 11 | 38 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 36 | 1090 | 9 | 30 | 970 | 107 | 68 | 6 | 38 | 14 | 11 | 39 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 192 | 1148 | 9 | 187 | 1019 | 112 | 197 | 23 | 147 | 201 | 38 | 134 |
| Arrive On Green | 0.03 | 0.62 | 0.62 | 0.03 | 0.62 | 0.62 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Sat Flow, veh/h | 1781 | 1852 | 15 | 1781 | 1655 | 183 | 1355 | 221 | 1398 | 1362 | 361 | 1279 |
| Grp Volume(v), veh/h | 36 | 0 | 1099 | 30 | 0 | 1077 | 68 | 0 | 44 | 14 | 0 | 50 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1838 | 1355 | 0 | 1619 | 1362 | 0 | 1640 |
| Q Serve(g_s), s | 0.6 | 0.0 | 42.2 | 0.5 | 0.0 | 42.3 | 3.8 | 0.0 | 1.9 | 0.7 | 0.0 | 2.2 |
| Cycle Q Clear(g_c), s | 0.6 | 0.0 | 42.2 | 0.5 | 0.0 | 42.3 | 6.0 | 0.0 | 1.9 | 2.7 | 0.0 | 2.2 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.10 | 1.00 | | 0.86 | 1.00 | | 0.78 |
| Lane Grp Cap(c), veh/h | 192 | 0 | 1158 | 187 | 0 | 1132 | 197 | 0 | 170 | 201 | 0 | 172 |
| V/C Ratio(X) | 0.19 | 0.00 | 0.95 | 0.16 | 0.00 | 0.95 | 0.35 | 0.00 | 0.26 | 0.07 | 0.00 | 0.29 |
| Avail Cap(c_a), veh/h | 440 | 0 | 1177 | 441 | 0 | 1158 | 551 | 0 | 594 | 558 | 0 | 601 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 17.2 | 0.0 | 13.6 | 16.9 | 0.0 | 13.9 | 34.9 | 0.0 | 32.0 | 33.2 | 0.0 | 32.1 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 15.9 | 0.1 | 0.0 | 16.5 | 1.0 | 0.0 | 0.8 | 0.1 | 0.0 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.6 | 0.0 | 23.0 | 0.5 | 0.0 | 23.0 | 2.3 | 0.0 | 1.4 | 0.4 | 0.0 | 1.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.4 | 0.0 | 29.5 | 17.1 | 0.0 | 30.3 | 35.9 | 0.0 | 32.8 | 33.4 | 0.0 | 33.0 |
| LnGrp LOS | B | A | C | B | A | C | D | A | C | C | A | C |
| Approach Vol, veh/h | | 1135 | | | 1107 | | | 112 | | | 64 | |
| Approach Delay, s/veh | | 29.1 | | | 30.0 | | | 34.7 | | | 33.1 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.9 | 54.2 | | 14.7 | 9.2 | 53.9 | | 14.7 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 44.2 | | 4.7 | 2.6 | 44.3 | | 8.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.7 | | 0.2 | 0.0 | 3.6 | | 0.4 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 29.9 | |
| HCM 6th LOS | | C | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 16 | 48 | 7 | 74 | 33 | 32 | 11 | 347 | 86 | 43 | 536 | 68 |
| Future Volume (veh/h) | 16 | 48 | 7 | 74 | 33 | 32 | 11 | 347 | 86 | 43 | 536 | 68 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 17 | 50 | 7 | 77 | 34 | 33 | 11 | 361 | 0 | 45 | 558 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 340 | 296 | 41 | 351 | 161 | 156 | 354 | 792 | | 512 | 851 | |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.01 | 0.42 | 0.00 | 0.05 | 0.46 | 0.00 |
| Sat Flow, veh/h | 1334 | 1605 | 225 | 1346 | 872 | 846 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 17 | 0 | 57 | 77 | 0 | 67 | 11 | 361 | 0 | 45 | 558 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1334 | 0 | 1830 | 1346 | 0 | 1718 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.6 | 0.0 | 1.4 | 2.7 | 0.0 | 1.7 | 0.2 | 7.2 | 0.0 | 0.7 | 12.0 | 0.0 |
| Cycle Q Clear(g_c), s | 2.3 | 0.0 | 1.4 | 4.0 | 0.0 | 1.7 | 0.2 | 7.2 | 0.0 | 0.7 | 12.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.12 | 1.00 | | 0.49 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 340 | 0 | 337 | 351 | 0 | 316 | 354 | 792 | | 512 | 851 | |
| V/C Ratio(X) | 0.05 | 0.00 | 0.17 | 0.22 | 0.00 | 0.21 | 0.03 | 0.46 | | 0.09 | 0.66 | |
| Avail Cap(c_a), veh/h | 351 | 0 | 352 | 362 | 0 | 331 | 500 | 792 | | 601 | 851 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 19.0 | 0.0 | 17.8 | 19.5 | 0.0 | 18.0 | 9.3 | 10.7 | 0.0 | 8.0 | 11.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.2 | 0.3 | 0.0 | 0.3 | 0.0 | 1.9 | 0.0 | 0.1 | 3.9 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 0.9 | 1.3 | 0.0 | 1.1 | 0.1 | 4.4 | 0.0 | 0.3 | 7.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.0 | 0.0 | 18.1 | 19.8 | 0.0 | 18.3 | 9.4 | 12.6 | 0.0 | 8.1 | 14.9 | 0.0 |
| LnGrp LOS | B | A | B | B | A | B | A | B | | A | B | |
| Approach Vol, veh/h | | 74 | | | 144 | | | 372 | | | 603 | |
| Approach Delay, s/veh | | 18.3 | | | 19.1 | | | 12.5 | | | 14.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.4 | 28.0 | | 15.6 | 6.7 | 29.7 | | 15.6 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 22.0 | | 10.0 | 5.0 | 22.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 9.2 | | 4.3 | 2.2 | 14.0 | | 6.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.0 | | 0.1 | 0.0 | 1.4 | | 0.1 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 14.6 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 60 | 98 | 66 | 8 | 21 | 56 |
| Future Vol, veh/h | 60 | 98 | 66 | 8 | 21 | 56 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 63 | 102 | 69 | 8 | 22 | 58 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 77 | 0 | - | 0 | 301 | 73 |
| Stage 1 | - | - | - | - | 73 | - |
| Stage 2 | - | - | - | - | 228 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1522 | - | - | - | 691 | 989 |
| Stage 1 | - | - | - | - | 950 | - |
| Stage 2 | - | - | - | - | 810 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1522 | - | - | - | 661 | 989 |
| Mov Cap-2 Maneuver | - | - | - | - | 661 | - |
| Stage 1 | - | - | - | - | 908 | - |
| Stage 2 | - | - | - | - | 810 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 2.8 | 0 | 9.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1522 | - | - | - | 871 |
| HCM Lane V/C Ratio | 0.041 | - | - | - | 0.092 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 9.6 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 20.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 402 | 666 | 433 | 57 | 47 | 490 |
| Future Vol, veh/h | 402 | 666 | 433 | 57 | 47 | 490 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 428 | 709 | 461 | 61 | 50 | 521 |

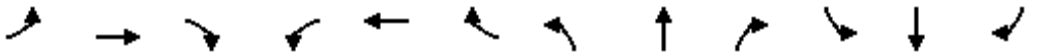
| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 522 | 0 | - | 0 | 2026 | 461 |
| Stage 1 | - | - | - | - | 461 | - |
| Stage 2 | - | - | - | - | 1565 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1044 | - | - | - | 63 | 600 |
| Stage 1 | - | - | - | - | 635 | - |
| Stage 2 | - | - | - | - | 189 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1044 | - | - | - | ~ 37 | 600 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 37 | - |
| Stage 1 | - | - | - | - | 375 | - |
| Stage 2 | - | - | - | - | 189 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4.1 | 0 | 73.1 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1044 | - | - | - | 37 | 600 |
| HCM Lane V/C Ratio | 0.41 | - | - | - | 1.351 | 0.869 |
| HCM Control Delay (s) | 10.8 | - | - | - | $ 437.1 | 38.2 |
| HCM Lane LOS | B | - | - | - | F | E |
| HCM 95th %tile Q(veh) | 2 | - | - | - | 5.2 | 9.9 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

# 2031 FUTURE PROJECTED CONDITIONS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 939 | 685 | 47 | 420 | 484 | 453 | 35 | 955 | 370 | 329 | 955 | 916 |
| Future Volume (vph) | 939 | 685 | 47 | 420 | 484 | 453 | 35 | 955 | 370 | 329 | 955 | 916 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3505 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.11 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3505 | | 3433 | 3539 | 1583 | 204 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 1067 | 778 | 53 | 477 | 550 | 515 | 40 | 1085 | 420 | 374 | 1085 | 1041 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 129 | 0 | 0 | 303 | 0 | 0 | 378 |
| Lane Group Flow (vph) | 1067 | 828 | 0 | 477 | 550 | 386 | 40 | 1085 | 117 | 374 | 1085 | 663 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 42.0 | 42.0 | | 35.0 | 35.0 | 35.0 | 50.0 | 46.0 | 46.0 | 19.5 | 61.5 | 61.5 |
| Effective Green, g (s) | 42.0 | 42.0 | | 35.0 | 35.0 | 35.0 | 50.0 | 46.0 | 46.0 | 19.5 | 61.5 | 61.5 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.30 | 0.28 | 0.28 | 0.12 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 871 | 889 | | 726 | 748 | 334 | 99 | 983 | 439 | 404 | 1315 | 588 |
| v/s Ratio Prot | c0.31 | 0.24 | | 0.14 | 0.16 | | 0.01 | 0.31 | | c0.11 | 0.31 | |
| v/s Ratio Perm | | | | | | c0.24 | 0.11 | | 0.07 | | | c0.42 |
| v/c Ratio | 1.23 | 0.93 | | 0.66 | 0.74 | 1.15 | 0.40 | 1.10 | 0.27 | 0.93 | 0.83 | 1.13 |
| Uniform Delay, d1 | 61.8 | 60.3 | | 59.8 | 60.9 | 65.2 | 43.6 | 59.8 | 46.6 | 72.3 | 47.1 | 52.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 111.5 | 16.2 | | 2.4 | 4.0 | 98.2 | 1.0 | 61.5 | 0.4 | 26.5 | 4.6 | 77.3 |
| Delay (s) | 173.2 | 76.6 | | 62.1 | 64.9 | 163.4 | 44.6 | 121.2 | 47.0 | 98.8 | 51.7 | 129.3 |
| Level of Service | F | E | | E | E | F | D | F | D | F | D | F |
| Approach Delay (s) | | 130.9 | | | 97.0 | | | 99.1 | | | 91.0 | |
| Approach LOS | | F | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 104.0 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.17 | | |
| Actuated Cycle Length (s) | 165.5 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 96.2% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 891 | 230 | 333 | 1172 | 37 | 471 | 73 | 310 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 135 | 756 | 195 | 199 | 1054 | 893 | 444 | 72 | 307 | 48 | 83 | 70 |
| Arrive On Green | 0.05 | 0.53 | 0.53 | 0.09 | 0.56 | 0.56 | 0.19 | 0.23 | 0.23 | 0.00 | 0.04 | 0.04 |
| Sat Flow, veh/h | 1781 | 1434 | 370 | 1781 | 1870 | 1585 | 1781 | 311 | 1321 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 1121 | 333 | 1172 | 37 | 471 | 0 | 383 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1804 | 1781 | 1870 | 1585 | 1781 | 0 | 1633 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.9 | 0.0 | 83.1 | 13.6 | 88.8 | 1.6 | 29.8 | 0.0 | 36.6 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.9 | 0.0 | 83.1 | 13.6 | 88.8 | 1.6 | 29.8 | 0.0 | 36.6 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 0.81 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 135 | 0 | 951 | 199 | 1054 | 893 | 444 | 0 | 379 | 48 | 83 | 70 |
| V/C Ratio(X) | 0.84 | 0.00 | 1.18 | 1.67 | 1.11 | 0.04 | 1.06 | 0.00 | 1.01 | 0.02 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 199 | 0 | 951 | 199 | 1054 | 893 | 444 | 0 | 379 | 326 | 349 | 296 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.0 | 0.0 | 37.3 | 56.8 | 34.4 | 15.4 | 60.2 | 0.0 | 60.5 | 71.9 | 72.0 | 72.0 |
| Incr Delay (d2), s/veh | 12.9 | 0.0 | 91.4 | 322.5 | 63.9 | 0.0 | 59.9 | 0.0 | 48.9 | 0.1 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.9 | 0.0 | 80.9 | 39.9 | 74.9 | 1.1 | 16.1 | 0.0 | 27.4 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 58.9 | 0.0 | 128.6 | 379.3 | 98.3 | 15.4 | 120.1 | 0.0 | 109.4 | 72.0 | 72.1 | 72.2 |
| LnGrp LOS | E | A | F | F | F | B | F | A | F | E | E | E |
| Approach Vol, veh/h | | 1235 | | | 1542 | | | 854 | | | 5 | |
| Approach Delay, s/veh | | 122.2 | | | 157.0 | | | 115.3 | | | 72.1 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 20.0 | 90.0 | 35.0 | 12.6 | 14.3 | 95.7 | 5.4 | 42.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 31.8 | 2.2 | 7.9 | 90.8 | 2.1 | 38.6 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 135.3 |
| HCM 6th LOS | F |

| Intersection | |
|---|---|
| Int Delay, s/veh | 638.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 17 | 936 | 96 | 44 | 1116 | 10 | 163 | 13 | 76 | 21 | 7 | 59 |
| Future Vol, veh/h | 17 | 936 | 96 | 44 | 1116 | 10 | 163 | 13 | 76 | 21 | 7 | 59 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 205 | - | - | 205 | - | - | 0 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 92 | 92 | 90 | 90 | 92 | 92 | 92 | 90 | 92 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 19 | 1040 | 104 | 48 | 1240 | 11 | 177 | 14 | 83 | 23 | 8 | 66 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1251 | 0 | 0 | 1144 | 0 | 0 | 2509 | 2477 | 1092 | 2521 | 2524 | 1246 |
| Stage 1 | - | - | - | - | - | - | 1130 | 1130 | - | 1342 | 1342 | - |
| Stage 2 | - | - | - | - | - | - | 1379 | 1347 | - | 1179 | 1182 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 556 | - | - | 611 | - | - | ~ 19 | 30 | 261 | ~ 19 | 28 | 212 |
| Stage 1 | - | - | - | - | - | - | 248 | 279 | - | 188 | 221 | - |
| Stage 2 | - | - | - | - | - | - | 179 | 220 | - | 232 | 263 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 556 | - | - | 611 | - | - | ~ 9 | 27 | 261 | ~ 7 | 25 | 212 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | ~ 9 | 27 | - | ~ 7 | 25 | - |
| Stage 1 | - | - | - | - | - | - | 240 | 270 | - | 182 | 204 | - |
| Stage 2 | - | - | - | - | - | - | ~ 110 | 203 | - | 145 | 254 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.2 | 0.4 | $ 6001.7 | $ 1691 |
| HCM LOS | | | F | F |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 9 | 115 | 556 | - | - | 611 | - | - | 24 |
| HCM Lane V/C Ratio | 19.686 | 0.841 | 0.034 | - | - | 0.078 | - | - | 4.021 |
| HCM Control Delay (s) | $ 9215.9 | 115.1 | 11.7 | - | - | 11.4 | - | - | $ 1691 |
| HCM Lane LOS | F | F | B | - | - | B | - | - | F |
| HCM 95th %tile Q(veh) | 23.8 | 5 | 0.1 | - | - | 0.3 | - | - | 12.1 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 286 | 767 | 37 | 24 | 858 | 43 | 114 | 61 | 37 | 62 | 31 | 235 |
| Future Volume (veh/h) | 286 | 767 | 37 | 24 | 858 | 43 | 114 | 61 | 37 | 62 | 31 | 235 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 321 | 862 | 42 | 27 | 964 | 48 | 128 | 69 | 42 | 70 | 35 | 264 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 284 | 960 | 47 | 177 | 787 | 39 | 163 | 282 | 172 | 333 | 49 | 369 |
| Arrive On Green | 0.12 | 0.54 | 0.54 | 0.03 | 0.45 | 0.45 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 |
| Sat Flow, veh/h | 1781 | 1769 | 86 | 1781 | 1767 | 88 | 1080 | 1089 | 663 | 1282 | 189 | 1425 |
| Grp Volume(v), veh/h | 321 | 0 | 904 | 27 | 0 | 1012 | 128 | 0 | 111 | 70 | 0 | 299 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1855 | 1781 | 0 | 1855 | 1080 | 0 | 1751 | 1282 | 0 | 1614 |
| Q Serve(g_s), s | 13.5 | 0.0 | 47.8 | 0.9 | 0.0 | 49.0 | 10.0 | 0.0 | 5.5 | 5.0 | 0.0 | 18.5 |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 47.8 | 0.9 | 0.0 | 49.0 | 28.5 | 0.0 | 5.5 | 10.5 | 0.0 | 18.5 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.38 | 1.00 | | 0.88 |
| Lane Grp Cap(c), veh/h | 284 | 0 | 1007 | 177 | 0 | 826 | 163 | 0 | 454 | 333 | 0 | 418 |
| V/C Ratio(X) | 1.13 | 0.00 | 0.90 | 0.15 | 0.00 | 1.23 | 0.78 | 0.00 | 0.24 | 0.21 | 0.00 | 0.72 |
| Avail Cap(c_a), veh/h | 284 | 0 | 1007 | 351 | 0 | 826 | 163 | 0 | 454 | 333 | 0 | 418 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.2 | 0.0 | 22.4 | 22.2 | 0.0 | 30.5 | 51.2 | 0.0 | 32.2 | 36.4 | 0.0 | 37.1 |
| Incr Delay (d2), s/veh | 93.1 | 0.0 | 11.3 | 0.1 | 0.0 | 112.0 | 21.6 | 0.0 | 0.3 | 0.3 | 0.0 | 5.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 16.3 | 0.0 | 28.2 | 0.6 | 0.0 | 64.4 | 8.0 | 0.0 | 4.3 | 2.9 | 0.0 | 12.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 129.3 | 0.0 | 33.7 | 22.3 | 0.0 | 142.5 | 72.8 | 0.0 | 32.5 | 36.7 | 0.0 | 42.8 |
| LnGrp LOS | F | A | C | C | A | F | E | A | C | D | A | D |
| Approach Vol, veh/h | | 1225 | | | 1039 | | | 239 | | | 369 | |
| Approach Delay, s/veh | | 58.8 | | | 139.4 | | | 54.1 | | | 41.6 | |
| Approach LOS | | E | | | F | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.3 | 65.7 | | 35.0 | 20.0 | 55.0 | | 35.0 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 49.8 | | 20.5 | 15.5 | 51.0 | | 30.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 1.0 | 0.0 | 0.0 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 85.3 | |
| HCM 6th LOS | | F | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 43 | 7 | 113 | 117 | 57 | 11 | 528 | 83 | 32 | 421 | 42 |
| Future Volume (veh/h) | 42 | 43 | 7 | 113 | 117 | 57 | 11 | 528 | 83 | 32 | 421 | 42 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 50 | 51 | 8 | 135 | 139 | 68 | 13 | 629 | 0 | 38 | 501 | 0 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 202 | 276 | 43 | 323 | 207 | 101 | 433 | 882 | | 359 | 925 | |
| Arrive On Green | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.02 | 0.47 | 0.00 | 0.04 | 0.49 | 0.00 |
| Sat Flow, veh/h | 1175 | 1578 | 248 | 1344 | 1186 | 580 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 50 | 0 | 59 | 135 | 0 | 207 | 13 | 629 | 0 | 38 | 501 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1175 | 0 | 1826 | 1344 | 0 | 1766 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 2.4 | 0.0 | 1.6 | 5.5 | 0.0 | 6.3 | 0.2 | 15.3 | 0.0 | 0.6 | 10.6 | 0.0 |
| Cycle Q Clear(g_c), s | 8.7 | 0.0 | 1.6 | 7.0 | 0.0 | 6.3 | 0.2 | 15.3 | 0.0 | 0.6 | 10.6 | 0.0 |
| Prop In Lane | 1.00 | | 0.14 | 1.00 | | 0.33 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 202 | 0 | 319 | 323 | 0 | 308 | 433 | 882 | | 359 | 925 | |
| V/C Ratio(X) | 0.25 | 0.00 | 0.19 | 0.42 | 0.00 | 0.67 | 0.03 | 0.71 | | 0.11 | 0.54 | |
| Avail Cap(c_a), veh/h | 202 | 0 | 319 | 323 | 0 | 308 | 559 | 882 | | 444 | 925 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 26.1 | 0.0 | 20.2 | 23.2 | 0.0 | 22.1 | 8.3 | 12.1 | 0.0 | 9.2 | 10.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.6 | 0.0 | 0.3 | 0.9 | 0.0 | 5.6 | 0.0 | 4.9 | 0.0 | 0.1 | 2.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.1 | 0.0 | 1.1 | 2.8 | 0.0 | 4.9 | 0.1 | 9.4 | 0.0 | 0.3 | 6.3 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 26.8 | 0.0 | 20.4 | 24.0 | 0.0 | 27.7 | 8.4 | 16.9 | 0.0 | 9.3 | 12.3 | 0.0 |
| LnGrp LOS | C | A | C | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | 109 | | | 342 | | | 642 | | | 539 | |
| Approach Delay, s/veh | | 23.3 | | | 26.2 | | | 16.8 | | | 12.0 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.3 | 33.0 | | 16.0 | 6.9 | 34.3 | | 16.0 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.3 | 27.0 | | 10.0 | 5.0 | 27.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.6 | 17.3 | | 10.7 | 2.2 | 12.6 | | 9.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.9 | | 0.0 | 0.0 | 1.7 | | 0.1 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 17.6 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.3 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 38 | 35 | 151 | 23 | 10 | 74 |
| Future Vol, veh/h | 38 | 35 | 151 | 23 | 10 | 74 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 40 | 36 | 157 | 24 | 10 | 77 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 181 | 0 | - | 0 | 285 | 169 |
| Stage 1 | - | - | - | - | 169 | - |
| Stage 2 | - | - | - | - | 116 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1394 | - | - | - | 705 | 875 |
| Stage 1 | - | - | - | - | 861 | - |
| Stage 2 | - | - | - | - | 909 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1394 | - | - | - | 685 | 875 |
| Mov Cap-2 Maneuver | - | - | - | - | 685 | - |
| Stage 1 | - | - | - | - | 836 | - |
| Stage 2 | - | - | - | - | 909 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4 | 0 | 9.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1394 | - | - | - | 847 |
| HCM Lane V/C Ratio | 0.028 | - | - | - | 0.103 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 17.9 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 412 | 340 | 729 | 135 | 27 | 300 |
| Future Vol, veh/h | 412 | 340 | 729 | 135 | 27 | 300 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 448 | 370 | 792 | 147 | 29 | 326 |

| Major/Minor | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|
| | | | | | Minor2 | |
| Conflicting Flow All | 939 | 0 | - | 0 | 2058 | 792 |
| Stage 1 | - | - | - | - | 792 | - |
| Stage 2 | - | - | - | - | 1266 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 730 | - | - | - | 61 | 389 |
| Stage 1 | - | - | - | - | 446 | - |
| Stage 2 | - | - | - | - | 265 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 730 | - | - | - | ~ 24 | 389 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 24 | - |
| Stage 1 | - | - | - | - | 172 | - |
| Stage 2 | - | - | - | - | 265 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 9.6 | 0 | 84.4 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 730 | - | - | - | 24 | 389 |
| HCM Lane V/C Ratio | 0.613 | - | - | - | 1.223 | 0.838 |
| HCM Control Delay (s) | 17.4 | - | - | - | $ 496.8 | 47.3 |
| HCM Lane LOS | C | - | - | - | F | E |
| HCM 95th %tile Q(veh) | 4.2 | - | - | - | 3.7 | 7.8 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 702 | 583 | 60 | 493 | 666 | 289 | 67 | 932 | 510 | 349 | 1081 | 916 |
| Future Volume (vph) | 702 | 583 | 60 | 493 | 666 | 289 | 67 | 932 | 510 | 349 | 1081 | 916 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3490 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.09 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3490 | | 3433 | 3539 | 1583 | 163 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 739 | 614 | 63 | 519 | 701 | 304 | 71 | 981 | 537 | 367 | 1138 | 964 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 135 | 0 | 0 | 315 | 0 | 0 | 365 |
| Lane Group Flow (vph) | 739 | 672 | 0 | 519 | 701 | 169 | 71 | 981 | 222 | 367 | 1138 | 599 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 40.8 | 40.8 | | 35.0 | 35.0 | 35.0 | 50.7 | 45.7 | 45.7 | 19.3 | 60.0 | 60.0 |
| Effective Green, g (s) | 40.8 | 40.8 | | 35.0 | 35.0 | 35.0 | 50.7 | 45.7 | 45.7 | 19.3 | 60.0 | 60.0 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.31 | 0.28 | 0.28 | 0.12 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 855 | 869 | | 733 | 756 | 338 | 99 | 987 | 441 | 404 | 1296 | 579 |
| v/s Ratio Prot | c0.22 | 0.19 | | 0.15 | c0.20 | | 0.02 | 0.28 | | c0.11 | 0.32 | |
| v/s Ratio Perm | | | | | | 0.11 | 0.20 | | 0.14 | | | c0.38 |
| v/c Ratio | 0.86 | 0.77 | | 0.71 | 0.93 | 0.50 | 0.72 | 0.99 | 0.50 | 0.91 | 0.88 | 1.03 |
| Uniform Delay, d1 | 58.9 | 57.2 | | 59.7 | 63.2 | 56.7 | 44.2 | 58.9 | 49.5 | 71.4 | 48.5 | 51.9 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 9.4 | 4.6 | | 3.4 | 17.5 | 1.6 | 18.5 | 27.0 | 1.2 | 23.2 | 7.2 | 46.6 |
| Delay (s) | 68.2 | 61.8 | | 63.0 | 80.7 | 58.3 | 62.7 | 85.9 | 50.8 | 94.6 | 55.7 | 98.5 |
| Level of Service | E | E | | E | F | E | E | F | D | F | E | F |
| Approach Delay (s) | | 65.1 | | | 70.2 | | | 73.0 | | | 78.2 | |
| Approach LOS | | E | | | E | | | E | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 72.6 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 0.97 | | |
| Actuated Cycle Length (s) | 163.8 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 93.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 1010 | 305 | 388 | 1085 | 4 | 224 | 10 | 333 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 85 | 720 | 217 | 197 | 1116 | 945 | 370 | 10 | 334 | 90 | 221 | 188 |
| Arrive On Green | 0.01 | 0.52 | 0.52 | 0.09 | 0.60 | 0.60 | 0.12 | 0.22 | 0.22 | 0.02 | 0.12 | 0.12 |
| Sat Flow, veh/h | 1781 | 1379 | 416 | 1781 | 1870 | 1585 | 1781 | 46 | 1546 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 1315 | 388 | 1085 | 4 | 224 | 0 | 343 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1795 | 1781 | 1870 | 1585 | 1781 | 0 | 1592 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 0.0 | 83.1 | 13.6 | 88.7 | 0.2 | 17.1 | 0.0 | 34.3 | 2.7 | 5.7 | 3.2 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 83.1 | 13.6 | 88.7 | 0.2 | 17.1 | 0.0 | 34.3 | 2.7 | 5.7 | 3.2 |
| Prop In Lane | 1.00 | | 0.23 | 1.00 | | 1.00 | 1.00 | | 0.97 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 85 | 0 | 938 | 197 | 1116 | 945 | 370 | 0 | 344 | 90 | 221 | 188 |
| V/C Ratio(X) | 0.12 | 0.00 | 1.40 | 1.96 | 0.97 | 0.00 | 0.61 | 0.00 | 1.00 | 0.39 | 0.33 | 0.19 |
| Avail Cap(c_a), veh/h | 218 | 0 | 938 | 197 | 1116 | 945 | 485 | 0 | 344 | 324 | 346 | 293 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.4 | 0.0 | 38.0 | 57.4 | 30.9 | 13.0 | 50.9 | 0.0 | 62.3 | 60.7 | 64.4 | 63.2 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 187.6 | 452.0 | 20.7 | 0.0 | 1.2 | 0.0 | 47.5 | 1.0 | 0.9 | 0.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 123.4 | 44.9 | 54.1 | 0.1 | 12.1 | 0.0 | 25.0 | 2.3 | 5.0 | 2.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 36.6 | 0.0 | 225.6 | 509.3 | 51.6 | 13.0 | 52.1 | 0.0 | 109.9 | 61.7 | 65.2 | 63.7 |
| LnGrp LOS | D | A | F | F | D | B | D | A | F | E | E | E |
| Approach Vol, veh/h | | 1325 | | | 1477 | | | 567 | | | 143 | |
| Approach Delay, s/veh | | 224.2 | | | 171.7 | | | 87.1 | | | 64.0 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 20.0 | 90.0 | 24.7 | 24.4 | 8.2 | 101.8 | 9.1 | 40.0 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 19.1 | 7.7 | 2.4 | 90.7 | 4.7 | 36.3 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.4 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 173.5 |
| HCM 6th LOS | F |

| Intersection | |
|---|---|
| Int Delay, s/veh | 35 |

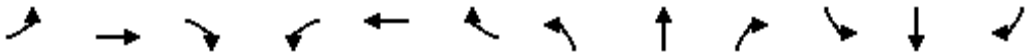
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 58 | 1118 | 176 | 81 | 1122 | 19 | 133 | 10 | 61 | 6 | 14 | 50 |
| Future Vol, veh/h | 58 | 1118 | 176 | 81 | 1122 | 19 | 133 | 10 | 61 | 6 | 14 | 50 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 205 | - | - | 205 | - | - | 0 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 92 | 92 | 98 | 98 | 92 | 92 | 92 | 98 | 92 | 98 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 59 | 1141 | 191 | 88 | 1145 | 19 | 145 | 11 | 66 | 6 | 15 | 51 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1164 | 0 | 0 | 1332 | 0 | 0 | 2719 | 2695 | 1237 | 2724 | 2781 | 1155 |
| Stage 1 | - | - | - | - | - | - | 1355 | 1355 | - | 1331 | 1331 | - |
| Stage 2 | - | - | - | - | - | - | 1364 | 1340 | - | 1393 | 1450 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 600 | - | - | 518 | - | - | ~ 14 | 22 | 215 | 13 | 19 | 240 |
| Stage 1 | - | - | - | - | - | - | 184 | 218 | - | 190 | 224 | - |
| Stage 2 | - | - | - | - | - | - | 182 | 221 | - | 175 | 196 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 600 | - | - | 518 | - | - | - | 16 | 215 | ~ 3 | ~ 14 | 240 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | 16 | - | ~ 3 | ~ 14 | - |
| Stage 1 | - | - | - | - | - | - | 166 | 197 | - | 171 | 186 | - |
| Stage 2 | - | - | - | - | - | - | ~ 109 | 183 | - | 103 | 177 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.5 | 0.9 | | $ 1396.1 |
| HCM LOS | | | - | F |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | 78 | 600 | - | - | 518 | - | - | 22 |
| HCM Lane V/C Ratio | - | 0.989 | 0.099 | - | - | 0.17 | - | - | 3.289 |
| HCM Control Delay (s) | - | 192.1 | 11.7 | - | - | 13.4 | - | - | $ 1396.1 |
| HCM Lane LOS | - | F | B | - | - | B | - | - | F |
| HCM 95th %tile Q(veh) | - | 5.3 | 0.3 | - | - | 0.6 | - | - | 9.2 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 45 | 1119 | 9 | 29 | 1018 | 105 | 67 | 6 | 37 | 14 | 11 | 52 |
| Future Volume (veh/h) | 45 | 1119 | 9 | 29 | 1018 | 105 | 67 | 6 | 37 | 14 | 11 | 52 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 46 | 1142 | 9 | 30 | 1039 | 107 | 68 | 6 | 38 | 14 | 11 | 53 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 161 | 1148 | 9 | 148 | 1017 | 105 | 193 | 25 | 158 | 210 | 32 | 153 |
| Arrive On Green | 0.04 | 0.62 | 0.62 | 0.03 | 0.61 | 0.61 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 1781 | 1853 | 15 | 1781 | 1668 | 172 | 1338 | 221 | 1398 | 1362 | 280 | 1348 |
| Grp Volume(v), veh/h | 46 | 0 | 1151 | 30 | 0 | 1146 | 68 | 0 | 44 | 14 | 0 | 64 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1839 | 1338 | 0 | 1619 | 1362 | 0 | 1628 |
| Q Serve(g_s), s | 0.7 | 0.0 | 49.1 | 0.5 | 0.0 | 49.0 | 4.0 | 0.0 | 2.0 | 0.8 | 0.0 | 2.9 |
| Cycle Q Clear(g_c), s | 0.7 | 0.0 | 49.1 | 0.5 | 0.0 | 49.0 | 6.9 | 0.0 | 2.0 | 2.7 | 0.0 | 2.9 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.09 | 1.00 | | 0.86 | 1.00 | | 0.83 |
| Lane Grp Cap(c), veh/h | 161 | 0 | 1157 | 148 | 0 | 1122 | 193 | 0 | 184 | 210 | 0 | 185 |
| V/C Ratio(X) | 0.29 | 0.00 | 0.99 | 0.20 | 0.00 | 1.02 | 0.35 | 0.00 | 0.24 | 0.07 | 0.00 | 0.35 |
| Avail Cap(c_a), veh/h | 389 | 0 | 1157 | 393 | 0 | 1122 | 516 | 0 | 574 | 539 | 0 | 578 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.0 | 0.0 | 15.1 | 20.2 | 0.0 | 15.7 | 36.0 | 0.0 | 32.4 | 33.7 | 0.0 | 32.9 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 25.1 | 0.2 | 0.0 | 32.3 | 1.1 | 0.0 | 0.7 | 0.1 | 0.0 | 1.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.8 | 0.0 | 29.1 | 0.5 | 0.0 | 32.2 | 2.4 | 0.0 | 1.4 | 0.5 | 0.0 | 2.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.4 | 0.0 | 40.2 | 20.4 | 0.0 | 48.0 | 37.1 | 0.0 | 33.1 | 33.8 | 0.0 | 34.0 |
| LnGrp LOS | C | A | D | C | A | F | D | A | C | C | A | C |
| Approach Vol, veh/h | | 1197 | | | 1176 | | | 112 | | | 78 | |
| Approach Delay, s/veh | | 39.5 | | | 47.3 | | | 35.6 | | | 33.9 | |
| Approach LOS | | D | | | D | | | D | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.9 | 55.8 | | 15.6 | 9.7 | 55.0 | | 15.6 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 51.1 | | 4.9 | 2.7 | 51.0 | | 8.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.2 | 0.0 | 0.0 | | 0.4 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 42.7 | |
| HCM 6th LOS | | D | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 29 | 48 | 7 | 74 | 33 | 32 | 11 | 388 | 86 | 43 | 567 | 78 |
| Future Volume (veh/h) | 29 | 48 | 7 | 74 | 33 | 32 | 11 | 388 | 86 | 43 | 567 | 78 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 30 | 50 | 7 | 77 | 34 | 33 | 11 | 404 | 0 | 45 | 591 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 342 | 298 | 42 | 353 | 162 | 157 | 331 | 791 | | 479 | 850 | |
| Arrive On Green | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.01 | 0.42 | 0.00 | 0.05 | 0.45 | 0.00 |
| Sat Flow, veh/h | 1334 | 1605 | 225 | 1346 | 872 | 846 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 30 | 0 | 57 | 77 | 0 | 67 | 11 | 404 | 0 | 45 | 591 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1334 | 0 | 1830 | 1346 | 0 | 1718 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 1.0 | 0.0 | 1.4 | 2.7 | 0.0 | 1.7 | 0.2 | 8.3 | 0.0 | 0.7 | 13.1 | 0.0 |
| Cycle Q Clear(g_c), s | 2.7 | 0.0 | 1.4 | 4.0 | 0.0 | 1.7 | 0.2 | 8.3 | 0.0 | 0.7 | 13.1 | 0.0 |
| Prop In Lane | 1.00 | | 0.12 | 1.00 | | 0.49 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 342 | 0 | 339 | 353 | 0 | 318 | 331 | 791 | | 479 | 850 | |
| V/C Ratio(X) | 0.09 | 0.00 | 0.17 | 0.22 | 0.00 | 0.21 | 0.03 | 0.51 | | 0.09 | 0.70 | |
| Avail Cap(c_a), veh/h | 351 | 0 | 352 | 362 | 0 | 330 | 477 | 791 | | 568 | 850 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 19.1 | 0.0 | 17.8 | 19.5 | 0.0 | 18.0 | 9.6 | 11.1 | 0.0 | 8.2 | 11.3 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.2 | 0.3 | 0.0 | 0.3 | 0.0 | 2.4 | 0.0 | 0.1 | 4.7 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.5 | 0.0 | 0.9 | 1.3 | 0.0 | 1.1 | 0.1 | 5.2 | 0.0 | 0.3 | 8.2 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.2 | 0.0 | 18.1 | 19.8 | 0.0 | 18.3 | 9.6 | 13.4 | 0.0 | 8.3 | 16.0 | 0.0 |
| LnGrp LOS | B | A | B | B | A | B | A | B | | A | B | |
| Approach Vol, veh/h | | 87 | | | 144 | | | 415 | | | 636 | |
| Approach Delay, s/veh | | 18.5 | | | 19.1 | | | 13.3 | | | 15.4 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.4 | 28.0 | | 15.6 | 6.7 | 29.7 | | 15.6 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.0 | 22.0 | | 10.0 | 5.0 | 22.0 | | 10.0 |
| Max Q Clear Time (g_c+I1), s | 2.7 | 10.3 | | 4.7 | 2.2 | 15.1 | | 6.0 |
| Green Ext Time (p_c), s | 0.0 | 1.2 | | 0.1 | 0.0 | 1.4 | | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 15.4 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 60 | 98 | 66 | 8 | 21 | 56 |
| Future Vol, veh/h | 60 | 98 | 66 | 8 | 21 | 56 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 63 | 102 | 69 | 8 | 22 | 58 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 77 | 0 | - | 0 | 301 | 73 |
| Stage 1 | - | - | - | - | 73 | - |
| Stage 2 | - | - | - | - | 228 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1522 | - | - | - | 691 | 989 |
| Stage 1 | - | - | - | - | 950 | - |
| Stage 2 | - | - | - | - | 810 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1522 | - | - | - | 661 | 989 |
| Mov Cap-2 Maneuver | - | - | - | - | 661 | - |
| Stage 1 | - | - | - | - | 908 | - |
| Stage 2 | - | - | - | - | 810 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 2.8 | 0 | 9.6 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1522 | - | - | - | 871 |
| HCM Lane V/C Ratio | 0.041 | - | - | - | 0.092 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 9.6 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 26.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 443 | 666 | 433 | 57 | 47 | 521 |
| Future Vol, veh/h | 443 | 666 | 433 | 57 | 47 | 521 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 471 | 709 | 461 | 61 | 50 | 554 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 522 | 0 | - | 0 | 2112 | 461 |
| Stage 1 | - | - | - | - | 461 | - |
| Stage 2 | - | - | - | - | 1651 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1044 | - | - | - | 56 | 600 |
| Stage 1 | - | - | - | - | 635 | - |
| Stage 2 | - | - | - | - | 172 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1044 | - | - | - | ~ 31 | 600 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 31 | - |
| Stage 1 | - | - | - | - | 349 | - |
| Stage 2 | - | - | - | - | 172 | - |

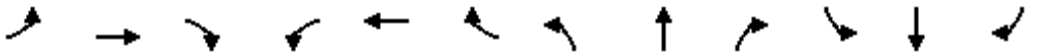
| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4.5 | 0 | 90.9 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1044 | - | - | - | 31 | 600 |
| HCM Lane V/C Ratio | 0.451 | - | - | - | 1.613 | 0.924 |
| HCM Control Delay (s) | 11.3 | - | - | - | $ 580.4 | 46.7 |
| HCM Lane LOS | B | - | - | - | F | E |
| HCM 95th %tile Q(veh) | 2.4 | - | - | - | 5.7 | 11.8 |

Notes

~: Volume exceeds capacity  $: Delay exceeds 300s  +: Computation Not Defined  *: All major volume in platoon

# 2031 FUTURE PROJECTED CONDITIONS WITH INTERSECTION IMPROVEMENTS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 939 | 685 | 47 | 420 | 484 | 453 | 35 | 955 | 370 | 329 | 955 | 916 |
| Future Volume (vph) | 939 | 685 | 47 | 420 | 484 | 453 | 35 | 955 | 370 | 329 | 955 | 916 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.5 | 6.0 | | 4.5 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3505 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.10 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3505 | | 3433 | 3539 | 1583 | 186 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 1067 | 778 | 53 | 477 | 550 | 515 | 40 | 1085 | 420 | 374 | 1085 | 1041 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 120 | 0 | 0 | 265 | 0 | 0 | 434 |
| Lane Group Flow (vph) | 1067 | 827 | 0 | 477 | 550 | 395 | 40 | 1085 | 155 | 374 | 1085 | 607 |
| Turn Type | Prot | NA | | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 34.5 | 35.1 | | 23.4 | 24.0 | 24.0 | 44.0 | 40.0 | 40.0 | 11.0 | 47.0 | 47.0 |
| Effective Green, g (s) | 34.5 | 35.1 | | 23.4 | 24.0 | 24.0 | 44.0 | 40.0 | 40.0 | 11.0 | 47.0 | 47.0 |
| Actuated g/C Ratio | 0.26 | 0.27 | | 0.18 | 0.18 | 0.18 | 0.34 | 0.31 | 0.31 | 0.08 | 0.36 | 0.36 |
| Clearance Time (s) | 4.5 | 6.0 | | 4.5 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 4.0 | | 3.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 904 | 939 | | 613 | 648 | 290 | 110 | 1080 | 483 | 288 | 1269 | 567 |
| v/s Ratio Prot | c0.31 | 0.24 | | 0.14 | 0.16 | | 0.01 | 0.31 | | c0.11 | 0.31 | |
| v/s Ratio Perm | | | | | | c0.25 | 0.11 | | 0.10 | | | c0.38 |
| v/c Ratio | 1.18 | 0.88 | | 0.78 | 0.85 | 1.36 | 0.36 | 1.00 | 0.32 | 1.30 | 0.86 | 1.07 |
| Uniform Delay, d1 | 48.2 | 46.0 | | 51.3 | 51.7 | 53.5 | 32.4 | 45.5 | 35.0 | 60.0 | 38.8 | 42.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 92.6 | 10.0 | | 6.2 | 10.5 | 183.5 | 0.7 | 28.5 | 0.5 | 157.6 | 6.0 | 58.0 |
| Delay (s) | 140.8 | 55.9 | | 57.5 | 62.2 | 237.0 | 33.1 | 74.0 | 35.6 | 217.6 | 44.9 | 100.0 |
| Level of Service | F | E | | E | E | F | C | E | D | F | D | F |
| Approach Delay (s) | | 103.6 | | | 119.2 | | | 62.5 | | | 93.7 | |
| Approach LOS | | F | | | F | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 95.0 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.22 | | |
| Actuated Cycle Length (s) | 131.0 | Sum of lost time (s) | 21.5 |
| Intersection Capacity Utilization | 95.0% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 891 | 230 | 333 | 1172 | 37 | 471 | 73 | 310 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 126 | 731 | 189 | 269 | 1104 | 935 | 395 | 382 | 520 | 97 | 87 | 74 |
| Arrive On Green | 0.04 | 0.51 | 0.51 | 0.12 | 0.59 | 0.59 | 0.16 | 0.20 | 0.20 | 0.00 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1434 | 370 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 1121 | 333 | 1172 | 37 | 471 | 73 | 310 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1804 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.5 | 0.0 | 76.5 | 18.6 | 88.5 | 1.5 | 23.8 | 4.8 | 24.5 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.5 | 0.0 | 76.5 | 18.6 | 88.5 | 1.5 | 23.8 | 4.8 | 24.5 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 126 | 0 | 920 | 269 | 1104 | 935 | 395 | 382 | 520 | 97 | 87 | 74 |
| V/C Ratio(X) | 0.90 | 0.00 | 1.22 | 1.24 | 1.06 | 0.04 | 1.19 | 0.19 | 0.60 | 0.01 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 126 | 0 | 920 | 269 | 1104 | 935 | 395 | 382 | 520 | 154 | 87 | 74 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 41.8 | 0.0 | 36.8 | 54.6 | 30.7 | 12.9 | 59.5 | 49.5 | 42.1 | 68.0 | 68.2 | 68.2 |
| Incr Delay (d2), s/veh | 50.3 | 0.0 | 108.3 | 135.0 | 45.2 | 0.0 | 108.9 | 0.2 | 1.9 | 0.0 | 0.1 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 6.8 | 0.0 | 83.3 | 29.6 | 65.2 | 0.9 | 23.3 | 4.1 | 14.7 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 92.1 | 0.0 | 145.0 | 189.6 | 75.9 | 12.9 | 168.4 | 49.7 | 44.0 | 68.0 | 68.3 | 68.4 |
| LnGrp LOS | F | A | F | F | F | B | F | D | D | E | E | E |
| Approach Vol, veh/h | | 1235 | | | 1542 | | | 854 | | | 5 | |
| Approach Delay, s/veh | | 140.1 | | | 99.0 | | | 113.1 | | | 68.3 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.0 | 83.4 | 29.0 | 12.6 | 13.0 | 95.4 | 5.4 | 36.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 8.6 | 76.5 | 23.8 | 7.0 | 6.6 | 88.5 | 5.0 | 25.8 |
| Max Q Clear Time (g_c+I1), s | 20.6 | 78.5 | 25.8 | 2.2 | 7.5 | 90.5 | 2.1 | 26.5 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 116.2 |
| HCM 6th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 17 | 936 | 96 | 44 | 1116 | 10 | 163 | 13 | 76 | 21 | 7 | 59 |
| Future Volume (veh/h) | 17 | 936 | 96 | 44 | 1116 | 10 | 163 | 13 | 76 | 21 | 7 | 59 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 19 | 1040 | 104 | 48 | 1240 | 11 | 177 | 14 | 83 | 23 | 8 | 66 |
| Peak Hour Factor | 0.90 | 0.90 | 0.92 | 0.92 | 0.90 | 0.90 | 0.92 | 0.92 | 0.92 | 0.90 | 0.92 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 93 | 1131 | 958 | 173 | 1287 | 1090 | 261 | 28 | 167 | 215 | 11 | 89 |
| Arrive On Green | 0.60 | 0.60 | 0.60 | 0.03 | 0.69 | 0.69 | 0.10 | 0.12 | 0.12 | 0.04 | 0.06 | 0.06 |
| Sat Flow, veh/h | 444 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 234 | 1387 | 1781 | 174 | 1437 |
| Grp Volume(v), veh/h | 19 | 1040 | 104 | 48 | 1240 | 11 | 177 | 0 | 97 | 23 | 0 | 74 |
| Grp Sat Flow(s),veh/h/ln | 444 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1621 | 1781 | 0 | 1612 |
| Q Serve(g_s), s | 5.0 | 59.4 | 3.3 | 1.1 | 73.7 | 0.3 | 10.9 | 0.0 | 6.7 | 1.4 | 0.0 | 5.4 |
| Cycle Q Clear(g_c), s | 68.6 | 59.4 | 3.3 | 1.1 | 73.7 | 0.3 | 10.9 | 0.0 | 6.7 | 1.4 | 0.0 | 5.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.86 | 1.00 | | 0.89 |
| Lane Grp Cap(c), veh/h | 93 | 1131 | 958 | 173 | 1287 | 1090 | 261 | 0 | 195 | 215 | 0 | 100 |
| V/C Ratio(X) | 0.20 | 0.92 | 0.11 | 0.28 | 0.96 | 0.01 | 0.68 | 0.00 | 0.50 | 0.11 | 0.00 | 0.74 |
| Avail Cap(c_a), veh/h | 93 | 1131 | 958 | 188 | 1287 | 1090 | 261 | 0 | 230 | 215 | 0 | 134 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.34 | 0.34 | 0.34 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 53.7 | 21.1 | 10.0 | 24.8 | 17.3 | 5.9 | 45.2 | 0.0 | 49.4 | 48.8 | 0.0 | 55.3 |
| Incr Delay (d2), s/veh | 4.9 | 13.3 | 0.2 | 0.3 | 8.4 | 0.0 | 6.9 | 0.0 | 2.0 | 0.2 | 0.0 | 13.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.2 | 34.0 | 1.9 | 1.3 | 31.5 | 0.1 | 9.1 | 0.0 | 5.1 | 1.2 | 0.0 | 4.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 58.7 | 34.4 | 10.3 | 25.1 | 25.7 | 5.9 | 52.1 | 0.0 | 51.3 | 49.0 | 0.0 | 68.9 |
| LnGrp LOS | E | C | B | C | C | A | D | A | D | D | A | E |
| Approach Vol, veh/h | | 1163 | | | 1299 | | | 274 | | | 97 | |
| Approach Delay, s/veh | | 32.7 | | | 25.5 | | | 51.9 | | | 64.2 | |
| Approach LOS | | C | | | C | | | D | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.0 | 20.4 | 10.0 | 78.6 | 18.0 | 13.4 | | 88.6 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.0 | 17.0 | 5.0 | 69.0 | 12.0 | 10.0 | | 80.0 |
| Max Q Clear Time (g_c+I1), s | 13.4 | 8.7 | 3.1 | 70.6 | 12.9 | 7.4 | | 75.7 |
| Green Ext Time (p_c), s | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | | 2.6 |

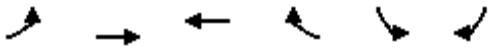
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 32.3 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 286 | 767 | 37 | 24 | 858 | 43 | 114 | 61 | 37 | 62 | 31 | 235 |
| Future Volume (veh/h) | 286 | 767 | 37 | 24 | 858 | 43 | 114 | 61 | 37 | 62 | 31 | 235 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 321 | 862 | 42 | 27 | 964 | 48 | 128 | 69 | 42 | 70 | 35 | 264 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 331 | 1182 | 58 | 316 | 950 | 47 | 144 | 176 | 107 | 127 | 40 | 379 |
| Arrive On Green | 0.15 | 0.67 | 0.67 | 0.02 | 0.54 | 0.54 | 0.04 | 0.16 | 0.16 | 0.08 | 0.08 | 0.08 |
| Sat Flow, veh/h | 1781 | 1769 | 86 | 1781 | 1767 | 88 | 1781 | 1089 | 663 | 955 | 477 | 1585 |
| Grp Volume(v), veh/h | 321 | 0 | 904 | 27 | 0 | 1012 | 128 | 0 | 111 | 105 | 0 | 264 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1855 | 1781 | 0 | 1855 | 1781 | 0 | 1751 | 1432 | 0 | 1585 |
| Q Serve(g_s), s | 19.2 | 0.0 | 41.0 | 0.9 | 0.0 | 69.9 | 5.5 | 0.0 | 7.4 | 9.4 | 0.0 | 11.0 |
| Cycle Q Clear(g_c), s | 19.2 | 0.0 | 41.0 | 0.9 | 0.0 | 69.9 | 5.5 | 0.0 | 7.4 | 9.4 | 0.0 | 11.0 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.38 | 0.67 | | 1.00 |
| Lane Grp Cap(c), veh/h | 331 | 0 | 1240 | 316 | 0 | 997 | 144 | 0 | 283 | 167 | 0 | 379 |
| V/C Ratio(X) | 0.97 | 0.00 | 0.73 | 0.09 | 0.00 | 1.01 | 0.89 | 0.00 | 0.39 | 0.63 | 0.00 | 0.70 |
| Avail Cap(c_a), veh/h | 331 | 0 | 1240 | 343 | 0 | 997 | 144 | 0 | 283 | 167 | 0 | 379 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.4 | 0.0 | 13.9 | 15.0 | 0.0 | 30.1 | 55.6 | 0.0 | 48.8 | 58.8 | 0.0 | 45.1 |
| Incr Delay (d2), s/veh | 41.2 | 0.0 | 2.7 | 0.0 | 0.0 | 32.3 | 44.1 | 0.0 | 0.9 | 7.2 | 0.0 | 5.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 19.3 | 0.0 | 21.3 | 0.6 | 0.0 | 46.7 | 5.9 | 0.0 | 6.0 | 6.8 | 0.0 | 13.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 87.6 | 0.0 | 16.7 | 15.0 | 0.0 | 62.3 | 99.7 | 0.0 | 49.7 | 66.0 | 0.0 | 50.6 |
| LnGrp LOS | F | A | B | B | A | F | F | A | D | E | A | D |
| Approach Vol, veh/h | | 1225 | | | 1039 | | | 239 | | | 369 | |
| Approach Delay, s/veh | | 35.2 | | | 61.1 | | | 76.5 | | | 55.0 | |
| Approach LOS | | D | | | E | | | E | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.6 | 92.9 | 10.0 | 17.5 | 26.6 | 75.9 | | 27.5 |
| Change Period (Y+Rc), s | 6.5 | 6.0 | 4.5 | 6.5 | 6.5 | 6.0 | | 6.5 |
| Max Green Setting (Gmax), s | 5.1 | 84.9 | 5.5 | 11.0 | 20.1 | 69.9 | | 21.0 |
| Max Q Clear Time (g_c+I1), s | 2.9 | 43.0 | 7.5 | 13.0 | 21.2 | 71.9 | | 9.4 |
| Green Ext Time (p_c), s | 0.0 | 12.5 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.3 |

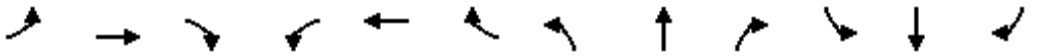
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 50.6 |
| HCM 6th LOS | D |



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 412 | 340 | 729 | 135 | 27 | 300 |
| Future Volume (veh/h) | 412 | 340 | 729 | 135 | 27 | 300 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 448 | 370 | 792 | 147 | 29 | 326 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 493 | 1426 | 961 | 815 | 156 | 414 |
| Arrive On Green | 0.17 | 0.76 | 0.51 | 0.51 | 0.09 | 0.09 |
| Sat Flow, veh/h | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Grp Volume(v), veh/h | 448 | 370 | 792 | 147 | 29 | 326 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Q Serve(g_s), s | 11.2 | 4.7 | 28.6 | 4.0 | 1.2 | 7.0 |
| Cycle Q Clear(g_c), s | 11.2 | 4.7 | 28.6 | 4.0 | 1.2 | 7.0 |
| Prop In Lane | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 493 | 1426 | 961 | 815 | 156 | 414 |
| V/C Ratio(X) | 0.91 | 0.26 | 0.82 | 0.18 | 0.19 | 0.79 |
| Avail Cap(c_a), veh/h | 562 | 1426 | 961 | 815 | 156 | 414 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.9 | 2.8 | 16.4 | 10.4 | 33.9 | 27.5 |
| Incr Delay (d2), s/veh | 17.4 | 0.4 | 8.0 | 0.5 | 0.6 | 9.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 10.2 | 1.7 | 17.8 | 2.3 | 0.9 | 19.8 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 36.4 | 3.3 | 24.4 | 10.9 | 34.4 | 37.3 |
| LnGrp LOS | D | A | C | B | C | D |
| Approach Vol, veh/h | | 818 | 939 | | 355 | |
| Approach Delay, s/veh | | 21.4 | 22.3 | | 37.0 | |
| Approach LOS | | C | C | | D | |

| Timer - Assigned Phs | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | 67.0 | | 13.0 | 19.9 | 47.1 |
| Change Period (Y+Rc), s | | | 6.0 | | 6.0 | 6.0 | 6.0 |
| Max Green Setting (Gmax), s | | | 61.0 | | 7.0 | 17.0 | 38.0 |
| Max Q Clear Time (g_c+I1), s | | | 6.7 | | 9.0 | 13.2 | 30.6 |
| Green Ext Time (p_c), s | | | 1.4 | | 0.0 | 0.7 | 2.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 24.4 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 702 | 583 | 60 | 493 | 666 | 289 | 67 | 932 | 510 | 349 | 1081 | 916 |
| Future Volume (vph) | 702 | 583 | 60 | 493 | 666 | 289 | 67 | 932 | 510 | 349 | 1081 | 916 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3490 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.11 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3490 | | 3433 | 3539 | 1583 | 201 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 739 | 614 | 63 | 519 | 701 | 304 | 71 | 981 | 537 | 367 | 1138 | 964 |
| RTOR Reduction (vph) | 0 | 6 | 0 | 0 | 0 | 140 | 0 | 0 | 304 | 0 | 0 | 353 |
| Lane Group Flow (vph) | 739 | 671 | 0 | 519 | 701 | 164 | 71 | 981 | 233 | 367 | 1138 | 611 |
| Turn Type | Prot | NA | | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 25.0 | 26.3 | | 21.7 | 23.0 | 23.0 | 41.0 | 37.0 | 37.0 | 13.0 | 46.0 | 46.0 |
| Effective Green, g (s) | 25.0 | 26.3 | | 21.7 | 23.0 | 23.0 | 41.0 | 37.0 | 37.0 | 13.0 | 46.0 | 46.0 |
| Actuated g/C Ratio | 0.21 | 0.22 | | 0.18 | 0.19 | 0.19 | 0.34 | 0.31 | 0.31 | 0.11 | 0.38 | 0.38 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 709 | 758 | | 615 | 672 | 300 | 119 | 1082 | 484 | 368 | 1345 | 601 |
| v/s Ratio Prot | c0.22 | 0.19 | | 0.15 | c0.20 | | 0.02 | 0.28 | | c0.11 | 0.32 | |
| v/s Ratio Perm | | | | | | 0.10 | 0.18 | | 0.15 | | | c0.39 |
| v/c Ratio | 1.04 | 0.88 | | 0.84 | 1.04 | 0.55 | 0.60 | 0.91 | 0.48 | 1.00 | 0.85 | 1.02 |
| Uniform Delay, d1 | 48.0 | 45.9 | | 48.0 | 49.0 | 44.3 | 30.0 | 40.3 | 34.2 | 54.0 | 34.3 | 37.5 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 45.3 | 12.3 | | 10.7 | 46.5 | 2.5 | 5.3 | 11.0 | 1.0 | 45.8 | 5.3 | 40.8 |
| Delay (s) | 93.3 | 58.2 | | 58.7 | 95.5 | 46.8 | 35.2 | 51.4 | 35.2 | 99.8 | 39.6 | 78.3 |
| Level of Service | F | E | | E | F | D | D | D | D | F | D | E |
| Approach Delay (s) | | 76.5 | | | 73.2 | | | 45.2 | | | 63.6 | |
| Approach LOS | | E | | | E | | | D | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 64.1 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.05 | | |
| Actuated Cycle Length (s) | 121.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 93.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 1010 | 305 | 388 | 1085 | 4 | 224 | 10 | 333 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 228 | 795 | 240 | 305 | 1327 | 1124 | 186 | 174 | 376 | 159 | 87 | 74 |
| Arrive On Green | 0.01 | 0.58 | 0.58 | 0.14 | 0.71 | 0.71 | 0.07 | 0.09 | 0.09 | 0.03 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1379 | 416 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 1315 | 388 | 1085 | 4 | 224 | 10 | 333 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1795 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.3 | 0.0 | 86.5 | 21.6 | 60.2 | 0.1 | 10.8 | 0.7 | 14.0 | 2.8 | 5.8 | 3.2 |
| Cycle Q Clear(g_c), s | 0.3 | 0.0 | 86.5 | 21.6 | 60.2 | 0.1 | 10.8 | 0.7 | 14.0 | 2.8 | 5.8 | 3.2 |
| Prop In Lane | 1.00 | | 0.23 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 228 | 0 | 1035 | 305 | 1327 | 1124 | 186 | 174 | 376 | 159 | 87 | 74 |
| V/C Ratio(X) | 0.04 | 0.00 | 1.27 | 1.27 | 0.82 | 0.00 | 1.20 | 0.06 | 0.89 | 0.22 | 0.84 | 0.47 |
| Avail Cap(c_a), veh/h | 267 | 0 | 1035 | 305 | 1327 | 1124 | 186 | 174 | 376 | 184 | 87 | 74 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 18.3 | 0.0 | 31.8 | 56.2 | 15.1 | 6.4 | 65.1 | 62.0 | 55.3 | 65.8 | 70.9 | 69.7 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 129.2 | 146.5 | 4.6 | 0.0 | 130.5 | 0.1 | 21.6 | 0.3 | 47.6 | 4.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.2 | 0.0 | 102.3 | 34.8 | 31.9 | 0.1 | 14.1 | 0.6 | 20.2 | 2.3 | 7.1 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 18.4 | 0.0 | 161.0 | 202.7 | 19.7 | 6.4 | 195.6 | 62.2 | 76.8 | 66.1 | 118.5 | 74.3 |
| LnGrp LOS | B | A | F | F | B | A | F | E | E | E | F | E |
| Approach Vol, veh/h | | 1325 | | | 1477 | | | 567 | | | 143 | |
| Approach Delay, s/veh | | 159.9 | | | 67.8 | | | 123.5 | | | 94.9 | |
| Approach LOS | | F | | | E | | | F | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 28.0 | 93.4 | 16.0 | 12.6 | 8.1 | 113.3 | 9.0 | 19.6 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 21.6 | 86.5 | 10.8 | 7.0 | 5.0 | 103.1 | 5.9 | 11.9 |
| Max Q Clear Time (g_c+I1), s | 23.6 | 88.5 | 12.8 | 7.8 | 2.3 | 62.2 | 4.8 | 16.0 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.1 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 112.6 |
| HCM 6th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 58 | 1118 | 176 | 81 | 1122 | 19 | 133 | 10 | 61 | 6 | 14 | 50 |
| Future Volume (veh/h) | 58 | 1118 | 176 | 81 | 1122 | 19 | 133 | 10 | 61 | 6 | 14 | 50 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 59 | 1141 | 191 | 88 | 1145 | 19 | 145 | 11 | 66 | 6 | 15 | 51 |
| Peak Hour Factor | 0.98 | 0.98 | 0.92 | 0.92 | 0.98 | 0.98 | 0.92 | 0.92 | 0.92 | 0.98 | 0.92 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 232 | 1255 | 1063 | 198 | 1410 | 1195 | 170 | 16 | 96 | 154 | 20 | 68 |
| Arrive On Green | 0.67 | 0.67 | 0.67 | 0.04 | 0.75 | 0.75 | 0.05 | 0.07 | 0.07 | 0.04 | 0.05 | 0.05 |
| Sat Flow, veh/h | 482 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 231 | 1389 | 1781 | 373 | 1269 |
| Grp Volume(v), veh/h | 59 | 1141 | 191 | 88 | 1145 | 19 | 145 | 0 | 77 | 6 | 0 | 66 |
| Grp Sat Flow(s),veh/h/ln | 482 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1620 | 1781 | 0 | 1642 |
| Q Serve(g_s), s | 11.5 | 66.9 | 5.9 | 1.9 | 50.5 | 0.4 | 7.0 | 0.0 | 6.0 | 0.4 | 0.0 | 5.2 |
| Cycle Q Clear(g_c), s | 51.2 | 66.9 | 5.9 | 1.9 | 50.5 | 0.4 | 7.0 | 0.0 | 6.0 | 0.4 | 0.0 | 5.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.86 | 1.00 | | 0.77 |
| Lane Grp Cap(c), veh/h | 232 | 1255 | 1063 | 198 | 1410 | 1195 | 170 | 0 | 112 | 154 | 0 | 88 |
| V/C Ratio(X) | 0.25 | 0.91 | 0.18 | 0.44 | 0.81 | 0.02 | 0.85 | 0.00 | 0.69 | 0.04 | 0.00 | 0.75 |
| Avail Cap(c_a), veh/h | 232 | 1255 | 1063 | 201 | 1410 | 1195 | 170 | 0 | 112 | 154 | 0 | 88 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.44 | 0.44 | 0.44 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 29.8 | 18.1 | 8.0 | 27.5 | 10.2 | 4.0 | 57.9 | 0.0 | 59.1 | 53.8 | 0.0 | 60.6 |
| Incr Delay (d2), s/veh | 2.6 | 11.3 | 0.4 | 0.7 | 2.4 | 0.0 | 31.6 | 0.0 | 29.1 | 0.5 | 0.0 | 43.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.6 | 35.5 | 3.3 | 3.0 | 19.6 | 0.2 | 5.1 | 0.0 | 6.1 | 0.4 | 0.0 | 5.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.5 | 29.3 | 8.4 | 28.2 | 12.5 | 4.0 | 89.5 | 0.0 | 88.2 | 54.3 | 0.0 | 104.0 |
| LnGrp LOS | C | C | A | C | B | A | F | A | F | D | A | F |
| Approach Vol, veh/h | | 1391 | | | 1252 | | | 222 | | | 72 | |
| Approach Delay, s/veh | | 26.6 | | | 13.5 | | | 89.1 | | | 99.9 | |
| Approach LOS | | C | | | B | | | F | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.0 | 15.0 | 10.8 | 93.2 | 13.0 | 13.0 | | 104.0 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.0 | 9.0 | 5.0 | 87.0 | 7.0 | 7.0 | | 98.0 |
| Max Q Clear Time (g_c+I1), s | 2.4 | 8.0 | 3.9 | 68.9 | 9.0 | 7.2 | | 52.5 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 7.5 | 0.0 | 0.0 | | 7.5 |

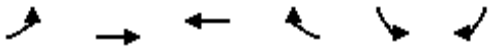
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 27.5 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 45 | 1119 | 9 | 29 | 1018 | 105 | 67 | 6 | 37 | 14 | 11 | 52 |
| Future Volume (veh/h) | 45 | 1119 | 9 | 29 | 1018 | 105 | 67 | 6 | 37 | 14 | 11 | 52 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 46 | 1142 | 9 | 30 | 1039 | 107 | 68 | 6 | 38 | 14 | 11 | 53 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 147 | 1194 | 9 | 152 | 1063 | 109 | 217 | 33 | 212 | 95 | 59 | 100 |
| Arrive On Green | 0.03 | 0.64 | 0.64 | 0.03 | 0.64 | 0.64 | 0.05 | 0.15 | 0.15 | 0.06 | 0.06 | 0.06 |
| Sat Flow, veh/h | 1781 | 1853 | 15 | 1781 | 1668 | 172 | 1781 | 221 | 1398 | 679 | 938 | 1585 |
| Grp Volume(v), veh/h | 46 | 0 | 1151 | 30 | 0 | 1146 | 68 | 0 | 44 | 25 | 0 | 53 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1839 | 1781 | 0 | 1619 | 1617 | 0 | 1585 |
| Q Serve(g_s), s | 0.9 | 0.0 | 61.4 | 0.6 | 0.0 | 64.5 | 3.7 | 0.0 | 2.6 | 0.0 | 0.0 | 3.5 |
| Cycle Q Clear(g_c), s | 0.9 | 0.0 | 61.4 | 0.6 | 0.0 | 64.5 | 3.7 | 0.0 | 2.6 | 1.4 | 0.0 | 3.5 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.09 | 1.00 | | 0.86 | 0.56 | | 1.00 |
| Lane Grp Cap(c), veh/h | 147 | 0 | 1204 | 152 | 0 | 1172 | 217 | 0 | 245 | 155 | 0 | 100 |
| V/C Ratio(X) | 0.31 | 0.00 | 0.96 | 0.20 | 0.00 | 0.98 | 0.31 | 0.00 | 0.18 | 0.16 | 0.00 | 0.53 |
| Avail Cap(c_a), veh/h | 170 | 0 | 1204 | 187 | 0 | 1180 | 222 | 0 | 254 | 159 | 0 | 105 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 27.0 | 0.0 | 17.7 | 24.4 | 0.0 | 18.8 | 42.6 | 0.0 | 39.8 | 47.8 | 0.0 | 48.8 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 16.8 | 0.2 | 0.0 | 21.0 | 0.8 | 0.0 | 0.3 | 0.5 | 0.0 | 4.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.3 | 0.0 | 33.8 | 0.8 | 0.0 | 36.3 | 3.0 | 0.0 | 1.9 | 1.2 | 0.0 | 2.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.4 | 0.0 | 34.5 | 24.6 | 0.0 | 39.8 | 43.4 | 0.0 | 40.2 | 48.3 | 0.0 | 53.3 |
| LnGrp LOS | C | A | C | C | A | D | D | A | D | D | A | D |
| Approach Vol, veh/h | | 1197 | | | 1176 | | | 112 | | | 78 | |
| Approach Delay, s/veh | | 34.2 | | | 39.4 | | | 42.1 | | | 51.7 | |
| Approach LOS | | C | | | D | | | D | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.5 | 75.3 | 9.5 | 13.3 | 10.2 | 74.6 | | 22.8 |
| Change Period (Y+Rc), s | 6.5 | 6.0 | 4.5 | 6.5 | 6.5 | 6.0 | | 6.5 |
| Max Green Setting (Gmax), s | 5.1 | 69.0 | 5.3 | 7.1 | 5.1 | 69.0 | | 16.9 |
| Max Q Clear Time (g_c+I1), s | 2.6 | 63.4 | 5.7 | 5.5 | 2.9 | 66.5 | | 4.6 |
| Green Ext Time (p_c), s | 0.0 | 4.4 | 0.0 | 0.0 | 0.0 | 2.1 | | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 37.5 |
| HCM 6th LOS | D |

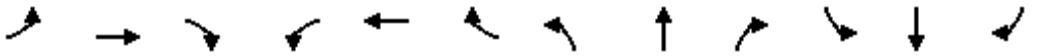


| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 443 | 666 | 433 | 57 | 47 | 521 |
| Future Volume (veh/h) | 443 | 666 | 433 | 57 | 47 | 521 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 471 | 709 | 461 | 61 | 50 | 554 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 614 | 1247 | 695 | 589 | 238 | 520 |
| Arrive On Green | 0.19 | 0.67 | 0.37 | 0.37 | 0.13 | 0.13 |
| Sat Flow, veh/h | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Grp Volume(v), veh/h | 471 | 709 | 461 | 61 | 50 | 554 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Q Serve(g_s), s | 8.6 | 12.2 | 12.3 | 1.5 | 1.5 | 8.0 |
| Cycle Q Clear(g_c), s | 8.6 | 12.2 | 12.3 | 1.5 | 1.5 | 8.0 |
| Prop In Lane | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 614 | 1247 | 695 | 589 | 238 | 520 |
| V/C Ratio(X) | 0.77 | 0.57 | 0.66 | 0.10 | 0.21 | 1.06 |
| Avail Cap(c_a), veh/h | 771 | 1247 | 695 | 589 | 238 | 520 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 9.9 | 5.4 | 15.7 | 12.3 | 23.2 | 20.2 |
| Incr Delay (d2), s/veh | 3.7 | 1.9 | 4.9 | 0.4 | 0.4 | 57.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.7 | 5.2 | 8.9 | 0.9 | 1.0 | 31.6 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 13.6 | 7.3 | 20.7 | 12.7 | 23.6 | 77.9 |
| LnGrp LOS | B | A | C | B | C | F |
| Approach Vol, veh/h | | 1180 | 522 | | 604 | |
| Approach Delay, s/veh | | 9.8 | 19.7 | | 73.4 | |
| Approach LOS | | A | B | | E | |

| Timer - Assigned Phs | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | 46.0 | | 14.0 | 17.7 | 28.3 |
| Change Period (Y+Rc), s | | | 6.0 | | 6.0 | 6.0 | 6.0 |
| Max Green Setting (Gmax), s | | | 40.0 | | 8.0 | 17.0 | 17.0 |
| Max Q Clear Time (g_c+I1), s | | | 14.2 | | 10.0 | 10.6 | 14.3 |
| Green Ext Time (p_c), s | | | 3.1 | | 0.0 | 1.1 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.7 |
| HCM 6th LOS | C |

# 2031 FUTURE PROJECTED CONDITIONS WITH INTERSECTION IMPROVEMENTS AND WIDENING



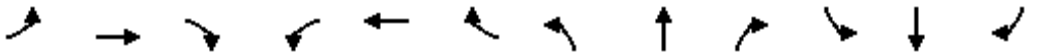
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 793 | 205 | 296 | 1043 | 34 | 419 | 67 | 276 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 891 | 230 | 333 | 1172 | 37 | 523 | 0 | 310 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 136 | 936 | 1051 | 353 | 1139 | 966 | 580 | 0 | 508 | 16 | 16 | 14 |
| Arrive On Green | 0.05 | 0.50 | 0.50 | 0.16 | 0.61 | 0.61 | 0.16 | 0.00 | 0.16 | 0.01 | 0.01 | 0.01 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 3563 | 0 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 891 | 230 | 333 | 1172 | 37 | 523 | 0 | 310 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.0 | 65.3 | 8.2 | 20.6 | 87.5 | 1.3 | 20.7 | 0.0 | 23.4 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.0 | 65.3 | 8.2 | 20.6 | 87.5 | 1.3 | 20.7 | 0.0 | 23.4 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 136 | 936 | 1051 | 353 | 1139 | 966 | 580 | 0 | 508 | 16 | 16 | 14 |
| V/C Ratio(X) | 0.84 | 0.95 | 0.22 | 0.94 | 1.03 | 0.04 | 0.90 | 0.00 | 0.61 | 0.06 | 0.12 | 0.14 |
| Avail Cap(c_a), veh/h | 144 | 939 | 1054 | 358 | 1139 | 966 | 580 | 0 | 508 | 87 | 91 | 77 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 37.8 | 34.3 | 9.5 | 46.8 | 28.1 | 11.2 | 59.0 | 0.0 | 41.2 | 70.6 | 70.6 | 70.6 |
| Incr Delay (d2), s/veh | 29.4 | 19.2 | 0.2 | 32.2 | 34.2 | 0.0 | 17.2 | 0.0 | 2.1 | 1.7 | 3.2 | 4.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 5.7 | 42.2 | 7.9 | 21.1 | 58.5 | 0.8 | 15.8 | 0.0 | 14.3 | 0.1 | 0.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 67.2 | 53.4 | 9.8 | 79.1 | 62.3 | 11.3 | 76.2 | 0.0 | 43.4 | 72.3 | 73.9 | 75.2 |
| LnGrp LOS | E | D | A | E | F | B | E | A | D | E | E | E |
| Approach Vol, veh/h | | 1235 | | | 1542 | | | 833 | | | 5 | |
| Approach Delay, s/veh | | 46.6 | | | 64.7 | | | 64.0 | | | 74.1 | |
| Approach LOS | | D | | | E | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 29.0 | 78.7 | | 6.9 | 13.4 | 94.4 | | 29.0 | | | | |
| Change Period (Y+Rc), s | 6.4 | 6.9 | | 5.6 | 6.4 | 6.9 | | 5.6 | | | | |
| Max Green Setting (Gmax), s | 23.0 | 72.1 | | 7.0 | 7.6 | 87.5 | | 23.4 | | | | |
| Max Q Clear Time (g_c+I1), s | 22.6 | 67.3 | | 2.2 | 7.0 | 89.5 | | 25.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.5 | | 0.0 | 0.0 | 0.0 | | 0.0 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 58.3 |
| HCM 6th LOS | | E |

**Notes**

User approved volume balancing among the lanes for turning movement.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 980 | 296 | 376 | 1052 | 4 | 217 | 9 | 323 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 1010 | 305 | 388 | 1085 | 4 | 231 | 0 | 333 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 218 | 1001 | 965 | 364 | 1312 | 1112 | 261 | 0 | 397 | 90 | 95 | 80 |
| Arrive On Green | 0.01 | 0.54 | 0.54 | 0.18 | 0.70 | 0.70 | 0.07 | 0.00 | 0.07 | 0.05 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 3563 | 0 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 1010 | 305 | 388 | 1085 | 4 | 231 | 0 | 333 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 80.3 | 14.0 | 26.6 | 61.9 | 0.1 | 9.6 | 0.0 | 11.0 | 2.9 | 5.8 | 3.2 |
| Cycle Q Clear(g_c), s | 0.4 | 80.3 | 14.0 | 26.6 | 61.9 | 0.1 | 9.6 | 0.0 | 11.0 | 2.9 | 5.8 | 3.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 218 | 1001 | 965 | 364 | 1312 | 1112 | 261 | 0 | 397 | 90 | 95 | 80 |
| V/C Ratio(X) | 0.05 | 1.01 | 0.32 | 1.07 | 0.83 | 0.00 | 0.88 | 0.00 | 0.84 | 0.39 | 0.77 | 0.44 |
| Avail Cap(c_a), veh/h | 257 | 1001 | 965 | 364 | 1312 | 1112 | 261 | 0 | 397 | 90 | 95 | 80 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.2 | 34.8 | 14.2 | 54.5 | 15.9 | 6.7 | 68.9 | 0.0 | 53.3 | 68.9 | 70.3 | 69.1 |
| Incr Delay (d2), s/veh | 0.0 | 30.6 | 0.4 | 65.9 | 5.0 | 0.0 | 28.0 | 0.0 | 14.6 | 2.7 | 31.3 | 3.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 53.7 | 10.1 | 27.9 | 33.0 | 0.1 | 9.1 | 0.0 | 19.1 | 2.5 | 6.5 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.2 | 65.4 | 14.6 | 120.4 | 21.0 | 6.7 | 96.9 | 0.0 | 67.9 | 71.7 | 101.6 | 72.8 |
| LnGrp LOS | C | F | B | F | C | A | F | A | E | E | F | E |
| Approach Vol, veh/h | | 1325 | | | 1477 | | | 564 | | | 143 | |
| Approach Delay, s/veh | | 53.4 | | | 47.0 | | | 79.8 | | | 87.2 | |
| Approach LOS | | D | | | D | | | E | | | F | |

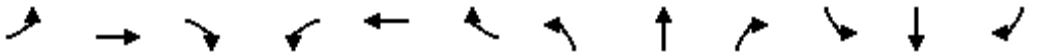
| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 33.0 | 87.2 | | 13.2 | 8.1 | 112.1 | | 16.6 | | | | |
| Change Period (Y+Rc), s | 6.4 | 6.9 | | 5.6 | 6.4 | 6.9 | | 5.6 | | | | |
| Max Green Setting (Gmax), s | 26.6 | 80.3 | | 7.6 | 5.0 | 101.9 | | 11.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 28.6 | 82.3 | | 7.8 | 2.4 | 63.9 | | 13.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.0 | 0.0 | 17.5 | | 0.0 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 56.3 |
| HCM 6th LOS | | E |

**Notes**

User approved volume balancing among the lanes for turning movement.

# 2034 BACKGROUND CONDITIONS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1007 | 718 | 51 | 424 | 492 | 418 | 37 | 1024 | 381 | 313 | 1024 | 983 |
| Future Volume (vph) | 1007 | 718 | 51 | 424 | 492 | 418 | 37 | 1024 | 381 | 313 | 1024 | 983 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3504 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.09 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3504 | | 3433 | 3539 | 1583 | 161 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 1144 | 816 | 58 | 482 | 559 | 475 | 42 | 1164 | 433 | 356 | 1164 | 1117 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 128 | 0 | 0 | 305 | 0 | 0 | 376 |
| Lane Group Flow (vph) | 1144 | 871 | 0 | 482 | 559 | 347 | 42 | 1164 | 128 | 356 | 1164 | 741 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 42.0 | 42.0 | | 35.0 | 35.0 | 35.0 | 50.2 | 46.2 | 46.2 | 19.0 | 61.2 | 61.2 |
| Effective Green, g (s) | 42.0 | 42.0 | | 35.0 | 35.0 | 35.0 | 50.2 | 46.2 | 46.2 | 19.0 | 61.2 | 61.2 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.30 | 0.28 | 0.28 | 0.12 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 872 | 890 | | 727 | 749 | 335 | 87 | 989 | 442 | 394 | 1311 | 586 |
| v/s Ratio Prot | c0.33 | 0.25 | | 0.14 | 0.16 | | 0.01 | 0.33 | | c0.10 | 0.33 | |
| v/s Ratio Perm | | | | | | c0.22 | 0.13 | | 0.08 | | | c0.47 |
| v/c Ratio | 1.31 | 0.98 | | 0.66 | 0.75 | 1.04 | 0.48 | 1.18 | 0.29 | 0.90 | 0.89 | 1.26 |
| Uniform Delay, d1 | 61.6 | 61.2 | | 59.7 | 60.9 | 65.1 | 44.5 | 59.5 | 46.6 | 72.2 | 48.8 | 52.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 148.6 | 24.8 | | 2.5 | 4.3 | 59.0 | 1.5 | 90.3 | 0.5 | 23.0 | 7.8 | 132.4 |
| Delay (s) | 210.2 | 86.0 | | 62.2 | 65.3 | 124.1 | 46.0 | 149.8 | 47.1 | 95.2 | 56.6 | 184.4 |
| Level of Service | F | F | | E | E | F | D | F | D | F | E | F |
| Approach Delay (s) | | 156.4 | | | 82.7 | | | 120.0 | | | 115.9 | |
| Approach LOS | | F | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 120.8 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.23 | | |
| Actuated Cycle Length (s) | 165.2 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 98.7% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 778 | 219 | 264 | 997 | 34 | 450 | 67 | 265 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 778 | 219 | 264 | 997 | 34 | 450 | 67 | 265 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 874 | 246 | 297 | 1120 | 37 | 506 | 73 | 298 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 135 | 740 | 208 | 199 | 1054 | 893 | 444 | 75 | 305 | 55 | 83 | 70 |
| Arrive On Green | 0.05 | 0.53 | 0.53 | 0.09 | 0.56 | 0.56 | 0.19 | 0.23 | 0.23 | 0.00 | 0.04 | 0.04 |
| Sat Flow, veh/h | 1781 | 1404 | 395 | 1781 | 1870 | 1585 | 1781 | 322 | 1313 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 1120 | 297 | 1120 | 37 | 506 | 0 | 371 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1799 | 1781 | 1870 | 1585 | 1781 | 0 | 1634 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.9 | 0.0 | 83.1 | 13.6 | 88.8 | 1.6 | 29.8 | 0.0 | 35.5 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.9 | 0.0 | 83.1 | 13.6 | 88.8 | 1.6 | 29.8 | 0.0 | 35.5 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 0.22 | 1.00 | | 1.00 | 1.00 | | 0.80 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 135 | 0 | 949 | 199 | 1054 | 893 | 444 | 0 | 379 | 55 | 83 | 70 |
| V/C Ratio(X) | 0.84 | 0.00 | 1.18 | 1.49 | 1.06 | 0.04 | 1.14 | 0.00 | 0.98 | 0.02 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 199 | 0 | 949 | 199 | 1054 | 893 | 444 | 0 | 379 | 333 | 349 | 296 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.0 | 0.0 | 37.3 | 56.8 | 34.4 | 15.4 | 60.2 | 0.0 | 60.1 | 71.9 | 72.0 | 72.0 |
| Incr Delay (d2), s/veh | 12.9 | 0.0 | 92.2 | 245.0 | 46.1 | 0.0 | 87.0 | 0.0 | 40.2 | 0.0 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.9 | 0.0 | 81.0 | 33.1 | 66.2 | 1.1 | 21.1 | 0.0 | 25.6 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 58.9 | 0.0 | 129.4 | 301.7 | 80.5 | 15.4 | 147.2 | 0.0 | 100.3 | 72.0 | 72.1 | 72.2 |
| LnGrp LOS | E | A | F | F | F | B | F | A | F | E | E | E |
| Approach Vol, veh/h | | 1234 | | | 1454 | | | 877 | | | 5 | |
| Approach Delay, s/veh | | 122.9 | | | 124.0 | | | 127.4 | | | 72.1 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 20.0 | 90.0 | 35.0 | 12.6 | 14.3 | 95.7 | 5.4 | 42.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 31.8 | 2.2 | 7.9 | 90.8 | 2.1 | 37.5 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 124.4 |
| HCM 6th LOS | F |

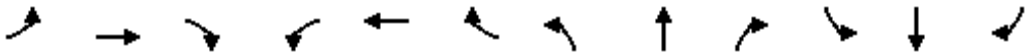
| Intersection | |
|---|---|
| Int Delay, s/veh | 9.6 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 18 | 1004 | 1197 | 11 | 23 | 63 |
| Future Vol, veh/h | 18 | 1004 | 1197 | 11 | 23 | 63 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 205 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 90 | 90 | 90 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 20 | 1116 | 1330 | 12 | 26 | 70 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1342 | 0 | - | 0 | 2492 | 1336 |
| Stage 1 | - | - | - | - | 1336 | - |
| Stage 2 | - | - | - | - | 1156 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 514 | - | - | - | 32 | 188 |
| Stage 1 | - | - | - | - | 245 | - |
| Stage 2 | - | - | - | - | 300 | - |
| Platoon blocked, % | | | - | - | | |
| Mov Cap-1 Maneuver | 514 | - | - | - | 31 | 188 |
| Mov Cap-2 Maneuver | - | - | - | - | 31 | - |
| Stage 1 | - | - | - | - | 235 | - |
| Stage 2 | - | - | - | - | 300 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.2 | 0 | 255.3 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 514 | - | - | - | 80 |
| HCM Lane V/C Ratio | 0.039 | - | - | - | 1.194 |
| HCM Control Delay (s) | 12.3 | - | - | - | 255.3 |
| HCM Lane LOS | B | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 7 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 293 | 755 | 40 | 25 | 880 | 47 | 122 | 65 | 40 | 67 | 33 | 245 |
| Future Volume (veh/h) | 293 | 755 | 40 | 25 | 880 | 47 | 122 | 65 | 40 | 67 | 33 | 245 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 329 | 848 | 45 | 28 | 989 | 53 | 137 | 73 | 45 | 75 | 37 | 275 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 284 | 954 | 51 | 184 | 784 | 42 | 153 | 281 | 173 | 327 | 50 | 369 |
| Arrive On Green | 0.12 | 0.54 | 0.54 | 0.03 | 0.45 | 0.45 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 |
| Sat Flow, veh/h | 1781 | 1760 | 93 | 1781 | 1759 | 94 | 1067 | 1083 | 667 | 1274 | 191 | 1423 |
| Grp Volume(v), veh/h | 329 | 0 | 893 | 28 | 0 | 1042 | 137 | 0 | 118 | 75 | 0 | 312 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1854 | 1781 | 0 | 1853 | 1067 | 0 | 1750 | 1274 | 0 | 1614 |
| Q Serve(g_s), s | 13.5 | 0.0 | 46.8 | 0.9 | 0.0 | 49.0 | 9.0 | 0.0 | 5.9 | 5.5 | 0.0 | 19.5 |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 46.8 | 0.9 | 0.0 | 49.0 | 28.5 | 0.0 | 5.9 | 11.4 | 0.0 | 19.5 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.38 | 1.00 | | 0.88 |
| Lane Grp Cap(c), veh/h | 284 | 0 | 1005 | 184 | 0 | 826 | 153 | 0 | 453 | 327 | 0 | 418 |
| V/C Ratio(X) | 1.16 | 0.00 | 0.89 | 0.15 | 0.00 | 1.26 | 0.90 | 0.00 | 0.26 | 0.23 | 0.00 | 0.75 |
| Avail Cap(c_a), veh/h | 284 | 0 | 1005 | 357 | 0 | 826 | 153 | 0 | 453 | 327 | 0 | 418 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.2 | 0.0 | 22.3 | 21.8 | 0.0 | 30.5 | 52.1 | 0.0 | 32.4 | 36.9 | 0.0 | 37.4 |
| Incr Delay (d2), s/veh | 103.2 | 0.0 | 10.4 | 0.1 | 0.0 | 127.6 | 44.4 | 0.0 | 0.3 | 0.4 | 0.0 | 7.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 17.6 | 0.0 | 27.5 | 0.6 | 0.0 | 70.2 | 9.6 | 0.0 | 4.6 | 3.1 | 0.0 | 13.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 139.4 | 0.0 | 32.7 | 22.0 | 0.0 | 158.1 | 96.6 | 0.0 | 32.7 | 37.2 | 0.0 | 44.6 |
| LnGrp LOS | F | A | C | C | A | F | F | A | C | D | A | D |
| Approach Vol, veh/h | | 1222 | | | 1070 | | | 255 | | | 387 | |
| Approach Delay, s/veh | | 61.4 | | | 154.6 | | | 67.0 | | | 43.2 | |
| Approach LOS | | E | | | F | | | E | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.4 | 65.6 | | 35.0 | 20.0 | 55.0 | | 35.0 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 48.8 | | 21.5 | 15.5 | 51.0 | | 30.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.1 | | 1.0 | 0.0 | 0.0 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 93.5 | |
| HCM 6th LOS | | F | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 37 | 47 | 8 | 121 | 125 | 61 | 12 | 543 | 89 | 35 | 410 | 32 |
| Future Volume (veh/h) | 37 | 47 | 8 | 121 | 125 | 61 | 12 | 543 | 89 | 35 | 410 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 44 | 56 | 10 | 144 | 149 | 73 | 14 | 646 | 0 | 42 | 488 | 0 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 189 | 269 | 48 | 316 | 206 | 101 | 444 | 879 | | 350 | 926 | |
| Arrive On Green | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.02 | 0.47 | 0.00 | 0.04 | 0.50 | 0.00 |
| Sat Flow, veh/h | 1159 | 1545 | 276 | 1335 | 1185 | 581 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 44 | 0 | 66 | 144 | 0 | 222 | 14 | 646 | 0 | 42 | 488 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1159 | 0 | 1821 | 1335 | 0 | 1766 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 2.1 | 0.0 | 1.8 | 5.9 | 0.0 | 6.8 | 0.2 | 16.1 | 0.0 | 0.7 | 10.2 | 0.0 |
| Cycle Q Clear(g_c), s | 9.0 | 0.0 | 1.8 | 7.7 | 0.0 | 6.8 | 0.2 | 16.1 | 0.0 | 0.7 | 10.2 | 0.0 |
| Prop In Lane | 1.00 | | 0.15 | 1.00 | | 0.33 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 189 | 0 | 317 | 316 | 0 | 307 | 444 | 879 | | 350 | 926 | |
| V/C Ratio(X) | 0.23 | 0.00 | 0.21 | 0.46 | 0.00 | 0.72 | 0.03 | 0.73 | | 0.12 | 0.53 | |
| Avail Cap(c_a), veh/h | 189 | 0 | 317 | 316 | 0 | 307 | 568 | 879 | | 430 | 926 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 26.6 | 0.0 | 20.3 | 23.6 | 0.0 | 22.4 | 8.3 | 12.3 | 0.0 | 9.4 | 9.9 | 0.0 |
| Incr Delay (d2), s/veh | 0.6 | 0.0 | 0.3 | 1.0 | 0.0 | 8.1 | 0.0 | 5.4 | 0.0 | 0.2 | 2.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.0 | 0.0 | 1.2 | 3.1 | 0.0 | 5.6 | 0.1 | 9.9 | 0.0 | 0.3 | 6.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 27.3 | 0.0 | 20.7 | 24.7 | 0.0 | 30.5 | 8.3 | 17.7 | 0.0 | 9.5 | 12.0 | 0.0 |
| LnGrp LOS | C | A | C | C | A | C | A | B | | A | B | |
| Approach Vol, veh/h | | 110 | | | 366 | | | 660 | | | 530 | |
| Approach Delay, s/veh | | 23.3 | | | 28.2 | | | 17.5 | | | 11.8 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.4 | 33.0 | | 16.0 | 7.0 | 34.4 | | 16.0 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 27.0 | | 10.0 | 5.0 | 27.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.7 | 18.1 | | 11.0 | 2.2 | 12.2 | | 9.7 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.9 | | 0.0 | 0.0 | 1.6 | | 0.0 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 18.5 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.4 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 41 | 37 | 162 | 25 | 11 | 80 |
| Future Vol, veh/h | 41 | 37 | 162 | 25 | 11 | 80 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 43 | 39 | 169 | 26 | 11 | 83 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 195 | 0 | - | 0 | 307 | 182 |
| Stage 1 | - | - | - | - | 182 | - |
| Stage 2 | - | - | - | - | 125 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1378 | - | - | - | 685 | 861 |
| Stage 1 | - | - | - | - | 849 | - |
| Stage 2 | - | - | - | - | 901 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1378 | - | - | - | 663 | 861 |
| Mov Cap-2 Maneuver | - | - | - | - | 663 | - |
| Stage 1 | - | - | - | - | 822 | - |
| Stage 2 | - | - | - | - | 901 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4 | 0 | 9.9 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1378 | - | - | - | 831 |
| HCM Lane V/C Ratio | 0.031 | - | - | - | 0.114 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.9 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 22.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 418 | 364 | 782 | 145 | 29 | 281 |
| Future Vol, veh/h | 418 | 364 | 782 | 145 | 29 | 281 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 454 | 396 | 850 | 158 | 32 | 305 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1008 | 0 | - | 0 | 2154 | 850 |
| Stage 1 | - | - | - | - | 850 | - |
| Stage 2 | - | - | - | - | 1304 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 687 | - | - | - | 53 | 360 |
| Stage 1 | - | - | - | - | 419 | - |
| Stage 2 | - | - | - | - | 254 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 687 | - | - | - | ~ 18 | 360 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 18 | - |
| Stage 1 | - | - | - | - | 142 | - |
| Stage 2 | - | - | - | - | 254 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.6 | 0 | 122 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 687 | - | - | - | 18 | 360 |
| HCM Lane V/C Ratio | 0.661 | - | - | - | 1.751 | 0.848 |
| HCM Control Delay (s) | 19.9 | - | - | - | $ 805.5 | 51.5 |
| HCM Lane LOS | C | - | - | - | F | F |
| HCM 95th %tile Q(veh) | 5 | - | - | - | 4.4 | 7.8 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

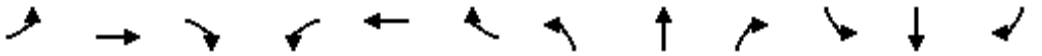
| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 128 | 231 | 0 | 0 | 0 |
| Future Vol, veh/h | 0 | 128 | 231 | 0 | 0 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 139 | 251 | 0 | 0 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 251 | 0 | - | 0 | 390 | 251 |
| Stage 1 | - | - | - | - | 251 | - |
| Stage 2 | - | - | - | - | 139 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1314 | - | - | - | 614 | 788 |
| Stage 1 | - | - | - | - | 791 | - |
| Stage 2 | - | - | - | - | 888 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1314 | - | - | - | 614 | 788 |
| Mov Cap-2 Maneuver | - | - | - | - | 614 | - |
| Stage 1 | - | - | - | - | 791 | - |
| Stage 2 | - | - | - | - | 888 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1314 | - | - | - | - |
| HCM Lane V/C Ratio | - | - | - | - | - |
| HCM Control Delay (s) | 0 | - | - | - | 0 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 753 | 596 | 64 | 507 | 692 | 255 | 72 | 1000 | 518 | 301 | 1160 | 983 |
| Future Volume (vph) | 753 | 596 | 64 | 507 | 692 | 255 | 72 | 1000 | 518 | 301 | 1160 | 983 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3488 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.09 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3488 | | 3433 | 3539 | 1583 | 159 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 793 | 627 | 67 | 534 | 728 | 268 | 76 | 1053 | 545 | 317 | 1221 | 1035 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 133 | 0 | 0 | 313 | 0 | 0 | 365 |
| Lane Group Flow (vph) | 793 | 689 | 0 | 534 | 728 | 135 | 76 | 1053 | 232 | 317 | 1221 | 670 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 41.8 | 41.8 | | 35.0 | 35.0 | 35.0 | 51.9 | 46.9 | 46.9 | 18.1 | 60.0 | 60.0 |
| Effective Green, g (s) | 41.8 | 41.8 | | 35.0 | 35.0 | 35.0 | 51.9 | 46.9 | 46.9 | 18.1 | 60.0 | 60.0 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.31 | 0.28 | 0.28 | 0.11 | 0.36 | 0.36 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 870 | 884 | | 729 | 751 | 336 | 98 | 1007 | 450 | 377 | 1288 | 576 |
| v/s Ratio Prot | c0.23 | 0.20 | | 0.16 | c0.21 | | 0.02 | 0.30 | | c0.09 | 0.34 | |
| v/s Ratio Perm | | | | | | 0.09 | 0.22 | | 0.15 | | | c0.42 |
| v/c Ratio | 0.91 | 0.78 | | 0.73 | 0.97 | 0.40 | 0.78 | 1.05 | 0.51 | 0.84 | 0.95 | 1.16 |
| Uniform Delay, d1 | 59.7 | 57.2 | | 60.5 | 64.4 | 55.9 | 45.8 | 59.0 | 49.4 | 71.9 | 50.9 | 52.4 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 13.8 | 4.7 | | 4.1 | 25.3 | 1.1 | 28.7 | 41.0 | 1.3 | 14.9 | 14.4 | 91.3 |
| Delay (s) | 73.5 | 61.9 | | 64.6 | 89.6 | 57.0 | 74.5 | 100.0 | 50.7 | 86.8 | 65.3 | 143.7 |
| Level of Service | E | E | | E | F | E | E | F | D | F | E | F |
| Approach Delay (s) | | 68.1 | | | 75.2 | | | 82.8 | | | 99.5 | |
| Approach LOS | | E | | | E | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 84.1 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.04 | | |
| Actuated Cycle Length (s) | 164.8 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 98.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 919 | 318 | 359 | 1028 | 4 | 233 | 9 | 288 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 919 | 318 | 359 | 1028 | 4 | 233 | 9 | 288 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 947 | 328 | 370 | 1060 | 4 | 240 | 10 | 297 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 113 | 704 | 244 | 200 | 1132 | 960 | 360 | 11 | 315 | 106 | 180 | 153 |
| Arrive On Green | 0.01 | 0.53 | 0.53 | 0.09 | 0.61 | 0.61 | 0.13 | 0.20 | 0.20 | 0.02 | 0.10 | 0.10 |
| Sat Flow, veh/h | 1781 | 1328 | 460 | 1781 | 1870 | 1585 | 1781 | 52 | 1541 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 1275 | 370 | 1060 | 4 | 240 | 0 | 307 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1788 | 1781 | 1870 | 1585 | 1781 | 0 | 1593 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 0.0 | 83.1 | 13.6 | 80.9 | 0.2 | 18.5 | 0.0 | 29.8 | 2.8 | 5.8 | 3.2 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 83.1 | 13.6 | 80.9 | 0.2 | 18.5 | 0.0 | 29.8 | 2.8 | 5.8 | 3.2 |
| Prop In Lane | 1.00 | | 0.26 | 1.00 | | 1.00 | 1.00 | | 0.97 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 113 | 0 | 947 | 200 | 1132 | 960 | 360 | 0 | 326 | 106 | 180 | 153 |
| V/C Ratio(X) | 0.09 | 0.00 | 1.35 | 1.85 | 0.94 | 0.00 | 0.67 | 0.00 | 0.94 | 0.33 | 0.41 | 0.23 |
| Avail Cap(c_a), veh/h | 248 | 0 | 947 | 200 | 1132 | 960 | 461 | 0 | 349 | 344 | 351 | 297 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 32.1 | 0.0 | 36.9 | 56.7 | 28.2 | 12.2 | 52.2 | 0.0 | 61.4 | 62.3 | 66.6 | 65.5 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 162.7 | 399.5 | 14.4 | 0.0 | 1.9 | 0.0 | 32.3 | 1.3 | 1.5 | 0.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 112.4 | 46.2 | 48.0 | 0.1 | 13.0 | 0.0 | 20.9 | 2.3 | 5.1 | 2.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.2 | 0.0 | 199.6 | 456.2 | 42.6 | 12.2 | 54.2 | 0.0 | 93.7 | 63.6 | 68.1 | 66.2 |
| LnGrp LOS | C | A | F | F | D | B | D | A | F | E | E | E |
| Approach Vol, veh/h | | 1285 | | | 1434 | | | 547 | | | 143 | |
| Approach Delay, s/veh | | 198.3 | | | 149.3 | | | 76.4 | | | 66.6 | |
| Approach LOS | | F | | | F | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 30.0 | 90.0 | 26.1 | 20.7 | 8.2 | 101.8 | 9.1 | 37.7 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 20.5 | 7.8 | 2.4 | 82.9 | 4.8 | 31.8 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.4 | 0.3 | 0.0 | 0.1 | 0.1 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 152.6 |
| HCM 6th LOS | F |

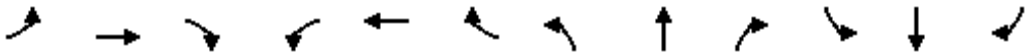
| Intersection | |
|---|---|
| Int Delay, s/veh | 1.9 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 62 | 1199 | 1202 | 20 | 7 | 53 |
| Future Vol, veh/h | 62 | 1199 | 1202 | 20 | 7 | 53 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 205 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 98 | 98 | 98 | 98 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 63 | 1223 | 1227 | 20 | 7 | 54 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1247 | 0 | - | 0 | 2586 | 1237 |
| Stage 1 | - | - | - | - | 1237 | - |
| Stage 2 | - | - | - | - | 1349 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 558 | - | - | - | 28 | 215 |
| Stage 1 | - | - | - | - | 274 | - |
| Stage 2 | - | - | - | - | 242 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 558 | - | - | - | 25 | 215 |
| Mov Cap-2 Maneuver | - | - | - | - | 25 | - |
| Stage 1 | - | - | - | - | 243 | - |
| Stage 2 | - | - | - | - | 242 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.6 | 0 | 68.4 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 558 | - | - | - | 114 |
| HCM Lane V/C Ratio | 0.113 | - | - | - | 0.537 |
| HCM Control Delay (s) | 12.3 | - | - | - | 68.4 |
| HCM Lane LOS | B | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.4 | - | - | - | 2.5 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 37 | 1145 | 9 | 31 | 1019 | 113 | 71 | 7 | 40 | 15 | 12 | 41 |
| Future Volume (veh/h) | 37 | 1145 | 9 | 31 | 1019 | 113 | 71 | 7 | 40 | 15 | 12 | 41 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 38 | 1168 | 9 | 32 | 1040 | 115 | 72 | 7 | 41 | 15 | 12 | 42 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 154 | 1148 | 9 | 147 | 1018 | 113 | 199 | 26 | 153 | 203 | 40 | 141 |
| Arrive On Green | 0.04 | 0.62 | 0.62 | 0.03 | 0.62 | 0.62 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 1781 | 1854 | 14 | 1781 | 1654 | 183 | 1350 | 236 | 1385 | 1357 | 365 | 1276 |
| Grp Volume(v), veh/h | 38 | 0 | 1177 | 32 | 0 | 1155 | 72 | 0 | 48 | 15 | 0 | 54 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1837 | 1350 | 0 | 1621 | 1357 | 0 | 1641 |
| Q Serve(g_s), s | 0.6 | 0.0 | 49.3 | 0.5 | 0.0 | 49.0 | 4.1 | 0.0 | 2.2 | 0.8 | 0.0 | 2.4 |
| Cycle Q Clear(g_c), s | 0.6 | 0.0 | 49.3 | 0.5 | 0.0 | 49.0 | 6.5 | 0.0 | 2.2 | 3.0 | 0.0 | 2.4 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.10 | 1.00 | | 0.85 | 1.00 | | 0.78 |
| Lane Grp Cap(c), veh/h | 154 | 0 | 1156 | 147 | 0 | 1131 | 199 | 0 | 179 | 203 | 0 | 181 |
| V/C Ratio(X) | 0.25 | 0.00 | 1.02 | 0.22 | 0.00 | 1.02 | 0.36 | 0.00 | 0.27 | 0.07 | 0.00 | 0.30 |
| Avail Cap(c_a), veh/h | 392 | 0 | 1156 | 392 | 0 | 1131 | 533 | 0 | 580 | 539 | 0 | 587 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.0 | 0.0 | 15.2 | 20.1 | 0.0 | 15.3 | 35.6 | 0.0 | 32.5 | 33.8 | 0.0 | 32.6 |
| Incr Delay (d2), s/veh | 0.3 | 0.0 | 31.0 | 0.3 | 0.0 | 32.3 | 1.1 | 0.0 | 0.8 | 0.2 | 0.0 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.7 | 0.0 | 31.8 | 0.6 | 0.0 | 31.9 | 2.5 | 0.0 | 1.6 | 0.5 | 0.0 | 1.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.3 | 0.0 | 46.2 | 20.4 | 0.0 | 47.7 | 36.7 | 0.0 | 33.3 | 34.0 | 0.0 | 33.5 |
| LnGrp LOS | C | A | F | C | A | F | D | A | C | C | A | C |
| Approach Vol, veh/h | | 1215 | | | 1187 | | | 120 | | | 69 | |
| Approach Delay, s/veh | | 45.3 | | | 46.9 | | | 35.3 | | | 33.6 | |
| Approach LOS | | D | | | D | | | D | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.0 | 55.3 | | 15.3 | 9.3 | 55.0 | | 15.3 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.5 | 51.3 | | 5.0 | 2.6 | 51.0 | | 8.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.2 | 0.0 | 0.0 | | 0.4 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 45.3 | |
| HCM 6th LOS | | D | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 17 | 52 | 8 | 80 | 36 | 35 | 12 | 372 | 92 | 47 | 575 | 73 |
| Future Volume (veh/h) | 17 | 52 | 8 | 80 | 36 | 35 | 12 | 372 | 92 | 47 | 575 | 73 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 18 | 54 | 8 | 83 | 38 | 36 | 12 | 388 | 0 | 49 | 599 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 335 | 295 | 44 | 348 | 164 | 155 | 327 | 788 | | 493 | 850 | |
| Arrive On Green | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.02 | 0.42 | 0.00 | 0.05 | 0.45 | 0.00 |
| Sat Flow, veh/h | 1326 | 1592 | 236 | 1340 | 883 | 837 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 18 | 0 | 62 | 83 | 0 | 74 | 12 | 388 | 0 | 49 | 599 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1326 | 0 | 1828 | 1340 | 0 | 1720 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.6 | 0.0 | 1.5 | 2.9 | 0.0 | 1.9 | 0.2 | 7.9 | 0.0 | 0.8 | 13.4 | 0.0 |
| Cycle Q Clear(g_c), s | 2.5 | 0.0 | 1.5 | 4.4 | 0.0 | 1.9 | 0.2 | 7.9 | 0.0 | 0.8 | 13.4 | 0.0 |
| Prop In Lane | 1.00 | | 0.13 | 1.00 | | 0.49 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 335 | 0 | 339 | 348 | 0 | 319 | 327 | 788 | | 493 | 850 | |
| V/C Ratio(X) | 0.05 | 0.00 | 0.18 | 0.24 | 0.00 | 0.23 | 0.04 | 0.49 | | 0.10 | 0.70 | |
| Avail Cap(c_a), veh/h | 343 | 0 | 350 | 356 | 0 | 329 | 470 | 788 | | 577 | 850 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 19.2 | 0.0 | 17.9 | 19.8 | 0.0 | 18.1 | 9.7 | 11.0 | 0.0 | 8.2 | 11.4 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.3 | 0.3 | 0.0 | 0.4 | 0.0 | 2.2 | 0.0 | 0.1 | 4.9 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 1.0 | 1.4 | 0.0 | 1.2 | 0.1 | 4.9 | 0.0 | 0.4 | 8.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 19.2 | 0.0 | 18.2 | 20.1 | 0.0 | 18.5 | 9.7 | 13.2 | 0.0 | 8.3 | 16.3 | 0.0 |
| LnGrp LOS | B | A | B | C | A | B | A | B | | A | B | |
| Approach Vol, veh/h | | 80 | | | 157 | | | 400 | | | 648 | |
| Approach Delay, s/veh | | 18.4 | | | 19.4 | | | 13.1 | | | 15.7 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.5 | 28.0 | | 15.7 | 6.8 | 29.7 | | 15.7 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.0 | 22.0 | | 10.0 | 5.0 | 22.0 | | 10.0 |
| Max Q Clear Time (g_c+I1), s | 2.8 | 9.9 | | 4.5 | 2.2 | 15.4 | | 6.4 |
| Green Ext Time (p_c), s | 0.0 | 1.1 | | 0.1 | 0.0 | 1.4 | | 0.2 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 15.5 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 64 | 105 | 70 | 9 | 23 | 60 |
| Future Vol, veh/h | 64 | 105 | 70 | 9 | 23 | 60 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 67 | 109 | 73 | 9 | 24 | 63 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 82 | 0 | - | 0 | 321 | 78 |
| Stage 1 | - | - | - | - | 78 | - |
| Stage 2 | - | - | - | - | 243 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1515 | - | - | - | 673 | 983 |
| Stage 1 | - | - | - | - | 945 | - |
| Stage 2 | - | - | - | - | 797 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1515 | - | - | - | 641 | 983 |
| Mov Cap-2 Maneuver | - | - | - | - | 641 | - |
| Stage 1 | - | - | - | - | 901 | - |
| Stage 2 | - | - | - | - | 797 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 2.8 | 0 | 9.7 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1515 | - | - | - | 856 |
| HCM Lane V/C Ratio | 0.044 | - | - | - | 0.101 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 32.5 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 431 | 714 | 464 | 61 | 51 | 525 |
| Future Vol, veh/h | 431 | 714 | 464 | 61 | 51 | 525 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 459 | 760 | 494 | 65 | 54 | 559 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 559 | 0 | - | 0 | 2172 | 494 |
| Stage 1 | - | - | - | - | 494 | - |
| Stage 2 | - | - | - | - | 1678 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1012 | - | - | - | ~ 51 | 575 |
| Stage 1 | - | - | - | - | 613 | - |
| Stage 2 | - | - | - | - | 166 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1012 | - | - | - | ~ 28 | 575 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 28 | - |
| Stage 1 | - | - | - | - | 335 | - |
| Stage 2 | - | - | - | - | 166 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4.3 | 0 | 118 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1012 | - | - | - | 28 | 575 |
| HCM Lane V/C Ratio | 0.453 | - | - | - | 1.938 | 0.971 |
| HCM Control Delay (s) | 11.5 | - | - | - | $ 740.3 | 57.5 |
| HCM Lane LOS | B | - | - | - | F | F |
| HCM 95th %tile Q(veh) | 2.4 | - | - | - | 6.4 | 13.5 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0 |

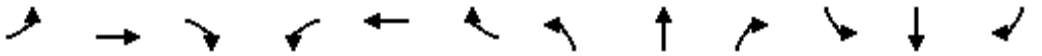
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 143 | 113 | 0 | 0 | 0 |
| Future Vol, veh/h | 0 | 143 | 113 | 0 | 0 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 155 | 123 | 0 | 0 | 0 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 123 | 0 | - | 0 | 278 | 123 |
| Stage 1 | - | - | - | - | 123 | - |
| Stage 2 | - | - | - | - | 155 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1464 | - | - | - | 712 | 928 |
| Stage 1 | - | - | - | - | 902 | - |
| Stage 2 | - | - | - | - | 873 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1464 | - | - | - | 712 | 928 |
| Mov Cap-2 Maneuver | - | - | - | - | 712 | - |
| Stage 1 | - | - | - | - | 902 | - |
| Stage 2 | - | - | - | - | 873 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 0 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1464 | - | - | - | - |
| HCM Lane V/C Ratio | - | - | - | - | - |
| HCM Control Delay (s) | 0 | - | - | - | 0 |
| HCM Lane LOS | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - |

# 2034 FUTURE PROJECTED CONDITIONS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1007 | 739 | 51 | 468 | 536 | 530 | 37 | 1024 | 402 | 367 | 1024 | 983 |
| Future Volume (vph) | 1007 | 739 | 51 | 468 | 536 | 530 | 37 | 1024 | 402 | 367 | 1024 | 983 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3505 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.09 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3505 | | 3433 | 3539 | 1583 | 162 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 1144 | 840 | 58 | 532 | 609 | 602 | 42 | 1164 | 457 | 417 | 1164 | 1117 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 128 | 0 | 0 | 305 | 0 | 0 | 372 |
| Lane Group Flow (vph) | 1144 | 895 | 0 | 532 | 609 | 474 | 42 | 1164 | 152 | 417 | 1164 | 745 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 42.0 | 42.0 | | 35.0 | 35.0 | 35.0 | 50.0 | 46.0 | 46.0 | 20.0 | 62.0 | 62.0 |
| Effective Green, g (s) | 42.0 | 42.0 | | 35.0 | 35.0 | 35.0 | 50.0 | 46.0 | 46.0 | 20.0 | 62.0 | 62.0 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.30 | 0.28 | 0.28 | 0.12 | 0.37 | 0.37 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 868 | 886 | | 723 | 746 | 333 | 87 | 980 | 438 | 413 | 1321 | 591 |
| v/s Ratio Prot | c0.33 | 0.26 | | 0.15 | 0.17 | | 0.01 | 0.33 | | c0.12 | 0.33 | |
| v/s Ratio Perm | | | | | | c0.30 | 0.13 | | 0.10 | | | c0.47 |
| v/c Ratio | 1.32 | 1.01 | | 0.74 | 0.82 | 1.42 | 0.48 | 1.19 | 0.35 | 1.01 | 0.88 | 1.26 |
| Uniform Delay, d1 | 62.0 | 62.0 | | 61.2 | 62.4 | 65.5 | 44.8 | 60.0 | 48.0 | 73.0 | 48.6 | 52.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 151.2 | 32.8 | | 4.2 | 7.2 | 207.4 | 1.5 | 94.8 | 0.7 | 46.7 | 7.4 | 130.8 |
| Delay (s) | 213.2 | 94.8 | | 65.3 | 69.7 | 272.9 | 46.3 | 154.8 | 48.6 | 119.7 | 55.9 | 182.8 |
| Level of Service | F | F | | E | E | F | D | F | D | F | E | F |
| Approach Delay (s) | | 161.1 | | | 138.6 | | | 122.9 | | | 118.3 | |
| Approach LOS | | F | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 134.3 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.33 | | |
| Actuated Cycle Length (s) | 166.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 104.9% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 970 | 258 | 297 | 1320 | 37 | 530 | 73 | 298 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 135 | 751 | 200 | 199 | 1054 | 893 | 444 | 75 | 305 | 55 | 83 | 70 |
| Arrive On Green | 0.05 | 0.53 | 0.53 | 0.09 | 0.56 | 0.56 | 0.19 | 0.23 | 0.23 | 0.00 | 0.04 | 0.04 |
| Sat Flow, veh/h | 1781 | 1424 | 379 | 1781 | 1870 | 1585 | 1781 | 322 | 1313 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 1228 | 297 | 1320 | 37 | 530 | 0 | 371 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1802 | 1781 | 1870 | 1585 | 1781 | 0 | 1634 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.9 | 0.0 | 83.1 | 13.6 | 88.8 | 1.6 | 29.8 | 0.0 | 35.5 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.9 | 0.0 | 83.1 | 13.6 | 88.8 | 1.6 | 29.8 | 0.0 | 35.5 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 0.80 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 135 | 0 | 950 | 199 | 1054 | 893 | 444 | 0 | 379 | 55 | 83 | 70 |
| V/C Ratio(X) | 0.84 | 0.00 | 1.29 | 1.49 | 1.25 | 0.04 | 1.19 | 0.00 | 0.98 | 0.02 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 199 | 0 | 950 | 199 | 1054 | 893 | 444 | 0 | 379 | 333 | 349 | 296 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.0 | 0.0 | 37.3 | 56.8 | 34.4 | 15.4 | 60.2 | 0.0 | 60.1 | 71.9 | 72.0 | 72.0 |
| Incr Delay (d2), s/veh | 12.9 | 0.0 | 139.4 | 245.0 | 121.7 | 0.0 | 107.7 | 0.0 | 40.2 | 0.0 | 0.1 | 0.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.9 | 0.0 | 102.4 | 33.1 | 103.5 | 1.1 | 24.9 | 0.0 | 25.6 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 58.9 | 0.0 | 176.7 | 301.7 | 156.1 | 15.4 | 167.8 | 0.0 | 100.3 | 72.0 | 72.1 | 72.2 |
| LnGrp LOS | E | A | F | F | F | B | F | A | F | E | E | E |
| Approach Vol, veh/h | | 1342 | | | 1654 | | | 901 | | | 5 | |
| Approach Delay, s/veh | | 166.7 | | | 179.1 | | | 140.0 | | | 72.1 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 20.0 | 90.0 | 35.0 | 12.6 | 14.3 | 95.7 | 5.4 | 42.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 31.8 | 2.2 | 7.9 | 90.8 | 2.1 | 37.5 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 165.7 |
| HCM 6th LOS | F |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1475.7 |

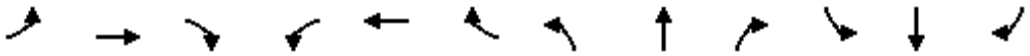
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 18 | 1004 | 85 | 54 | 1197 | 11 | 178 | 22 | 111 | 23 | 10 | 63 |
| Future Vol, veh/h | 18 | 1004 | 85 | 54 | 1197 | 11 | 178 | 22 | 111 | 23 | 10 | 63 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 205 | - | - | 205 | - | - | 0 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 90 | 90 | 92 | 92 | 90 | 90 | 92 | 92 | 92 | 90 | 92 | 90 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 20 | 1116 | 92 | 59 | 1330 | 12 | 193 | 24 | 121 | 26 | 11 | 70 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1342 | 0 | 0 | 1208 | 0 | 0 | 2697 | 2662 | 1162 | 2729 | 2702 | 1336 |
| Stage 1 | - | - | - | - | - | - | 1202 | 1202 | - | 1454 | 1454 | - |
| Stage 2 | - | - | - | - | - | - | 1495 | 1460 | - | 1275 | 1248 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 514 | - | - | 578 | - | - | ~ 14 | ~ 23 | 237 | ~ 13 | 21 | 188 |
| Stage 1 | - | - | - | - | - | - | 225 | 258 | - | 162 | 195 | - |
| Stage 2 | - | - | - | - | - | - | ~ 153 | 194 | - | 205 | 245 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 514 | - | - | 578 | - | - | ~ 4 | ~ 20 | 237 | - | 18 | 188 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | ~ 4 | ~ 20 | - | - | 18 | - |
| Stage 1 | - | - | - | - | - | - | 216 | 248 | - | 156 | 175 | - |
| Stage 2 | - | - | - | - | - | - | ~ 81 | 174 | - | 87 | 235 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.2 | 0.5 | $ 13413.4 | |
| HCM LOS | | | F | - |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 4 | 85 | 514 | - | - | 578 | - | - | - |
| HCM Lane V/C Ratio | 48.37 | 1.701 | 0.039 | - | - | 0.102 | - | - | - |
| HCM Control Delay (s) | $ 23103.8 | $ 444.3 | 12.3 | - | - | 11.9 | - | - | - |
| HCM Lane LOS | F | F | B | - | - | B | - | - | - |
| HCM 95th %tile Q(veh) | 26.4 | 12 | 0.1 | - | - | 0.3 | - | - | - |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 315 | 844 | 40 | 36 | 923 | 47 | 122 | 65 | 62 | 67 | 33 | 256 |
| Future Volume (veh/h) | 315 | 844 | 40 | 36 | 923 | 47 | 122 | 65 | 62 | 67 | 33 | 256 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 354 | 948 | 45 | 40 | 1037 | 53 | 137 | 73 | 70 | 75 | 37 | 288 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 284 | 950 | 45 | 124 | 786 | 40 | 142 | 227 | 218 | 304 | 48 | 370 |
| Arrive On Green | 0.12 | 0.54 | 0.54 | 0.03 | 0.45 | 0.45 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 |
| Sat Flow, veh/h | 1781 | 1771 | 84 | 1781 | 1764 | 90 | 1055 | 877 | 841 | 1245 | 184 | 1429 |
| Grp Volume(v), veh/h | 354 | 0 | 993 | 40 | 0 | 1090 | 137 | 0 | 143 | 75 | 0 | 325 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1855 | 1781 | 0 | 1854 | 1055 | 0 | 1719 | 1245 | 0 | 1613 |
| Q Serve(g_s), s | 13.5 | 0.0 | 58.8 | 1.3 | 0.0 | 49.0 | 7.9 | 0.0 | 7.4 | 5.7 | 0.0 | 20.6 |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 58.8 | 1.3 | 0.0 | 49.0 | 28.5 | 0.0 | 7.4 | 13.1 | 0.0 | 20.6 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.49 | 1.00 | | 0.89 |
| Lane Grp Cap(c), veh/h | 284 | 0 | 995 | 124 | 0 | 826 | 142 | 0 | 445 | 304 | 0 | 418 |
| V/C Ratio(X) | 1.25 | 0.00 | 1.00 | 0.32 | 0.00 | 1.32 | 0.97 | 0.00 | 0.32 | 0.25 | 0.00 | 0.78 |
| Avail Cap(c_a), veh/h | 284 | 0 | 995 | 285 | 0 | 826 | 142 | 0 | 445 | 304 | 0 | 418 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 36.2 | 0.0 | 25.5 | 26.3 | 0.0 | 30.5 | 52.8 | 0.0 | 32.9 | 38.2 | 0.0 | 37.8 |
| Incr Delay (d2), s/veh | 136.8 | 0.0 | 28.1 | 0.6 | 0.0 | 152.4 | 65.6 | 0.0 | 0.4 | 0.4 | 0.0 | 9.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 21.6 | 0.0 | 38.4 | 0.9 | 0.0 | 79.5 | 10.5 | 0.0 | 5.6 | 3.2 | 0.0 | 14.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 173.0 | 0.0 | 53.6 | 26.8 | 0.0 | 182.9 | 118.4 | 0.0 | 33.3 | 38.6 | 0.0 | 46.8 |
| LnGrp LOS | F | A | D | C | A | F | F | A | C | D | A | D |
| Approach Vol, veh/h | | 1347 | | | 1130 | | | 280 | | | 400 | |
| Approach Delay, s/veh | | 85.0 | | | 177.3 | | | 75.0 | | | 45.3 | |
| Approach LOS | | F | | | F | | | E | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.0 | 65.0 | | 35.0 | 20.0 | 55.0 | | 35.0 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 3.3 | 60.8 | | 22.6 | 15.5 | 51.0 | | 30.5 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.9 | 0.0 | 0.0 | | 0.0 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 112.1 | |
| HCM 6th LOS | | F | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 37 | 58 | 8 | 188 | 147 | 83 | 12 | 543 | 121 | 46 | 410 | 32 |
| Future Volume (veh/h) | 37 | 58 | 8 | 188 | 147 | 83 | 12 | 543 | 121 | 46 | 410 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 44 | 69 | 10 | 224 | 175 | 99 | 14 | 646 | 0 | 55 | 488 | 0 |
| Peak Hour Factor | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 146 | 276 | 40 | 303 | 194 | 110 | 448 | 872 | | 359 | 934 | |
| Arrive On Green | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.02 | 0.47 | 0.00 | 0.05 | 0.50 | 0.00 |
| Sat Flow, veh/h | 1105 | 1597 | 231 | 1320 | 1122 | 635 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 44 | 0 | 79 | 224 | 0 | 274 | 14 | 646 | 0 | 55 | 488 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1105 | 0 | 1829 | 1320 | 0 | 1756 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 1.1 | 0.0 | 2.2 | 7.8 | 0.0 | 8.9 | 0.2 | 16.3 | 0.0 | 0.9 | 10.2 | 0.0 |
| Cycle Q Clear(g_c), s | 10.0 | 0.0 | 2.2 | 10.0 | 0.0 | 8.9 | 0.2 | 16.3 | 0.0 | 0.9 | 10.2 | 0.0 |
| Prop In Lane | 1.00 | | 0.13 | 1.00 | | 0.36 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 146 | 0 | 316 | 303 | 0 | 303 | 448 | 872 | | 359 | 934 | |
| V/C Ratio(X) | 0.30 | 0.00 | 0.25 | 0.74 | 0.00 | 0.90 | 0.03 | 0.74 | | 0.15 | 0.52 | |
| Avail Cap(c_a), veh/h | 146 | 0 | 316 | 303 | 0 | 303 | 571 | 872 | | 423 | 934 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 28.7 | 0.0 | 20.7 | 25.8 | 0.0 | 23.5 | 8.4 | 12.6 | 0.0 | 9.5 | 9.8 | 0.0 |
| Incr Delay (d2), s/veh | 1.1 | 0.0 | 0.4 | 9.3 | 0.0 | 28.6 | 0.0 | 5.6 | 0.0 | 0.2 | 2.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.1 | 0.0 | 1.5 | 6.4 | 0.0 | 9.4 | 0.1 | 10.2 | 0.0 | 0.4 | 6.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 29.8 | 0.0 | 21.1 | 35.1 | 0.0 | 52.1 | 8.4 | 18.3 | 0.0 | 9.7 | 11.9 | 0.0 |
| LnGrp LOS | C | A | C | D | A | D | A | B | | A | B | |
| Approach Vol, veh/h | | 123 | | | 498 | | | 660 | | | 543 | |
| Approach Delay, s/veh | | 24.2 | | | 44.4 | | | 18.0 | | | 11.7 | |
| Approach LOS | | C | | | D | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.9 | 33.0 | | 16.0 | 7.0 | 34.9 | | 16.0 | | | | |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 27.0 | | 10.0 | 5.0 | 27.0 | | 10.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 18.3 | | 12.0 | 2.2 | 12.2 | | 12.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 1.8 | | 0.0 | 0.0 | 1.6 | | 0.0 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 23.8 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 63 | 37 | 162 | 25 | 11 | 91 |
| Future Vol, veh/h | 63 | 37 | 162 | 25 | 11 | 91 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 66 | 39 | 169 | 26 | 11 | 95 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 195 | 0 | - | 0 | 353 | 182 |
| Stage 1 | - | - | - | - | 182 | - |
| Stage 2 | - | - | - | - | 171 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1378 | - | - | - | 645 | 861 |
| Stage 1 | - | - | - | - | 849 | - |
| Stage 2 | - | - | - | - | 859 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1378 | - | - | - | 613 | 861 |
| Mov Cap-2 Maneuver | - | - | - | - | 613 | - |
| Stage 1 | - | - | - | - | 807 | - |
| Stage 2 | - | - | - | - | 859 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 4.9 | 0 | 10 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1378 | - | - | - | 825 |
| HCM Lane V/C Ratio | 0.048 | - | - | - | 0.129 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 10 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 35.9 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 450 | 364 | 782 | 145 | 29 | 348 |
| Future Vol, veh/h | 450 | 364 | 782 | 145 | 29 | 348 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 489 | 396 | 850 | 158 | 32 | 378 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1008 | 0 | - | 0 | 2224 | 850 |
| Stage 1 | - | - | - | - | 850 | - |
| Stage 2 | - | - | - | - | 1374 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 687 | - | - | - | 48 | ~ 360 |
| Stage 1 | - | - | - | - | 419 | - |
| Stage 2 | - | - | - | - | 235 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 687 | - | - | - | ~ 14 | ~ 360 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 14 | - |
| Stage 1 | - | - | - | - | 121 | - |
| Stage 2 | - | - | - | - | 235 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 12.2 | 0 | 175.4 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 687 | - | - | - | 14 | 360 |
| HCM Lane V/C Ratio | 0.712 | - | - | - | 2.252 | 1.051 |
| HCM Control Delay (s) | 22.1 | - | - | - | $ 1126.7 | 96.1 |
| HCM Lane LOS | C | - | - | - | F | F |
| HCM 95th %tile Q(veh) | 6 | - | - | - | 4.7 | 13.1 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

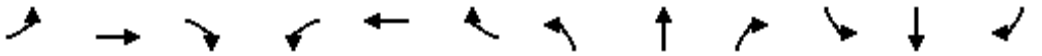
| Intersection | |
|---|---|
| Int Delay, s/veh | 3.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 54 | 170 | 307 | 11 | 22 | 111 |
| Future Vol, veh/h | 54 | 170 | 307 | 11 | 22 | 111 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 59 | 185 | 334 | 12 | 24 | 121 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 346 | 0 | - | 0 | 643 | 340 |
| Stage 1 | - | - | - | - | 340 | - |
| Stage 2 | - | - | - | - | 303 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1213 | - | - | - | 438 | 702 |
| Stage 1 | - | - | - | - | 721 | - |
| Stage 2 | - | - | - | - | 749 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1213 | - | - | - | 414 | 702 |
| Mov Cap-2 Maneuver | - | - | - | - | 414 | - |
| Stage 1 | - | - | - | - | 682 | - |
| Stage 2 | - | - | - | - | 749 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 2 | 0 | 12.4 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1213 | - | - | - | 630 |
| HCM Lane V/C Ratio | 0.048 | - | - | - | 0.229 |
| HCM Control Delay (s) | 8.1 | 0 | - | - | 12.4 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.2 | - | - | - | 0.9 |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 753 | 641 | 64 | 538 | 723 | 334 | 72 | 1000 | 563 | 414 | 1160 | 983 |
| Future Volume (vph) | 753 | 641 | 64 | 538 | 723 | 334 | 72 | 1000 | 563 | 414 | 1160 | 983 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3491 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.09 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3491 | | 3433 | 3539 | 1583 | 166 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 793 | 675 | 67 | 566 | 761 | 352 | 76 | 1053 | 593 | 436 | 1221 | 1035 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 133 | 0 | 0 | 313 | 0 | 0 | 364 |
| Lane Group Flow (vph) | 793 | 738 | 0 | 566 | 761 | 219 | 76 | 1053 | 280 | 436 | 1221 | 671 |
| Turn Type | Split | NA | | Split | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 1 | | 2 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 41.8 | 41.8 | | 35.0 | 35.0 | 35.0 | 50.0 | 45.0 | 45.0 | 20.0 | 60.0 | 60.0 |
| Effective Green, g (s) | 41.8 | 41.8 | | 35.0 | 35.0 | 35.0 | 50.0 | 45.0 | 45.0 | 20.0 | 60.0 | 60.0 |
| Actuated g/C Ratio | 0.25 | 0.25 | | 0.21 | 0.21 | 0.21 | 0.30 | 0.27 | 0.27 | 0.12 | 0.36 | 0.36 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 870 | 885 | | 729 | 751 | 336 | 99 | 966 | 432 | 416 | 1288 | 576 |
| v/s Ratio Prot | c0.23 | 0.21 | | 0.16 | c0.22 | | 0.02 | 0.30 | | c0.13 | 0.34 | |
| v/s Ratio Perm | | | | | | 0.14 | 0.21 | | 0.18 | | | c0.42 |
| v/c Ratio | 0.91 | 0.83 | | 0.78 | 1.01 | 0.65 | 0.77 | 1.09 | 0.65 | 1.05 | 0.95 | 1.16 |
| Uniform Delay, d1 | 59.7 | 58.2 | | 61.2 | 64.9 | 59.3 | 47.2 | 59.9 | 52.9 | 72.4 | 50.9 | 52.4 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 13.8 | 7.1 | | 5.5 | 36.2 | 5.0 | 26.8 | 56.7 | 3.7 | 57.3 | 14.4 | 91.8 |
| Delay (s) | 73.5 | 65.3 | | 66.7 | 101.1 | 64.3 | 74.0 | 116.6 | 56.7 | 129.7 | 65.3 | 144.2 |
| Level of Service | E | E | | E | F | E | E | F | E | F | E | F |
| Approach Delay (s) | | 69.5 | | | 81.8 | | | 94.1 | | | 106.1 | |
| Approach LOS | | E | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 90.7 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.07 | | |
| Actuated Cycle Length (s) | 164.8 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 100.1% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 1133 | 352 | 370 | 1189 | 4 | 257 | 10 | 297 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 66 | 725 | 225 | 200 | 1132 | 960 | 364 | 11 | 315 | 106 | 162 | 137 |
| Arrive On Green | 0.01 | 0.53 | 0.53 | 0.09 | 0.61 | 0.61 | 0.14 | 0.20 | 0.20 | 0.02 | 0.09 | 0.09 |
| Sat Flow, veh/h | 1781 | 1369 | 425 | 1781 | 1870 | 1585 | 1781 | 52 | 1541 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 1485 | 370 | 1189 | 4 | 257 | 0 | 307 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1794 | 1781 | 1870 | 1585 | 1781 | 0 | 1593 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 0.0 | 83.1 | 13.6 | 94.9 | 0.2 | 20.0 | 0.0 | 29.8 | 2.8 | 5.8 | 3.2 |
| Cycle Q Clear(g_c), s | 0.4 | 0.0 | 83.1 | 13.6 | 94.9 | 0.2 | 20.0 | 0.0 | 29.8 | 2.8 | 5.8 | 3.2 |
| Prop In Lane | 1.00 | | 0.24 | 1.00 | | 1.00 | 1.00 | | 0.97 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 66 | 0 | 951 | 200 | 1132 | 960 | 364 | 0 | 326 | 106 | 162 | 137 |
| V/C Ratio(X) | 0.15 | 0.00 | 1.56 | 1.85 | 1.05 | 0.00 | 0.71 | 0.00 | 0.94 | 0.33 | 0.45 | 0.26 |
| Avail Cap(c_a), veh/h | 200 | 0 | 951 | 200 | 1132 | 960 | 448 | 0 | 349 | 344 | 351 | 297 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.6 | 0.0 | 36.9 | 56.7 | 30.9 | 12.2 | 52.8 | 0.0 | 61.4 | 63.6 | 68.1 | 66.9 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 258.1 | 399.5 | 40.9 | 0.0 | 3.3 | 0.0 | 32.3 | 0.7 | 2.0 | 1.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.4 | 0.0 | 156.8 | 46.2 | 66.6 | 0.1 | 14.0 | 0.0 | 20.9 | 2.3 | 5.2 | 2.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 39.0 | 0.0 | 295.0 | 456.2 | 71.8 | 12.2 | 56.1 | 0.0 | 93.7 | 64.2 | 70.0 | 67.9 |
| LnGrp LOS | D | A | F | F | F | B | E | A | F | E | E | E |
| Approach Vol, veh/h | | 1495 | | | 1563 | | | 564 | | | 143 | |
| Approach Delay, s/veh | | 293.3 | | | 162.7 | | | 76.6 | | | 68.1 | |
| Approach LOS | | F | | | F | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 30.0 | 90.0 | 27.6 | 19.2 | 8.2 | 101.8 | 9.1 | 37.7 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 13.6 | 83.1 | 29.8 | 29.4 | 13.6 | 83.1 | 24.8 | 34.4 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 85.1 | 22.0 | 7.8 | 2.4 | 96.9 | 4.8 | 31.8 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.4 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 198.0 |
| HCM 6th LOS | F |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.8 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 62 | 1199 | 180 | 113 | 1202 | 20 | 125 | 16 | 80 | 7 | 23 | 53 |
| Future Vol, veh/h | 62 | 1199 | 180 | 113 | 1202 | 20 | 125 | 16 | 80 | 7 | 23 | 53 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 205 | - | - | 205 | - | - | 0 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 98 | 98 | 92 | 92 | 98 | 98 | 92 | 92 | 92 | 98 | 92 | 98 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 63 | 1223 | 196 | 123 | 1227 | 20 | 136 | 17 | 87 | 7 | 25 | 54 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1247 | 0 | 0 | 1419 | 0 | 0 | 2970 | 2940 | 1321 | 2982 | 3028 | 1237 |
| Stage 1 | - | - | - | - | - | - | 1447 | 1447 | - | 1483 | 1483 | - |
| Stage 2 | - | - | - | - | - | - | 1523 | 1493 | - | 1499 | 1545 | - |
| Critical Hdwy | 4.12 | - | - | 4.12 | - | - | 7.12 | 6.52 | 6.22 | 7.12 | 6.52 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.12 | 5.52 | - | 6.12 | 5.52 | - |
| Follow-up Hdwy | 2.218 | - | - | 2.218 | - | - | 3.518 | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver | 558 | - | - | 480 | - | - | ~ 9 | ~ 15 | 191 | 9 | ~ 13 | 215 |
| Stage 1 | - | - | - | - | - | - | 163 | 196 | - | 156 | 189 | - |
| Stage 2 | - | - | - | - | - | - | 148 | 187 | - | 152 | 176 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 558 | - | - | 480 | - | - | - | ~ 10 | 191 | - | ~ 9 | 215 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | - | ~ 10 | - | - | ~ 9 | - |
| Stage 1 | - | - | - | - | - | - | 145 | 174 | - | 138 | 141 | - |
| Stage 2 | - | - | - | - | - | - | ~ 68 | 139 | - | 66 | 156 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.5 | 1.4 | | |
| HCM LOS | | | - | - |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | - | 48 | 558 | - | - | 480 | - | - | - |
| HCM Lane V/C Ratio | - | 2.174 | 0.113 | - | - | 0.256 | - | - | - |
| HCM Control Delay (s) | - | $ 722.5 | 12.3 | - | - | 15.1 | - | - | - |
| HCM Lane LOS | - | F | B | - | - | C | - | - | - |
| HCM 95th %tile Q(veh) | - | 10.7 | 0.4 | - | - | 1 | - | - | - |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 53 | 1209 | 9 | 54 | 1109 | 113 | 71 | 7 | 56 | 15 | 12 | 64 |
| Future Volume (veh/h) | 53 | 1209 | 9 | 54 | 1109 | 113 | 71 | 7 | 56 | 15 | 12 | 64 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 54 | 1234 | 9 | 55 | 1132 | 115 | 72 | 7 | 57 | 15 | 12 | 65 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 165 | 1110 | 8 | 166 | 1001 | 102 | 196 | 22 | 180 | 208 | 32 | 172 |
| Arrive On Green | 0.04 | 0.60 | 0.60 | 0.04 | 0.60 | 0.60 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Sat Flow, veh/h | 1781 | 1854 | 14 | 1781 | 1670 | 170 | 1322 | 176 | 1436 | 1338 | 253 | 1371 |
| Grp Volume(v), veh/h | 54 | 0 | 1243 | 55 | 0 | 1247 | 72 | 0 | 64 | 15 | 0 | 77 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1840 | 1322 | 0 | 1612 | 1338 | 0 | 1624 |
| Q Serve(g_s), s | 0.9 | 0.0 | 49.0 | 0.9 | 0.0 | 49.0 | 4.3 | 0.0 | 3.0 | 0.8 | 0.0 | 3.6 |
| Cycle Q Clear(g_c), s | 0.9 | 0.0 | 49.0 | 0.9 | 0.0 | 49.0 | 7.9 | 0.0 | 3.0 | 3.8 | 0.0 | 3.6 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.09 | 1.00 | | 0.89 | 1.00 | | 0.84 |
| Lane Grp Cap(c), veh/h | 165 | 0 | 1118 | 166 | 0 | 1102 | 196 | 0 | 202 | 208 | 0 | 204 |
| V/C Ratio(X) | 0.33 | 0.00 | 1.11 | 0.33 | 0.00 | 1.13 | 0.37 | 0.00 | 0.32 | 0.07 | 0.00 | 0.38 |
| Avail Cap(c_a), veh/h | 382 | 0 | 1118 | 382 | 0 | 1102 | 491 | 0 | 561 | 505 | 0 | 565 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 20.1 | 0.0 | 16.4 | 20.1 | 0.0 | 16.4 | 36.5 | 0.0 | 32.6 | 34.3 | 0.0 | 32.8 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 63.0 | 0.4 | 0.0 | 70.9 | 1.1 | 0.0 | 0.9 | 0.1 | 0.0 | 1.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.0 | 0.0 | 47.2 | 1.0 | 0.0 | 50.3 | 2.6 | 0.0 | 2.1 | 0.5 | 0.0 | 2.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.5 | 0.0 | 79.4 | 20.5 | 0.0 | 87.3 | 37.6 | 0.0 | 33.5 | 34.5 | 0.0 | 34.0 |
| LnGrp LOS | C | A | F | C | A | F | D | A | C | C | A | C |
| Approach Vol, veh/h | | 1297 | | | 1302 | | | 136 | | | 92 | |
| Approach Delay, s/veh | | 77.0 | | | 84.5 | | | 35.7 | | | 34.1 | |
| Approach LOS | | E | | | F | | | D | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.1 | 55.0 | | 16.8 | 10.0 | 55.0 | | 16.8 | | | | |
| Change Period (Y+Rc), s | 6.5 | 6.0 | | 6.5 | 6.5 | 6.0 | | 6.5 | | | | |
| Max Green Setting (Gmax), s | 13.5 | 49.0 | | 28.5 | 13.5 | 49.0 | | 28.5 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.9 | 51.0 | | 5.8 | 2.9 | 51.0 | | 9.9 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.3 | 0.0 | 0.0 | | 0.4 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 77.0 | |
| HCM 6th LOS | | E | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 17 | 74 | 8 | 127 | 52 | 51 | 12 | 372 | 160 | 70 | 575 | 73 |
| Future Volume (veh/h) | 17 | 74 | 8 | 127 | 52 | 51 | 12 | 372 | 160 | 70 | 575 | 73 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 18 | 77 | 8 | 132 | 54 | 53 | 12 | 388 | 0 | 73 | 599 | 0 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 306 | 311 | 32 | 329 | 162 | 159 | 331 | 773 | | 504 | 860 | |
| Arrive On Green | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.02 | 0.41 | 0.00 | 0.06 | 0.46 | 0.00 |
| Sat Flow, veh/h | 1287 | 1666 | 173 | 1313 | 867 | 851 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 18 | 0 | 85 | 132 | 0 | 107 | 12 | 388 | 0 | 73 | 599 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1287 | 0 | 1839 | 1313 | 0 | 1717 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.7 | 0.0 | 2.1 | 5.1 | 0.0 | 2.9 | 0.2 | 8.2 | 0.0 | 1.2 | 13.5 | 0.0 |
| Cycle Q Clear(g_c), s | 3.5 | 0.0 | 2.1 | 7.2 | 0.0 | 2.9 | 0.2 | 8.2 | 0.0 | 1.2 | 13.5 | 0.0 |
| Prop In Lane | 1.00 | | 0.09 | 1.00 | | 0.50 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 306 | 0 | 343 | 329 | 0 | 321 | 331 | 773 | | 504 | 860 | |
| V/C Ratio(X) | 0.06 | 0.00 | 0.25 | 0.40 | 0.00 | 0.33 | 0.04 | 0.50 | | 0.14 | 0.70 | |
| Avail Cap(c_a), veh/h | 307 | 0 | 345 | 330 | 0 | 323 | 471 | 773 | | 561 | 860 | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 20.3 | 0.0 | 18.5 | 21.5 | 0.0 | 18.8 | 9.9 | 11.6 | 0.0 | 8.3 | 11.4 | 0.0 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 0.4 | 0.8 | 0.0 | 0.6 | 0.0 | 2.3 | 0.0 | 0.1 | 4.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 1.4 | 2.5 | 0.0 | 1.8 | 0.1 | 5.2 | 0.0 | 0.6 | 8.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 20.4 | 0.0 | 18.8 | 22.3 | 0.0 | 19.4 | 10.0 | 13.9 | 0.0 | 8.5 | 16.1 | 0.0 |
| LnGrp LOS | C | A | B | C | A | B | A | B | | A | B | |
| Approach Vol, veh/h | | 103 | | | 239 | | | 400 | | | 672 | |
| Approach Delay, s/veh | | 19.1 | | | 21.0 | | | 13.8 | | | 15.2 | |
| Approach LOS | | B | | | C | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 9.3 | 28.0 | | 15.9 | 6.8 | 30.5 | | 15.9 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.3 | 22.0 | | 10.0 | 5.0 | 22.0 | | 10.0 |
| Max Q Clear Time (g_c+I1), s | 3.2 | 10.2 | | 5.5 | 2.2 | 15.5 | | 9.2 |
| Green Ext Time (p_c), s | 0.0 | 1.1 | | 0.1 | 0.0 | 1.4 | | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 16.1 |
| HCM 6th LOS | B |

**Notes**

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.4 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 80 | 105 | 70 | 9 | 23 | 83 |
| Future Vol, veh/h | 80 | 105 | 70 | 9 | 23 | 83 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 96 | 96 | 96 | 96 | 96 | 96 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 83 | 109 | 73 | 9 | 24 | 86 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 82 | 0 | - | 0 | 353 | 78 |
| Stage 1 | - | - | - | - | 78 | - |
| Stage 2 | - | - | - | - | 275 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1515 | - | - | - | 645 | 983 |
| Stage 1 | - | - | - | - | 945 | - |
| Stage 2 | - | - | - | - | 771 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1515 | - | - | - | 608 | 983 |
| Mov Cap-2 Maneuver | - | - | - | - | 608 | - |
| Stage 1 | - | - | - | - | 890 | - |
| Stage 2 | - | - | - | - | 771 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 3.2 | 0 | 9.8 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1515 | - | - | - | 867 |
| HCM Lane V/C Ratio | 0.055 | - | - | - | 0.127 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 9.8 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | - | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 47.6 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 499 | 714 | 464 | 61 | 51 | 572 |
| Future Vol, veh/h | 499 | 714 | 464 | 61 | 51 | 572 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 150 | - | - | 120 | 0 | 125 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 94 | 94 | 94 | 94 | 94 | 94 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 531 | 760 | 494 | 65 | 54 | 609 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 559 | 0 | - | 0 | 2316 | 494 |
| Stage 1 | - | - | - | - | 494 | - |
| Stage 2 | - | - | - | - | 1822 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1012 | - | - | - | ~ 42 | ~ 575 |
| Stage 1 | - | - | - | - | 613 | - |
| Stage 2 | - | - | - | - | 141 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1012 | - | - | - | ~ 20 | ~ 575 |
| Mov Cap-2 Maneuver | - | - | - | - | ~ 20 | - |
| Stage 1 | - | - | - | - | 291 | - |
| Stage 2 | - | - | - | - | 141 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 5.1 | 0 | 170.3 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1012 | - | - | - | 20 | 575 |
| HCM Lane V/C Ratio | 0.525 | - | - | - | 2.713 | 1.058 |
| HCM Control Delay (s) | 12.4 | - | - | - | $ 1177.2 | 80.5 |
| HCM Lane LOS | B | - | - | - | F | F |
| HCM 95th %tile Q(veh) | 3.1 | - | - | - | 7.1 | 17.3 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.3 |

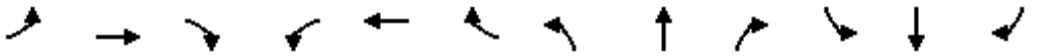
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 113 | 190 | 150 | 23 | 16 | 79 |
| Future Vol, veh/h | 113 | 190 | 150 | 23 | 16 | 79 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 123 | 207 | 163 | 25 | 17 | 86 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 188 | 0 | - | 0 | 629 | 176 |
| Stage 1 | - | - | - | - | 176 | - |
| Stage 2 | - | - | - | - | 453 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | 1386 | - | - | - | 446 | 867 |
| Stage 1 | - | - | - | - | 855 | - |
| Stage 2 | - | - | - | - | 640 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1386 | - | - | - | 401 | 867 |
| Mov Cap-2 Maneuver | - | - | - | - | 401 | - |
| Stage 1 | - | - | - | - | 770 | - |
| Stage 2 | - | - | - | - | 640 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 2.9 | 0 | 10.8 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1386 | - | - | - | 725 |
| HCM Lane V/C Ratio | 0.089 | - | - | - | 0.142 |
| HCM Control Delay (s) | 7.8 | 0 | - | - | 10.8 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.3 | - | - | - | 0.5 |

# 2034 FUTURE PROJECTED CONDITIONS WITH INTERSECTION IMPROVEMENTS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1007 | 739 | 51 | 468 | 536 | 530 | 37 | 1024 | 402 | 367 | 1024 | 983 |
| Future Volume (vph) | 1007 | 739 | 51 | 468 | 536 | 530 | 37 | 1024 | 402 | 367 | 1024 | 983 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3505 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.10 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3505 | | 3433 | 3539 | 1583 | 177 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 1144 | 840 | 58 | 532 | 609 | 602 | 42 | 1164 | 457 | 417 | 1164 | 1117 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 109 | 0 | 0 | 288 | 0 | 0 | 415 |
| Lane Group Flow (vph) | 1144 | 894 | 0 | 532 | 609 | 493 | 42 | 1164 | 169 | 417 | 1164 | 702 |
| Turn Type | Prot | NA | | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 39.0 | 42.6 | | 28.4 | 32.0 | 32.0 | 46.0 | 42.0 | 42.0 | 15.0 | 53.0 | 53.0 |
| Effective Green, g (s) | 39.0 | 42.6 | | 28.4 | 32.0 | 32.0 | 46.0 | 42.0 | 42.0 | 15.0 | 53.0 | 53.0 |
| Actuated g/C Ratio | 0.26 | 0.28 | | 0.19 | 0.21 | 0.21 | 0.30 | 0.28 | 0.28 | 0.10 | 0.35 | 0.35 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 886 | 988 | | 645 | 749 | 335 | 96 | 984 | 440 | 341 | 1242 | 555 |
| v/s Ratio Prot | c0.33 | 0.26 | | 0.15 | 0.17 | | 0.01 | 0.33 | | c0.12 | 0.33 | |
| v/s Ratio Perm | | | | | | c0.31 | 0.12 | | 0.11 | | | c0.44 |
| v/c Ratio | 1.29 | 0.91 | | 0.82 | 0.81 | 1.47 | 0.44 | 1.18 | 0.38 | 1.22 | 0.94 | 1.27 |
| Uniform Delay, d1 | 56.0 | 52.3 | | 58.9 | 56.7 | 59.5 | 41.3 | 54.5 | 44.0 | 68.0 | 47.4 | 49.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 139.5 | 11.7 | | 8.8 | 7.1 | 228.2 | 1.2 | 92.8 | 0.8 | 123.8 | 13.3 | 133.3 |
| Delay (s) | 195.5 | 64.0 | | 67.7 | 63.7 | 287.7 | 42.5 | 147.3 | 44.8 | 191.8 | 60.7 | 182.3 |
| Level of Service | F | E | | E | E | F | D | F | D | F | E | F |
| Approach Delay (s) | | 137.7 | | | 142.3 | | | 116.5 | | | 131.3 | |
| Approach LOS | | F | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 132.2 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.35 | | |
| Actuated Cycle Length (s) | 151.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 104.9% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 970 | 258 | 297 | 1320 | 37 | 530 | 73 | 298 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 126 | 745 | 198 | 221 | 1079 | 914 | 419 | 406 | 499 | 98 | 87 | 74 |
| Arrive On Green | 0.04 | 0.52 | 0.52 | 0.10 | 0.58 | 0.58 | 0.17 | 0.22 | 0.22 | 0.00 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1424 | 379 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 0 | 1228 | 297 | 1320 | 37 | 530 | 73 | 298 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1802 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.5 | 0.0 | 78.5 | 14.6 | 86.5 | 1.5 | 25.8 | 4.8 | 23.8 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.5 | 0.0 | 78.5 | 14.6 | 86.5 | 1.5 | 25.8 | 4.8 | 23.8 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 0.21 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 126 | 0 | 943 | 221 | 1079 | 914 | 419 | 406 | 499 | 98 | 87 | 74 |
| V/C Ratio(X) | 0.90 | 0.00 | 1.30 | 1.34 | 1.22 | 0.04 | 1.27 | 0.18 | 0.60 | 0.01 | 0.02 | 0.03 |
| Avail Cap(c_a), veh/h | 126 | 0 | 943 | 221 | 1079 | 914 | 419 | 406 | 499 | 155 | 87 | 74 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 42.7 | 0.0 | 35.8 | 54.2 | 31.8 | 13.8 | 58.5 | 47.8 | 43.4 | 68.0 | 68.2 | 68.2 |
| Incr Delay (d2), s/veh | 50.3 | 0.0 | 143.7 | 180.9 | 109.1 | 0.0 | 137.2 | 0.2 | 2.0 | 0.0 | 0.1 | 0.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 6.9 | 0.0 | 100.9 | 29.3 | 96.1 | 1.0 | 29.2 | 4.0 | 14.4 | 0.1 | 0.1 | 0.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 92.9 | 0.0 | 179.4 | 235.1 | 140.9 | 13.8 | 195.7 | 48.0 | 45.3 | 68.0 | 68.3 | 68.4 |
| LnGrp LOS | F | A | F | F | F | B | F | D | D | E | E | E |
| Approach Vol, veh/h | | 1342 | | | 1654 | | | 901 | | | 5 | |
| Approach Delay, s/veh | | 172.1 | | | 155.0 | | | 134.0 | | | 68.3 | |
| Approach LOS | | F | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 21.0 | 85.4 | 31.0 | 12.6 | 13.0 | 93.4 | 5.4 | 38.2 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 14.6 | 78.5 | 25.8 | 7.0 | 6.6 | 86.5 | 5.0 | 27.8 |
| Max Q Clear Time (g_c+I1), s | 16.6 | 80.5 | 27.8 | 2.2 | 7.5 | 88.5 | 2.1 | 25.8 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 155.9 |
| HCM 6th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 18 | 1004 | 85 | 54 | 1197 | 11 | 178 | 22 | 111 | 23 | 10 | 63 |
| Future Volume (veh/h) | 18 | 1004 | 85 | 54 | 1197 | 11 | 178 | 22 | 111 | 23 | 10 | 63 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 20 | 1116 | 92 | 59 | 1330 | 12 | 193 | 24 | 121 | 26 | 11 | 70 |
| Peak Hour Factor | 0.90 | 0.90 | 0.92 | 0.92 | 0.90 | 0.90 | 0.92 | 0.92 | 0.92 | 0.90 | 0.92 | 0.90 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 60 | 1118 | 948 | 125 | 1279 | 1084 | 261 | 34 | 169 | 182 | 15 | 93 |
| Arrive On Green | 0.60 | 0.60 | 0.60 | 0.04 | 0.68 | 0.68 | 0.10 | 0.12 | 0.12 | 0.04 | 0.07 | 0.07 |
| Sat Flow, veh/h | 407 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 269 | 1357 | 1781 | 220 | 1399 |
| Grp Volume(v), veh/h | 20 | 1116 | 92 | 59 | 1330 | 12 | 193 | 0 | 145 | 26 | 0 | 81 |
| Grp Sat Flow(s),veh/h/ln | 407 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1626 | 1781 | 0 | 1619 |
| Q Serve(g_s), s | 0.0 | 71.4 | 3.0 | 1.4 | 82.1 | 0.3 | 11.9 | 0.0 | 10.3 | 1.6 | 0.0 | 5.9 |
| Cycle Q Clear(g_c), s | 71.8 | 71.4 | 3.0 | 1.4 | 82.1 | 0.3 | 11.9 | 0.0 | 10.3 | 1.6 | 0.0 | 5.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.83 | 1.00 | | 0.86 |
| Lane Grp Cap(c), veh/h | 60 | 1118 | 948 | 125 | 1279 | 1084 | 261 | 0 | 202 | 182 | 0 | 107 |
| V/C Ratio(X) | 0.33 | 1.00 | 0.10 | 0.47 | 1.04 | 0.01 | 0.74 | 0.00 | 0.72 | 0.14 | 0.00 | 0.76 |
| Avail Cap(c_a), veh/h | 60 | 1118 | 948 | 136 | 1279 | 1084 | 261 | 0 | 230 | 182 | 0 | 135 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.22 | 0.22 | 0.22 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 60.0 | 24.0 | 10.3 | 30.2 | 19.0 | 6.0 | 45.2 | 0.0 | 50.5 | 48.5 | 0.0 | 55.1 |
| Incr Delay (d2), s/veh | 14.3 | 26.4 | 0.2 | 0.6 | 24.0 | 0.0 | 10.7 | 0.0 | 8.8 | 0.4 | 0.0 | 16.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.5 | 43.8 | 1.7 | 1.8 | 41.1 | 0.1 | 10.1 | 0.0 | 8.2 | 1.3 | 0.0 | 5.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 74.3 | 50.4 | 10.5 | 30.8 | 43.0 | 6.0 | 56.0 | 0.0 | 59.3 | 48.9 | 0.0 | 71.9 |
| LnGrp LOS | E | D | B | C | F | A | E | A | E | D | A | E |
| Approach Vol, veh/h | | 1228 | | | 1401 | | | 338 | | | 107 | |
| Approach Delay, s/veh | | 47.8 | | | 42.1 | | | 57.4 | | | 66.3 | |
| Approach LOS | | D | | | D | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.0 | 20.9 | 10.3 | 77.8 | 18.0 | 13.9 | | 88.1 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.0 | 17.0 | 5.0 | 69.0 | 12.0 | 10.0 | | 80.0 |
| Max Q Clear Time (g_c+I1), s | 13.8 | 12.3 | 3.4 | 73.8 | 13.9 | 7.9 | | 84.1 |
| Green Ext Time (p_c), s | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |

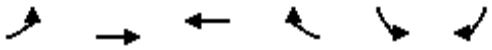
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 46.9 |
| HCM 6th LOS | D |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 315 | 844 | 40 | 36 | 923 | 47 | 122 | 65 | 62 | 67 | 33 | 256 |
| Future Volume (veh/h) | 315 | 844 | 40 | 36 | 923 | 47 | 122 | 65 | 62 | 67 | 33 | 256 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 354 | 948 | 45 | 40 | 1037 | 53 | 137 | 73 | 70 | 75 | 37 | 288 |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 339 | 1221 | 58 | 285 | 976 | 50 | 121 | 137 | 132 | 115 | 37 | 395 |
| Arrive On Green | 0.16 | 0.69 | 0.69 | 0.03 | 0.55 | 0.55 | 0.04 | 0.16 | 0.16 | 0.09 | 0.09 | 0.09 |
| Sat Flow, veh/h | 1781 | 1771 | 84 | 1781 | 1764 | 90 | 1781 | 877 | 841 | 874 | 431 | 1585 |
| Grp Volume(v), veh/h | 354 | 0 | 993 | 40 | 0 | 1090 | 137 | 0 | 143 | 112 | 0 | 288 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1855 | 1781 | 0 | 1854 | 1781 | 0 | 1719 | 1305 | 0 | 1585 |
| Q Serve(g_s), s | 24.5 | 0.0 | 53.6 | 1.4 | 0.0 | 83.0 | 6.1 | 0.0 | 11.5 | 12.0 | 0.0 | 12.9 |
| Cycle Q Clear(g_c), s | 24.5 | 0.0 | 53.6 | 1.4 | 0.0 | 83.0 | 6.1 | 0.0 | 11.5 | 12.9 | 0.0 | 12.9 |
| Prop In Lane | 1.00 | | 0.05 | 1.00 | | 0.05 | 1.00 | | 0.49 | 0.67 | | 1.00 |
| Lane Grp Cap(c), veh/h | 339 | 0 | 1279 | 285 | 0 | 1026 | 121 | 0 | 269 | 152 | 0 | 395 |
| V/C Ratio(X) | 1.04 | 0.00 | 0.78 | 0.14 | 0.00 | 1.06 | 1.14 | 0.00 | 0.53 | 0.74 | 0.00 | 0.73 |
| Avail Cap(c_a), veh/h | 339 | 0 | 1279 | 299 | 0 | 1026 | 121 | 0 | 269 | 152 | 0 | 395 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 55.3 | 0.0 | 15.5 | 17.5 | 0.0 | 33.5 | 64.2 | 0.0 | 58.2 | 69.0 | 0.0 | 51.6 |
| Incr Delay (d2), s/veh | 60.9 | 0.0 | 3.6 | 0.1 | 0.0 | 46.2 | 123.2 | 0.0 | 2.0 | 16.9 | 0.0 | 6.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 25.2 | 0.0 | 27.8 | 1.0 | 0.0 | 61.0 | 10.1 | 0.0 | 8.9 | 8.7 | 0.0 | 16.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 116.2 | 0.0 | 19.1 | 17.5 | 0.0 | 79.7 | 187.4 | 0.0 | 60.2 | 85.8 | 0.0 | 58.3 |
| LnGrp LOS | F | A | B | B | A | F | F | A | E | F | A | E |
| Approach Vol, veh/h | | 1347 | | | 1130 | | | 280 | | | 400 | |
| Approach Delay, s/veh | | 44.6 | | | 77.5 | | | 122.4 | | | 66.0 | |
| Approach LOS | | D | | | E | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.6 | 109.4 | 10.6 | 19.4 | 31.0 | 89.0 | | 30.0 |
| Change Period (Y+Rc), s | 6.5 | 6.0 | 4.5 | 6.5 | 6.5 | 6.0 | | 6.5 |
| Max Green Setting (Gmax), s | 5.3 | 102.2 | 6.1 | 12.9 | 24.5 | 83.0 | | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.4 | 55.6 | 8.1 | 14.9 | 26.5 | 85.0 | | 13.5 |
| Green Ext Time (p_c), s | 0.0 | 15.4 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.3 |

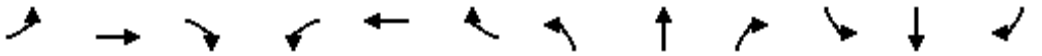
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 66.0 |
| HCM 6th LOS | E |



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 450 | 364 | 782 | 145 | 29 | 348 |
| Future Volume (veh/h) | 450 | 364 | 782 | 145 | 29 | 348 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 489 | 396 | 850 | 158 | 32 | 378 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 519 | 1476 | 943 | 799 | 139 | 469 |
| Arrive On Green | 0.22 | 0.79 | 0.50 | 0.50 | 0.08 | 0.08 |
| Sat Flow, veh/h | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Grp Volume(v), veh/h | 489 | 396 | 850 | 158 | 32 | 378 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Q Serve(g_s), s | 17.5 | 5.1 | 37.2 | 4.9 | 1.5 | 7.0 |
| Cycle Q Clear(g_c), s | 17.5 | 5.1 | 37.2 | 4.9 | 1.5 | 7.0 |
| Prop In Lane | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 519 | 1476 | 943 | 799 | 139 | 469 |
| V/C Ratio(X) | 0.94 | 0.27 | 0.90 | 0.20 | 0.23 | 0.81 |
| Avail Cap(c_a), veh/h | 527 | 1476 | 943 | 799 | 139 | 469 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.4 | 2.5 | 20.3 | 12.3 | 39.0 | 29.3 |
| Incr Delay (d2), s/veh | 25.2 | 0.4 | 13.4 | 0.6 | 0.8 | 10.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 19.1 | 1.9 | 24.1 | 3.0 | 1.2 | 24.2 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 50.7 | 3.0 | 33.7 | 12.8 | 39.8 | 39.2 |
| LnGrp LOS | D | A | C | B | D | D |
| Approach Vol, veh/h | | 885 | 1008 | | 410 | |
| Approach Delay, s/veh | | 29.3 | 30.4 | | 39.3 | |
| Approach LOS | | C | C | | D | |

| Timer - Assigned Phs | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | 77.0 | | 13.0 | 25.6 | 51.4 |
| Change Period (Y+Rc), s | | | 6.0 | | 6.0 | 6.0 | 6.0 |
| Max Green Setting (Gmax), s | | | 71.0 | | 7.0 | 20.0 | 45.0 |
| Max Q Clear Time (g_c+I1), s | | | 7.1 | | 9.0 | 19.5 | 39.2 |
| Green Ext Time (p_c), s | | | 1.5 | | 0.0 | 0.1 | 2.4 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 31.6 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 753 | 641 | 64 | 538 | 723 | 334 | 72 | 1000 | 563 | 414 | 1160 | 983 |
| Future Volume (vph) | 753 | 641 | 64 | 538 | 723 | 334 | 72 | 1000 | 563 | 414 | 1160 | 983 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Lane Util. Factor | 0.97 | 0.95 | | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 3491 | | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.09 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 3491 | | 3433 | 3539 | 1583 | 162 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 793 | 675 | 67 | 566 | 761 | 352 | 76 | 1053 | 593 | 436 | 1221 | 1035 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 138 | 0 | 0 | 281 | 0 | 0 | 344 |
| Lane Group Flow (vph) | 793 | 737 | 0 | 566 | 761 | 214 | 76 | 1053 | 312 | 436 | 1221 | 691 |
| Turn Type | Prot | NA | | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | | | | | | 2 | 8 | | 8 | | | 4 |
| Actuated Green, G (s) | 32.0 | 35.2 | | 26.8 | 30.0 | 30.0 | 51.0 | 46.0 | 46.0 | 19.0 | 60.0 | 60.0 |
| Effective Green, g (s) | 32.0 | 35.2 | | 26.8 | 30.0 | 30.0 | 51.0 | 46.0 | 46.0 | 19.0 | 60.0 | 60.0 |
| Actuated g/C Ratio | 0.21 | 0.23 | | 0.18 | 0.20 | 0.20 | 0.34 | 0.31 | 0.31 | 0.13 | 0.40 | 0.40 |
| Clearance Time (s) | 6.0 | 6.0 | | 6.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 | 5.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 | 1.5 | 4.0 | 4.0 |
| Lane Grp Cap (vph) | 732 | 819 | | 613 | 707 | 316 | 108 | 1085 | 485 | 434 | 1415 | 633 |
| v/s Ratio Prot | c0.23 | 0.21 | | 0.16 | c0.22 | | 0.02 | 0.30 | | c0.13 | 0.34 | |
| v/s Ratio Perm | | | | | | 0.13 | 0.21 | | 0.20 | | | c0.44 |
| v/c Ratio | 1.08 | 0.90 | | 0.92 | 1.08 | 0.68 | 0.70 | 0.97 | 0.64 | 1.00 | 0.86 | 1.09 |
| Uniform Delay, d1 | 59.0 | 55.7 | | 60.6 | 60.0 | 55.5 | 37.7 | 51.3 | 44.9 | 65.5 | 41.2 | 45.0 |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 58.1 | 12.9 | | 19.9 | 56.3 | 6.1 | 15.6 | 20.5 | 3.2 | 44.4 | 5.9 | 63.1 |
| Delay (s) | 117.1 | 68.6 | | 80.5 | 116.3 | 61.6 | 53.3 | 71.9 | 48.1 | 109.9 | 47.1 | 108.1 |
| Level of Service | F | E | | F | F | E | D | E | D | F | D | F |
| Approach Delay (s) | | 93.7 | | | 92.8 | | | 62.9 | | | 80.7 | |
| Approach LOS | | F | | | F | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 81.9 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.10 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 100.1% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 1133 | 352 | 370 | 1189 | 4 | 257 | 10 | 297 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 151 | 813 | 253 | 257 | 1309 | 1109 | 202 | 192 | 348 | 163 | 92 | 78 |
| Arrive On Green | 0.01 | 0.59 | 0.59 | 0.12 | 0.70 | 0.70 | 0.08 | 0.10 | 0.10 | 0.03 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1369 | 425 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 0 | 1485 | 370 | 1189 | 4 | 257 | 10 | 297 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1794 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.3 | 0.0 | 89.1 | 17.6 | 78.5 | 0.1 | 11.8 | 0.7 | 15.4 | 2.8 | 5.8 | 3.2 |
| Cycle Q Clear(g_c), s | 0.3 | 0.0 | 89.1 | 17.6 | 78.5 | 0.1 | 11.8 | 0.7 | 15.4 | 2.8 | 5.8 | 3.2 |
| Prop In Lane | 1.00 | | 0.24 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 151 | 0 | 1066 | 257 | 1309 | 1109 | 202 | 192 | 348 | 163 | 92 | 78 |
| V/C Ratio(X) | 0.07 | 0.00 | 1.39 | 1.44 | 0.91 | 0.00 | 1.27 | 0.05 | 0.85 | 0.21 | 0.79 | 0.45 |
| Avail Cap(c_a), veh/h | 190 | 0 | 1066 | 257 | 1309 | 1109 | 202 | 192 | 348 | 191 | 92 | 78 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.1 | 0.0 | 30.5 | 56.8 | 18.5 | 6.8 | 64.3 | 60.7 | 56.2 | 65.5 | 70.5 | 69.3 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 182.9 | 218.6 | 9.9 | 0.0 | 155.6 | 0.1 | 18.1 | 0.2 | 35.9 | 4.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 0.0 | 132.3 | 37.9 | 42.2 | 0.1 | 17.2 | 0.6 | 18.0 | 2.3 | 6.7 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.2 | 0.0 | 213.4 | 275.4 | 28.4 | 6.8 | 219.9 | 60.9 | 74.3 | 65.7 | 106.5 | 73.3 |
| LnGrp LOS | C | A | F | F | C | A | F | E | E | E | F | E |
| Approach Vol, veh/h | | 1495 | | | 1563 | | | 564 | | | 143 | |
| Approach Delay, s/veh | | 212.1 | | | 86.8 | | | 140.4 | | | 88.4 | |
| Approach LOS | | F | | | F | | | F | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 24.0 | 96.0 | 17.0 | 13.0 | 8.1 | 111.9 | 9.0 | 21.0 |
| Change Period (Y+Rc), s | 6.4 | 6.9 | 5.2 | 5.6 | 6.4 | 6.9 | 5.2 | 5.6 |
| Max Green Setting (Gmax), s | 17.6 | 89.1 | 11.8 | 7.4 | 5.0 | 101.7 | 6.2 | 13.0 |
| Max Q Clear Time (g_c+I1), s | 19.6 | 91.1 | 13.8 | 7.8 | 2.3 | 80.5 | 4.8 | 17.4 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.2 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 144.7 |
| HCM 6th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 62 | 1199 | 180 | 113 | 1202 | 20 | 125 | 16 | 80 | 7 | 23 | 53 |
| Future Volume (veh/h) | 62 | 1199 | 180 | 113 | 1202 | 20 | 125 | 16 | 80 | 7 | 23 | 53 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 63 | 1223 | 196 | 123 | 1227 | 20 | 136 | 17 | 87 | 7 | 25 | 54 |
| Peak Hour Factor | 0.98 | 0.98 | 0.92 | 0.92 | 0.98 | 0.98 | 0.92 | 0.92 | 0.92 | 0.98 | 0.92 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 182 | 1252 | 1061 | 144 | 1410 | 1195 | 160 | 18 | 94 | 131 | 28 | 61 |
| Arrive On Green | 0.67 | 0.67 | 0.67 | 0.04 | 0.75 | 0.75 | 0.05 | 0.07 | 0.07 | 0.04 | 0.05 | 0.05 |
| Sat Flow, veh/h | 446 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 266 | 1360 | 1781 | 527 | 1138 |
| Grp Volume(v), veh/h | 63 | 1223 | 196 | 123 | 1227 | 20 | 136 | 0 | 104 | 7 | 0 | 79 |
| Grp Sat Flow(s),veh/h/ln | 446 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1626 | 1781 | 0 | 1665 |
| Q Serve(g_s), s | 15.3 | 81.2 | 6.1 | 3.3 | 61.0 | 0.4 | 7.0 | 0.0 | 8.3 | 0.5 | 0.0 | 6.1 |
| Cycle Q Clear(g_c), s | 65.3 | 81.2 | 6.1 | 3.3 | 61.0 | 0.4 | 7.0 | 0.0 | 8.3 | 0.5 | 0.0 | 6.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.84 | 1.00 | | 0.68 |
| Lane Grp Cap(c), veh/h | 182 | 1252 | 1061 | 144 | 1410 | 1195 | 160 | 0 | 113 | 131 | 0 | 90 |
| V/C Ratio(X) | 0.35 | 0.98 | 0.18 | 0.85 | 0.87 | 0.02 | 0.85 | 0.00 | 0.92 | 0.05 | 0.00 | 0.88 |
| Avail Cap(c_a), veh/h | 182 | 1252 | 1061 | 144 | 1410 | 1195 | 160 | 0 | 113 | 131 | 0 | 90 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 0.39 | 0.39 | 0.39 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 38.8 | 20.5 | 8.1 | 38.1 | 11.4 | 4.0 | 57.6 | 0.0 | 60.2 | 53.9 | 0.0 | 61.1 |
| Incr Delay (d2), s/veh | 5.1 | 20.5 | 0.4 | 17.3 | 3.2 | 0.0 | 32.6 | 0.0 | 66.2 | 0.8 | 0.0 | 66.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.3 | 44.9 | 3.4 | 5.1 | 23.0 | 0.2 | 4.5 | 0.0 | 9.3 | 0.4 | 0.0 | 7.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 43.9 | 41.1 | 8.5 | 55.4 | 14.6 | 4.0 | 90.2 | 0.0 | 126.4 | 54.7 | 0.0 | 127.4 |
| LnGrp LOS | D | D | A | E | B | A | F | A | F | D | A | F |
| Approach Vol, veh/h | | 1482 | | | 1370 | | | 240 | | | 86 | |
| Approach Delay, s/veh | | 36.9 | | | 18.1 | | | 105.9 | | | 121.5 | |
| Approach LOS | | D | | | B | | | F | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 11.0 | 15.0 | 11.0 | 93.0 | 13.0 | 13.0 | | 104.0 |
| Change Period (Y+Rc), s | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | 6.0 |
| Max Green Setting (Gmax), s | 5.0 | 9.0 | 5.0 | 87.0 | 7.0 | 7.0 | | 98.0 |
| Max Q Clear Time (g_c+I1), s | 2.5 | 10.3 | 5.3 | 83.2 | 9.0 | 8.1 | | 63.0 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 2.7 | 0.0 | 0.0 | | 8.6 |

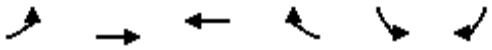
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 36.3 |
| HCM 6th LOS | D |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 53 | 1209 | 9 | 54 | 1109 | 113 | 71 | 7 | 56 | 15 | 12 | 64 |
| Future Volume (veh/h) | 53 | 1209 | 9 | 54 | 1109 | 113 | 71 | 7 | 56 | 15 | 12 | 64 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 54 | 1234 | 9 | 55 | 1132 | 115 | 72 | 7 | 57 | 15 | 12 | 65 |
| Peak Hour Factor | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 128 | 1274 | 9 | 144 | 1148 | 117 | 184 | 23 | 189 | 81 | 52 | 88 |
| Arrive On Green | 0.03 | 0.69 | 0.69 | 0.03 | 0.69 | 0.69 | 0.04 | 0.13 | 0.13 | 0.06 | 0.06 | 0.06 |
| Sat Flow, veh/h | 1781 | 1854 | 14 | 1781 | 1670 | 170 | 1781 | 176 | 1436 | 671 | 932 | 1585 |
| Grp Volume(v), veh/h | 54 | 0 | 1243 | 55 | 0 | 1247 | 72 | 0 | 64 | 27 | 0 | 65 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1868 | 1781 | 0 | 1840 | 1781 | 0 | 1612 | 1603 | 0 | 1585 |
| Q Serve(g_s), s | 1.1 | 0.0 | 80.1 | 1.1 | 0.0 | 84.6 | 4.8 | 0.0 | 4.6 | 0.3 | 0.0 | 5.2 |
| Cycle Q Clear(g_c), s | 1.1 | 0.0 | 80.1 | 1.1 | 0.0 | 84.6 | 4.8 | 0.0 | 4.6 | 1.8 | 0.0 | 5.2 |
| Prop In Lane | 1.00 | | 0.01 | 1.00 | | 0.09 | 1.00 | | 0.89 | 0.56 | | 1.00 |
| Lane Grp Cap(c), veh/h | 128 | 0 | 1283 | 144 | 0 | 1264 | 184 | 0 | 213 | 133 | 0 | 88 |
| V/C Ratio(X) | 0.42 | 0.00 | 0.97 | 0.38 | 0.00 | 0.99 | 0.39 | 0.00 | 0.30 | 0.20 | 0.00 | 0.74 |
| Avail Cap(c_a), veh/h | 142 | 0 | 1287 | 158 | 0 | 1267 | 184 | 0 | 214 | 134 | 0 | 90 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 35.1 | 0.0 | 18.8 | 33.4 | 0.0 | 19.5 | 52.8 | 0.0 | 50.5 | 58.2 | 0.0 | 59.8 |
| Incr Delay (d2), s/veh | 0.8 | 0.0 | 18.2 | 0.6 | 0.0 | 22.1 | 1.3 | 0.0 | 0.8 | 0.7 | 0.0 | 26.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.0 | 0.0 | 42.6 | 2.1 | 0.0 | 45.3 | 4.0 | 0.0 | 3.5 | 1.6 | 0.0 | 4.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.9 | 0.0 | 37.1 | 34.0 | 0.0 | 41.6 | 54.2 | 0.0 | 51.2 | 58.9 | 0.0 | 86.0 |
| LnGrp LOS | D | A | D | C | A | D | D | A | D | E | A | F |
| Approach Vol, veh/h | | 1297 | | | 1302 | | | 136 | | | 92 | |
| Approach Delay, s/veh | | 37.0 | | | 41.3 | | | 52.8 | | | 78.1 | |
| Approach LOS | | D | | | D | | | D | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 10.8 | 94.3 | 9.8 | 13.7 | 10.8 | 94.4 | | 23.5 |
| Change Period (Y+Rc), s | 6.5 | 6.0 | 4.5 | 6.5 | 6.5 | 6.0 | | 6.5 |
| Max Green Setting (Gmax), s | 5.3 | 88.6 | 5.3 | 7.3 | 5.3 | 88.6 | | 17.1 |
| Max Q Clear Time (g_c+I1), s | 3.1 | 82.1 | 6.8 | 7.2 | 3.1 | 86.6 | | 6.6 |
| Green Ext Time (p_c), s | 0.0 | 5.4 | 0.0 | 0.0 | 0.0 | 1.7 | | 0.1 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 41.1 |
| HCM 6th LOS | D |

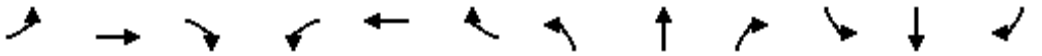


| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 499 | 714 | 464 | 61 | 51 | 572 |
| Future Volume (veh/h) | 499 | 714 | 464 | 61 | 51 | 572 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | No | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 531 | 760 | 494 | 65 | 54 | 609 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 628 | 1278 | 675 | 572 | 208 | 537 |
| Arrive On Green | 0.22 | 0.68 | 0.36 | 0.36 | 0.12 | 0.12 |
| Sat Flow, veh/h | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Grp Volume(v), veh/h | 531 | 760 | 494 | 65 | 54 | 609 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1870 | 1585 | 1781 | 1585 |
| Q Serve(g_s), s | 9.8 | 13.0 | 13.8 | 1.6 | 1.7 | 7.0 |
| Cycle Q Clear(g_c), s | 9.8 | 13.0 | 13.8 | 1.6 | 1.7 | 7.0 |
| Prop In Lane | 1.00 | | | 1.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h | 628 | 1278 | 675 | 572 | 208 | 537 |
| V/C Ratio(X) | 0.85 | 0.59 | 0.73 | 0.11 | 0.26 | 1.13 |
| Avail Cap(c_a), veh/h | 855 | 1278 | 675 | 572 | 208 | 537 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 10.1 | 5.1 | 16.6 | 12.8 | 24.1 | 19.8 |
| Incr Delay (d2), s/veh | 5.9 | 2.0 | 6.9 | 0.4 | 0.7 | 81.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 5.6 | 5.3 | 10.1 | 1.0 | 1.2 | 37.6 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 16.0 | 7.1 | 23.5 | 13.2 | 24.8 | 101.0 |
| LnGrp LOS | B | A | C | B | C | F |
| Approach Vol, veh/h | | 1291 | 559 | | 663 | |
| Approach Delay, s/veh | | 10.8 | 22.3 | | 94.8 | |
| Approach LOS | | B | C | | F | |

| Timer - Assigned Phs | | | 4 | | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | | 47.0 | | 13.0 | 19.3 | 27.7 |
| Change Period (Y+Rc), s | | | 6.0 | | 6.0 | 6.0 | 6.0 |
| Max Green Setting (Gmax), s | | | 41.0 | | 7.0 | 21.0 | 14.0 |
| Max Q Clear Time (g_c+I1), s | | | 15.0 | | 9.0 | 11.8 | 15.8 |
| Green Ext Time (p_c), s | | | 3.5 | | 0.0 | 1.6 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 35.5 |
| HCM 6th LOS | D |

# 2034 FUTURE PROJECTED CONDITIONS WITH INTERSECTION IMPROVEMENTS AND WIDENING



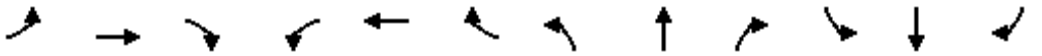
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |
| Future Volume (veh/h) | 105 | 863 | 230 | 264 | 1175 | 34 | 472 | 67 | 265 | 1 | 2 | 2 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 114 | 970 | 258 | 297 | 1320 | 37 | 582 | 0 | 298 | 1 | 2 | 2 |
| Peak Hour Factor | 0.92 | 0.89 | 0.89 | 0.89 | 0.89 | 0.92 | 0.89 | 0.92 | 0.89 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 119 | 988 | 1094 | 292 | 1160 | 983 | 578 | 0 | 465 | 16 | 16 | 14 |
| Arrive On Green | 0.04 | 0.53 | 0.53 | 0.13 | 0.62 | 0.62 | 0.16 | 0.00 | 0.16 | 0.01 | 0.01 | 0.01 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 3563 | 0 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 114 | 970 | 258 | 297 | 1320 | 37 | 582 | 0 | 298 | 1 | 2 | 2 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 5.2 | 73.3 | 8.7 | 18.9 | 89.5 | 1.3 | 23.4 | 0.0 | 23.4 | 0.1 | 0.2 | 0.2 |
| Cycle Q Clear(g_c), s | 5.2 | 73.3 | 8.7 | 18.9 | 89.5 | 1.3 | 23.4 | 0.0 | 23.4 | 0.1 | 0.2 | 0.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 119 | 988 | 1094 | 292 | 1160 | 983 | 578 | 0 | 465 | 16 | 16 | 14 |
| V/C Ratio(X) | 0.96 | 0.98 | 0.24 | 1.02 | 1.14 | 0.04 | 1.01 | 0.00 | 0.64 | 0.06 | 0.12 | 0.14 |
| Avail Cap(c_a), veh/h | 119 | 988 | 1094 | 292 | 1160 | 983 | 578 | 0 | 465 | 86 | 91 | 77 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 40.6 | 33.4 | 8.3 | 51.2 | 27.4 | 10.6 | 60.4 | 0.0 | 44.4 | 70.9 | 70.9 | 71.0 |
| Incr Delay (d2), s/veh | 68.5 | 24.3 | 0.2 | 56.8 | 72.8 | 0.0 | 39.2 | 0.0 | 3.0 | 1.7 | 3.2 | 4.6 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 10.5 | 47.7 | 8.4 | 21.6 | 79.9 | 0.8 | 19.5 | 0.0 | 14.4 | 0.1 | 0.2 | 0.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 109.2 | 57.7 | 8.5 | 108.1 | 100.2 | 10.7 | 99.7 | 0.0 | 47.4 | 72.6 | 74.2 | 75.6 |
| LnGrp LOS | F | E | A | F | F | B | F | A | D | E | E | E |
| Approach Vol, veh/h | | 1342 | | | 1654 | | | 880 | | | 5 | |
| Approach Delay, s/veh | | 52.6 | | | 99.6 | | | 82.0 | | | 74.4 | |
| Approach LOS | | D | | | F | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 25.3 | 83.1 | | 6.9 | 12.0 | 96.4 | | 29.0 | | | | |
| Change Period (Y+Rc), s | 6.4 | 6.9 | | 5.6 | 6.4 | 6.9 | | 5.6 | | | | |
| Max Green Setting (Gmax), s | 18.9 | 76.2 | | 7.0 | 5.6 | 89.5 | | 23.4 | | | | |
| Max Q Clear Time (g_c+I1), s | 20.9 | 75.3 | | 2.2 | 7.2 | 91.5 | | 25.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.7 | | 0.0 | 0.0 | 0.0 | | 0.0 | | | | |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 79.3 |
| HCM 6th LOS | | E |

**Notes**

User approved volume balancing among the lanes for turning movement.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |
| Future Volume (veh/h) | 9 | 1099 | 341 | 359 | 1153 | 4 | 249 | 9 | 288 | 32 | 67 | 32 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 10 | 1133 | 352 | 370 | 1189 | 4 | 264 | 0 | 297 | 35 | 73 | 35 |
| Peak Hour Factor | 0.92 | 0.97 | 0.97 | 0.97 | 0.97 | 0.92 | 0.97 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 151 | 1049 | 1009 | 316 | 1309 | 1109 | 271 | 0 | 359 | 88 | 92 | 78 |
| Arrive On Green | 0.01 | 0.56 | 0.56 | 0.15 | 0.70 | 0.70 | 0.08 | 0.00 | 0.08 | 0.05 | 0.05 | 0.05 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 3563 | 0 | 1585 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 10 | 1133 | 352 | 370 | 1189 | 4 | 264 | 0 | 297 | 35 | 73 | 35 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1781 | 1870 | 1585 | 1781 | 0 | 1585 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 0.4 | 84.1 | 15.6 | 22.6 | 78.5 | 0.1 | 11.1 | 0.0 | 11.4 | 2.9 | 5.8 | 3.2 |
| Cycle Q Clear(g_c), s | 0.4 | 84.1 | 15.6 | 22.6 | 78.5 | 0.1 | 11.1 | 0.0 | 11.4 | 2.9 | 5.8 | 3.2 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 151 | 1049 | 1009 | 316 | 1309 | 1109 | 271 | 0 | 359 | 88 | 92 | 78 |
| V/C Ratio(X) | 0.07 | 1.08 | 0.35 | 1.17 | 0.91 | 0.00 | 0.98 | 0.00 | 0.83 | 0.40 | 0.79 | 0.45 |
| Avail Cap(c_a), veh/h | 190 | 1049 | 1009 | 316 | 1309 | 1109 | 271 | 0 | 359 | 88 | 92 | 78 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 25.1 | 32.9 | 12.7 | 55.7 | 18.5 | 6.8 | 69.2 | 0.0 | 55.2 | 69.1 | 70.5 | 69.3 |
| Incr Delay (d2), s/veh | 0.1 | 52.2 | 0.4 | 104.8 | 9.9 | 0.0 | 47.6 | 0.0 | 14.6 | 2.9 | 35.9 | 4.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 0.3 | 66.2 | 11.1 | 30.2 | 42.2 | 0.1 | 11.0 | 0.0 | 17.5 | 2.5 | 6.7 | 2.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 25.2 | 85.1 | 13.2 | 160.5 | 28.4 | 6.8 | 116.8 | 0.0 | 69.8 | 72.0 | 106.5 | 73.3 |
| LnGrp LOS | C | F | B | F | C | A | F | A | E | E | F | E |
| Approach Vol, veh/h | | 1495 | | | 1563 | | | 561 | | | 143 | |
| Approach Delay, s/veh | | 67.8 | | | 59.6 | | | 91.9 | | | 89.9 | |
| Approach LOS | | E | | | E | | | F | | | F | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 29.0 | 91.0 | | 13.0 | 8.1 | 111.9 | | 17.0 | | | | |
| Change Period (Y+Rc), s | 6.4 | 6.9 | | 5.6 | 6.4 | 6.9 | | 5.6 | | | | |
| Max Green Setting (Gmax), s | 22.6 | 84.1 | | 7.4 | 5.0 | 101.7 | | 11.4 | | | | |
| Max Q Clear Time (g_c+I1), s | 24.6 | 86.1 | | 7.8 | 2.4 | 80.5 | | 13.4 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.0 | 0.0 | 14.2 | | 0.0 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 68.8 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |

**Notes**

User approved volume balancing among the lanes for turning movement.

# APPENDIX I
# SIGNAL WARRANT ANALYSIS

# Warrants Summary Report

**1: Bear Creek & Patterson**

**Intersection Informatior**

| | Major Street | Minor Street |
|---|---|---|
| **Street Name** | Bear Creek Pk | Patterson Dr |
| **Direction** | EB/WB | NB/SB |
| **Number of Lane:** | 2 | 2 |
| **Approch Speed** | 45 | 25 |

| Warrant | Met? | Notes |
|---|---|---|
| **Warrant 1, Eight-Hour Vehicular Volume** | | |
| | Yes | |
| Condition A or B Met | Yes | 13 Hours met (8 required) |
| Condition A and B M | No | 4 Hours met (8 required) |
| **Warrant 2, Four-Hour Vehicular Volume** | | |
| | Yes | 13 Hours met (4 required) |
| **Warrant 3, Peak Hour** | | |
| | Yes | |
| Condition A Met? | No | 0 Hours met (1 required) |
| Condition B Met? | Yes | 7 Hours met (1 required) |
| **Warrant 8, Roadway Network** | | |
| | Yes | |

# Warrant 1: Eight-hour Vehicular Volume

**1: Bear Creek & Patterson**

**Intersection Informatior**

| | |
|---|---|
| Major Street Name: | Bear Creek Pk |
| Major Street Direction: | EB/WB |
| Minor Street Direction: | NB/SB |

**WARRANT 1 MET?** Yes

**Details:**

| | | |
|---|---|---|
| Condition A Met? | Yes | 13 Hours met (8 required) |
| Condition B Met? | No | 4 Hours met (8 required) |

| Hour | Major Street Vehicles (Total of Both Approaches) | | High Volume Minor Approach Vehicles | | 70% Standard Met? Cond. A OR Cond. B | | 56% Standard Met? Cond. A AND Cond. B | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Condition A 70% Column | Condition B 70% Column | Condition A 56% Column | Condition B 56% Column |
| **06:00 to 07:00** | **1,238** | | **98** | | No | Yes* | No | Yes |
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |
| **07:00 to 08:00** | **2,158** | | **209** | | Yes* | Yes* | Yes* | Yes* |
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | Yes | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | Yes | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |
| **08:00 to 09:00** | **1,552** | | **170** | | Yes* | Yes* | Yes* | Yes* |
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | Yes | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | Yes | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |
| **09:00 to 10:00** | **1,230** | | **103** | | No | Yes* | No | Yes |
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 10:00 to 11:00 | 1,263 | | 87 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 11:00 to 12:00 | 1,251 | | 85 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 12:00 to 13:00 | 1,328 | | 89 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 13:00 to 14:00 | 1,258 | | 94 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 14:00 to 15:00 | 1,598 | | 103 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 15:00 to 16:00 | 1,969 | | 108 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 16:00 to 17:00 | 2,071 | | 146 | | Yes* | Yes* | Yes* | Yes* |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | Yes | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | Yes | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 17:00 to 18:00 | 1,774 | | 166 | | Yes* | Yes* | Yes* | Yes* |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | Yes | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | Yes | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

| 18:00 to 19:00 | 1,044 | | 108 | | No | Yes* | No | Yes |
|---|---|---|---|---|---|---|---|---|
| Condition A | Volume >= 70% column (420)? | Yes | Volume >= 70% column (630)? | No | | | | |
| | Volume >= 56% column (336)? | Yes | Volume >= 56% column (504)? | No | | | | |
| Condition B | **Volume >= 70% column (630)?** | Yes | **Volume >= 70% column (70)?** | Yes | | | | |
| | **Volume >= 56% column (504)?** | Yes | **Volume >= 56% column (56)?** | Yes | | | | |

# Warrant 2: Four-hour Vehicular Volume

**1: Bear Creek & Patterson**

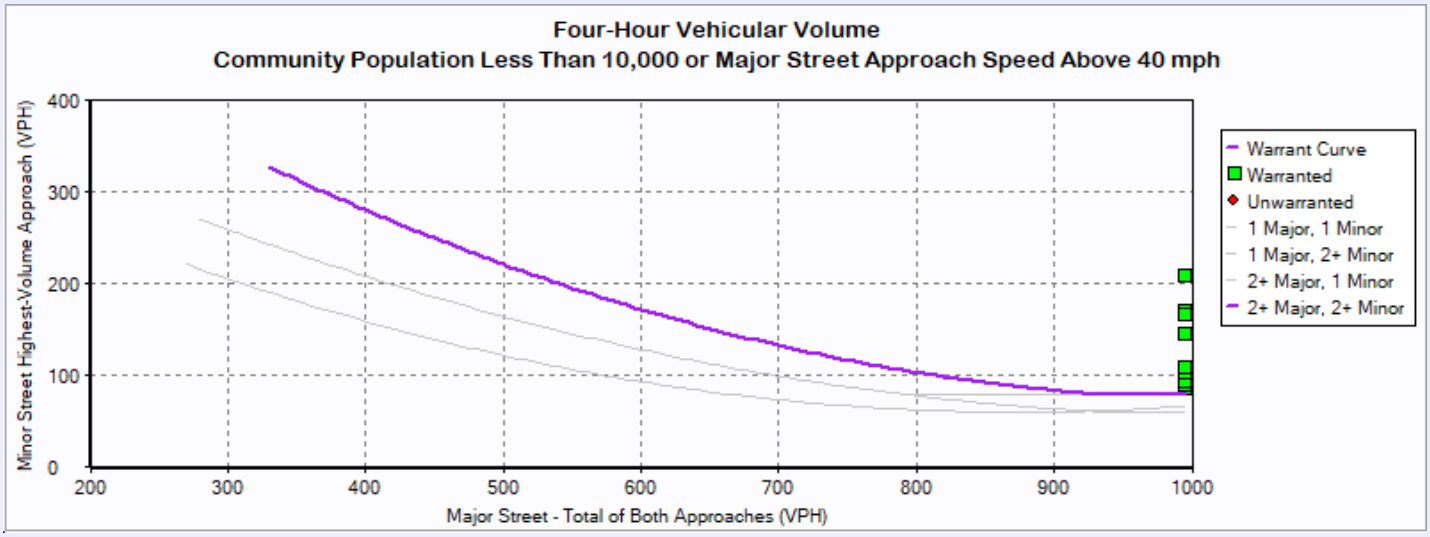
**Intersection Informatior**

| | Major Street | Minor Street |
|---|---|---|
| **Street Name** | Bear Creek Pk | Patterson Dr |
| **Direction** | EB/WB | NB/SB |
| **Number of Lane:** | 2 | 2 |
| **Approch Speed** | 45 | 25 |

**Warrant 2 Met?** **Yes**

**Details:**

| | |
|---|---|
| **Notes** | 13 Hours met (4 required) |
| **Low populatior** | No |



## Hourly Volumes

| Hour | Major Street<br>Total All Approaches (vph) | Minor Street<br>Highest Volume Approach (vph) |
|---|---|---|
| 00:00:00 - 01:00:00 | 0.00 | 0.00 |
| 01:00:00 - 02:00:00 | 0.00 | 0.00 |
| 02:00:00 - 03:00:00 | 0.00 | 0.00 |
| 03:00:00 - 04:00:00 | 0.00 | 0.00 |
| 04:00:00 - 05:00:00 | 0.00 | 0.00 |
| 05:00:00 - 06:00:00 | 0.00 | 0.00 |
| 06:00:00 - 07:00:00 | 1,238.00 | 98.00 |
| 07:00:00 - 08:00:00 | 2,158.00 | 209.00 |
| 08:00:00 - 09:00:00 | 1,552.00 | 170.00 |
| 09:00:00 - 10:00:00 | 1,230.00 | 103.00 |
| 10:00:00 - 11:00:00 | 1,263.00 | 87.00 |
| 11:00:00 - 12:00:00 | 1,251.00 | 85.00 |
| 12:00:00 - 13:00:00 | 1,328.00 | 89.00 |
| 13:00:00 - 14:00:00 | 1,258.00 | 94.00 |
| 14:00:00 - 15:00:00 | 1,598.00 | 103.00 |
| 15:00:00 - 16:00:00 | 1,969.00 | 108.00 |
| 16:00:00 - 17:00:00 | 2,071.00 | 146.00 |
| 17:00:00 - 18:00:00 | 1,774.00 | 166.00 |
| 18:00:00 - 19:00:00 | 1,044.00 | 108.00 |
| 19:00:00 - 20:00:00 | 0.00 | 0.00 |
| 20:00:00 - 21:00:00 | 0.00 | 0.00 |
| 21:00:00 - 22:00:00 | 0.00 | 0.00 |
| 22:00:00 - 23:00:00 | 0.00 | 0.00 |
| 23:00:00 - 00:00:00 | 0.00 | 0.00 |

**Warranted Volumes**

| Hour | Major Street<br>Total All Approaches (vph) | Minor Street<br>Highest Volume Approach (vph) |
|---|---|---|
| 06:00:00 - 07:00:00 | 1,238.00 | 98.00 |
| 07:00:00 - 08:00:00 | 2,158.00 | 209.00 |
| 08:00:00 - 09:00:00 | 1,552.00 | 170.00 |
| 09:00:00 - 10:00:00 | 1,230.00 | 103.00 |
| 10:00:00 - 11:00:00 | 1,263.00 | 87.00 |
| 11:00:00 - 12:00:00 | 1,251.00 | 85.00 |
| 12:00:00 - 13:00:00 | 1,328.00 | 89.00 |
| 13:00:00 - 14:00:00 | 1,258.00 | 94.00 |
| 14:00:00 - 15:00:00 | 1,598.00 | 103.00 |
| 15:00:00 - 16:00:00 | 1,969.00 | 108.00 |
| 16:00:00 - 17:00:00 | 2,071.00 | 146.00 |
| 17:00:00 - 18:00:00 | 1,774.00 | 166.00 |
| 18:00:00 - 19:00:00 | 1,044.00 | 108.00 |

# Warrant 3: Peak Hour

**1: Bear Creek & Patterson**

**Intersection Informatior**

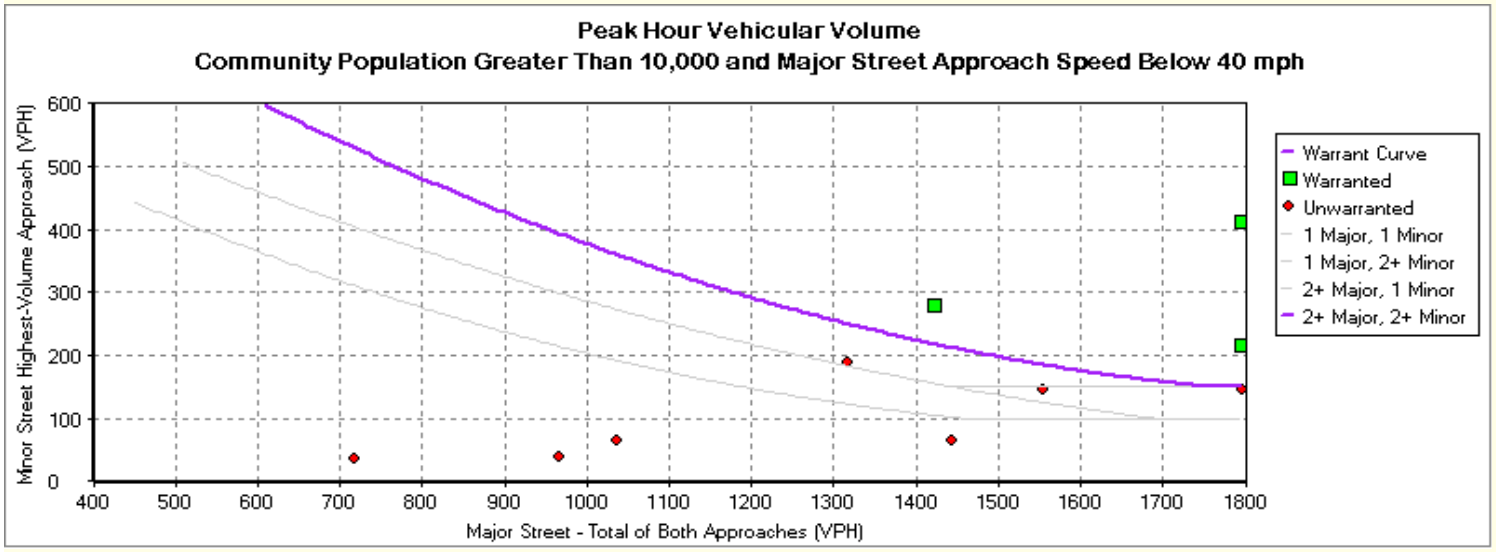
| | Major Street | Minor Street |
|---|---|---|
| **Street Name** | Bear Creek Pk | Patterson Dr |
| **Direction** | EB/WB | NB/SB |
| **Number of Lane:** | 2 | 2 |
| **Approch Speed** | 45 | 25 |

**Warrant 3 Met?** **Yes**

**Details**

| | | | |
|---|---|---|---|
| **Low Population?** | No | | |
| **Condition A Met** | No | **Condition B Met** | Yes |
| **Notes** | 0 Hours met (1 required) | **Notes** | 7 Hours met (1 required) |

| | |
|---|---|
| Minor Approach Time Delay Condition Met? | Not Met |
| Minor Approach Volume Condition Met? | Met |
| Total Entering Intersection Volume Condition Met? | Not Met |



| Hour | Major Street<br>Total All Approaches (vph) | Minor Street<br>Highest Volume Approach (vph) |
|---|---|---|
| 6:00 | 1,238 | 98 |
| 7:00 | 2,158 | 209 |
| 8:00 | 1,552 | 170 |
| 9:00 | 1,230 | 103 |
| 10:00 | 1,263 | 87 |
| 11:00 | 1,251 | 85 |
| 12:00 | 1,328 | 89 |
| 13:00 | 1,258 | 94 |
| 14:00 | 1,598 | 103 |
| 15:00 | 1,969 | 108 |
| 16:00 | 2,071 | 146 |
| 17:00 | 1,774 | 166 |
| 18:00 | 1,044 | 108 |

**Intersection:** **Bear Creek Pk & Patterson Dr**
Control: One-way Stop
Day: Tuesday
Date: 2/22/2022
Count by: Marr Traffic

| Street | | | Bear Creek Pike | | | | Bear Creek Pike | | | | | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | 15-Min | Rolling |
| TOD | 15-Min Increment | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | Total | Hour Total |
| AM | 6:00 | 6:15 | 0 | 118 | 0 | 118 | 0 | 62 | 0 | 62 | | | | 0 | 1 | 0 | 2 | 3 | 183 | 970 |
| | 6:15 | 6:30 | 1 | 120 | 2 | 123 | 0 | 93 | 0 | 93 | | | | 0 | 2 | 0 | 5 | 7 | 223 | 1156 |
| | 6:30 | 6:45 | 0 | 147 | 0 | 147 | 0 | 108 | 0 | 108 | | | | 0 | 1 | 0 | 4 | 5 | 260 | 1364 |
| | 6:45 | 7:00 | 1 | 167 | 0 | 168 | 0 | 124 | 0 | 124 | | | | 0 | 4 | 0 | 8 | 12 | 304 | 1546 |
| | 7:00 | 7:15 | 1 | 186 | 0 | 187 | 0 | 168 | 0 | 168 | | | | 0 | 1 | 0 | 13 | 14 | 369 | 1680 |
| | 7:15 | 7:30 | 4 | 221 | 1 | 226 | 0 | 189 | 1 | 190 | | | | 0 | 7 | 0 | 8 | 15 | 431 | 1659 |
| | 7:30 | 7:45 | 1 | 185 | 0 | 186 | 0 | 241 | 0 | 241 | | | | 0 | 1 | 0 | 14 | 15 | 442 | 1539 |
| | 7:45 | 8:00 | 3 | 177 | 0 | 180 | 0 | 239 | 1 | 240 | | | | 0 | 3 | 0 | 15 | 18 | 438 | 1385 |
| | 8:00 | 8:15 | 6 | 150 | 0 | 156 | 0 | 186 | 1 | 187 | | | | 0 | 2 | 0 | 3 | 5 | 348 | 1173 |
| | 8:15 | 8:30 | 3 | 135 | 0 | 138 | 0 | 163 | 1 | 164 | | | | 0 | 1 | 0 | 8 | 9 | 311 | 1057 |
| | 8:30 | 8:45 | 4 | 125 | 0 | 129 | 0 | 150 | 2 | 152 | | | | 0 | 1 | 0 | 6 | 7 | 288 | 967 |
| | 8:45 | 9:00 | 5 | 88 | 0 | 93 | 0 | 129 | 0 | 129 | | | | 0 | 1 | 0 | 3 | 4 | 226 | 923 |
| | 9:00 | 9:15 | 4 | 95 | 0 | 99 | 0 | 117 | 0 | 117 | | | | 0 | 4 | 0 | 12 | 16 | 232 | 955 |
| | 9:15 | 9:30 | 5 | 111 | 0 | 116 | 0 | 95 | 3 | 98 | | | | 0 | 0 | 0 | 7 | 7 | 221 | 970 |
| | 9:30 | 9:45 | 3 | 109 | 0 | 112 | 0 | 127 | 0 | 127 | | | | 0 | 0 | 0 | 5 | 5 | 244 | 994 |
| | 9:45 | 10:00 | 6 | 113 | 1 | 120 | 0 | 127 | 2 | 129 | | | | 0 | 0 | 0 | 9 | 9 | 258 | 1020 |
| | 10:00 | 10:15 | 3 | 127 | 0 | 130 | 0 | 105 | 0 | 105 | | | | 0 | 1 | 0 | 11 | 12 | 247 | 974 |
| | 10:15 | 10:30 | 8 | 116 | 0 | 124 | 0 | 114 | 0 | 114 | | | | 0 | 0 | 0 | 7 | 7 | 245 | 970 |
| | 10:30 | 10:45 | 6 | 109 | 0 | 115 | 0 | 147 | 0 | 147 | | | | 0 | 3 | 0 | 5 | 8 | 270 | 982 |
| | 10:45 | 11:00 | 3 | 117 | 0 | 120 | 0 | 87 | 1 | 88 | | | | 0 | 1 | 0 | 3 | 4 | 212 | 937 |
| Midday | 11:00 | 11:15 | 8 | 117 | 0 | 125 | 0 | 110 | 1 | 111 | | | | 0 | 3 | 0 | 4 | 7 | 243 | 946 |
| | 11:15 | 11:30 | 10 | 128 | 0 | 138 | 0 | 114 | 1 | 115 | | | | 0 | 0 | 0 | 4 | 4 | 257 | 943 |
| | 11:30 | 11:45 | 2 | 113 | 0 | 115 | 0 | 108 | 0 | 108 | | | | 0 | 0 | 0 | 2 | 2 | 225 | 954 |
| | 11:45 | 12:00 | 7 | 106 | 0 | 113 | 0 | 96 | 0 | 96 | | | | 0 | 2 | 0 | 10 | 12 | 221 | 998 |
| | 12:00 | 12:15 | 7 | 121 | 0 | 128 | 0 | 109 | 0 | 109 | | | | 0 | 0 | 0 | 3 | 3 | 240 | 1004 |
| | 12:15 | 12:30 | 10 | 119 | 0 | 129 | 0 | 130 | 0 | 130 | | | | 0 | 1 | 0 | 8 | 9 | 268 | 1000 |
| | 12:30 | 12:45 | 4 | 126 | 0 | 130 | 0 | 128 | 0 | 128 | | | | 0 | 1 | 0 | 10 | 11 | 269 | 972 |
| | 12:45 | 13:00 | 7 | 104 | 0 | 111 | 0 | 113 | 0 | 113 | | | | 0 | 0 | 0 | 3 | 3 | 227 | 941 |
| | 13:00 | 13:15 | 7 | 123 | 0 | 130 | 0 | 101 | 0 | 101 | | | | 0 | 2 | 0 | 3 | 5 | 236 | 943 |
| | 13:15 | 13:30 | 4 | 104 | 1 | 109 | 0 | 125 | 2 | 127 | | | | 0 | 0 | 0 | 4 | 4 | 240 | 963 |
| | 13:30 | 13:45 | 5 | 112 | 0 | 117 | 0 | 115 | 1 | 116 | | | | 0 | 1 | 0 | 4 | 5 | 238 | 1012 |
| | 13:45 | 14:00 | 1 | 101 | 1 | 103 | 0 | 115 | 2 | 117 | | | | 0 | 1 | 0 | 8 | 9 | 229 | 1121 |
| | 14:00 | 14:15 | 4 | 134 | 0 | 138 | 0 | 114 | 0 | 114 | | | | 0 | 0 | 0 | 4 | 4 | 256 | 1207 |
| | 14:15 | 14:30 | 7 | 156 | 0 | 163 | 0 | 122 | 0 | 122 | | | | 0 | 0 | 0 | 4 | 4 | 289 | 1290 |
| | 14:30 | 14:45 | 3 | 150 | 0 | 153 | 0 | 174 | 4 | 178 | | | | 0 | 1 | 0 | 15 | 16 | 347 | 1363 |
| | 14:45 | 15:00 | 3 | 149 | 1 | 153 | 0 | 154 | 1 | 155 | | | | 0 | 0 | 0 | 7 | 7 | 315 | 1423 |
| PM | 15:00 | 15:15 | 6 | 152 | 0 | 158 | 0 | 168 | 1 | 169 | | | | 0 | 4 | 0 | 8 | 12 | 339 | 1471 |
| | 15:15 | 15:30 | 11 | 154 | 1 | 166 | 0 | 189 | 0 | 189 | | | | 0 | 1 | 0 | 6 | 7 | 362 | 1480 |
| | 15:30 | 15:45 | 12 | 190 | 1 | 203 | 0 | 194 | 4 | 198 | | | | 0 | 0 | 0 | 6 | 6 | 407 | 1517 |
| | 15:45 | 16:00 | 9 | 174 | 0 | 183 | 0 | 171 | 1 | 172 | | | | 0 | 0 | 0 | 8 | 8 | 363 | 1482 |
| | 16:00 | 16:15 | 7 | 152 | 0 | 159 | 0 | 171 | 3 | 174 | | | | 0 | 1 | 0 | 14 | 15 | 348 | 1518 |
| | 16:15 | 16:30 | 10 | 173 | 0 | 183 | 0 | 206 | 3 | 209 | | | | 0 | 1 | 0 | 6 | 7 | 399 | 1547 |
| | 16:30 | 16:45 | 9 | 153 | 0 | 162 | 0 | 202 | 2 | 204 | | | | 0 | 0 | 0 | 6 | 6 | 372 | 1469 |
| | 16:45 | 17:00 | 8 | 174 | 0 | 182 | 0 | 207 | 5 | 212 | | | | 0 | 1 | 0 | 4 | 5 | 399 | 1422 |
| | 17:00 | 17:15 | 15 | 158 | 0 | 173 | 0 | 197 | 2 | 199 | | | | 0 | 1 | 0 | 4 | 5 | 377 | 1262 |
| | 17:15 | 17:30 | 14 | 161 | 0 | 175 | 0 | 138 | 2 | 140 | | | | 0 | 0 | 0 | 6 | 6 | 321 | 1137 |
| | 17:30 | 17:45 | 11 | 132 | 0 | 143 | 0 | 176 | 1 | 177 | | | | 0 | 0 | 0 | 5 | 5 | 325 | 1012 |
| | 17:45 | 18:00 | 5 | 105 | 0 | 110 | 0 | 124 | 2 | 126 | | | | 0 | 2 | 0 | 1 | 3 | 239 | 853 |
| | 18:00 | 18:15 | 10 | 87 | 0 | 97 | 0 | 152 | 0 | 152 | | | | 0 | 0 | 0 | 3 | 3 | 252 | 741 |
| | 18:15 | 18:30 | 9 | 76 | 0 | 85 | 0 | 103 | 2 | 105 | | | | 0 | 1 | 0 | 5 | 6 | 196 | 489 |
| | 18:30 | 18:45 | 7 | 67 | 0 | 74 | 0 | 83 | 3 | 86 | | | | 0 | 1 | 0 | 5 | 6 | 166 | 293 |
| | 18:45 | 19:00 | 5 | 56 | 0 | 61 | 0 | 61 | 0 | 61 | | | | 0 | 0 | 0 | 5 | 5 | 127 | 127 |
| | | | | | | | | | | | | | | | | | | | | |
| AM | 7:00 | 8:00 | 9 | 769 | 1 | 779 | 0 | 837 | 2 | 839 | 0 | 0 | 0 | 0 | 12 | 0 | 50 | 62 | | 1680 |
| PM | 16:15 | 17:15 | 42 | 658 | 0 | 700 | 0 | 812 | 12 | 824 | 0 | 0 | 0 | 0 | 3 | 0 | 20 | 23 | | 1547 |

**Intersection:** **Bear Creek Pk & Patterson Dr**
Control: One-way Stop
Day: Tuesday
Date: 2/22/2022
Count by: Marr Traffic

**2022 Existing (Unadjusted)**

| Street | | | Bear Creek Pike | | | | Bear Creek Pike | | | | | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly | Rolling |
| TOD | Hourly Increment | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | Total | Hour Total |
| AM | 6:00 | 7:00 | 2 | 552 | 2 | 556 | 0 | 387 | 0 | 387 | 0 | 0 | 0 | 0 | 8 | 0 | 19 | 27 | 970 | 970 |
| | 7:00 | 8:00 | 9 | 769 | 1 | 779 | 0 | 837 | 2 | 839 | 0 | 0 | 0 | 0 | 12 | 0 | 50 | 62 | 1680 | 1680 |
| | 8:00 | 9:00 | 18 | 498 | 0 | 516 | 0 | 628 | 4 | 632 | 0 | 0 | 0 | 0 | 5 | 0 | 20 | 25 | 1173 | 1173 |
| | 9:00 | 10:00 | 18 | 428 | 1 | 447 | 0 | 466 | 5 | 471 | 0 | 0 | 0 | 0 | 4 | 0 | 33 | 37 | 955 | 955 |
| | 10:00 | 11:00 | 20 | 469 | 0 | 489 | 0 | 453 | 1 | 454 | 0 | 0 | 0 | 0 | 5 | 0 | 26 | 31 | 974 | 974 |
| Midday | 11:00 | 12:00 | 27 | 464 | 0 | 491 | 0 | 428 | 2 | 430 | 0 | 0 | 0 | 0 | 5 | 0 | 20 | 25 | 946 | 946 |
| | 12:00 | 13:00 | 28 | 470 | 0 | 498 | 0 | 480 | 0 | 480 | 0 | 0 | 0 | 0 | 2 | 0 | 24 | 26 | 1004 | 1004 |
| | 13:00 | 14:00 | 17 | 440 | 2 | 459 | 0 | 456 | 5 | 461 | 0 | 0 | 0 | 0 | 4 | 0 | 19 | 23 | 943 | 943 |
| | 14:00 | 15:00 | 17 | 589 | 1 | 607 | 0 | 564 | 5 | 569 | 0 | 0 | 0 | 0 | 1 | 0 | 30 | 31 | 1207 | 1207 |
| PM | 15:00 | 16:00 | 38 | 670 | 2 | 710 | 0 | 722 | 6 | 728 | 0 | 0 | 0 | 0 | 5 | 0 | 28 | 33 | 1471 | 1471 |
| | 16:00 | 17:00 | 34 | 652 | 0 | 686 | 0 | 786 | 13 | 799 | 0 | 0 | 0 | 0 | 3 | 0 | 30 | 33 | 1518 | 1518 |
| | 17:00 | 18:00 | 45 | 556 | 0 | 601 | 0 | 635 | 7 | 642 | 0 | 0 | 0 | 0 | 3 | 0 | 16 | 19 | 1262 | 1262 |
| | 18:00 | 19:00 | 31 | 286 | 0 | 317 | 0 | 399 | 5 | 404 | 0 | 0 | 0 | 0 | 2 | 0 | 18 | 20 | 741 | 741 |

**Intersection:** **Bear Creek Pike & Patterson Drive**
Control: One-way Stop
Day:
Date:
Count by:

**2031 Background Growth 27% (9 years at 3%)**

| Street | | | | Bear Creek Pike | | | | Bear Creek Pike | | | | | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly | Rolling |
| TOD | Hourly Increment | | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | Total | Hour Total |
| AM | 6:00 | - | 7:00 | 3 | 701 | 3 | 707 | 0 | 491 | 0 | 491 | 0 | 0 | 0 | 0 | 10 | 0 | 24 | 34 | 1232 | 1232 |
| | 7:00 | - | 8:00 | 11 | 977 | 1 | 989 | 0 | 1063 | 3 | 1066 | 0 | 0 | 0 | 0 | 15 | 0 | 64 | 79 | 2134 | 2134 |
| | 8:00 | - | 9:00 | 23 | 632 | 0 | 655 | 0 | 798 | 5 | 803 | 0 | 0 | 0 | 0 | 6 | 0 | 25 | 31 | 1489 | 1489 |
| | 9:00 | - | 10:00 | 23 | 544 | 1 | 568 | 0 | 592 | 6 | 598 | 0 | 0 | 0 | 0 | 5 | 0 | 42 | 47 | 1213 | 1213 |
| | 10:00 | - | 11:00 | 25 | 596 | 0 | 621 | 0 | 575 | 1 | 576 | 0 | 0 | 0 | 0 | 6 | 0 | 33 | 39 | 1236 | 1236 |
| Midday | 11:00 | - | 12:00 | 34 | 589 | 0 | 623 | 0 | 544 | 3 | 547 | 0 | 0 | 0 | 0 | 6 | 0 | 25 | 31 | 1201 | 1201 |
| | 12:00 | - | 13:00 | 36 | 597 | 0 | 633 | 0 | 610 | 0 | 610 | 0 | 0 | 0 | 0 | 3 | 0 | 30 | 33 | 1276 | 1276 |
| | 13:00 | - | 14:00 | 22 | 559 | 3 | 584 | 0 | 579 | 6 | 585 | 0 | 0 | 0 | 0 | 5 | 0 | 24 | 29 | 1198 | 1198 |
| | 14:00 | - | 15:00 | 22 | 748 | 1 | 771 | 0 | 716 | 6 | 722 | 0 | 0 | 0 | 0 | 1 | 0 | 38 | 39 | 1532 | 1532 |
| PM | 15:00 | - | 16:00 | 48 | 851 | 3 | 902 | 0 | 917 | 8 | 925 | 0 | 0 | 0 | 0 | 6 | 0 | 36 | 42 | 1869 | 1869 |
| | 16:00 | - | 17:00 | 43 | 828 | 0 | 871 | 0 | 998 | 17 | 1015 | 0 | 0 | 0 | 0 | 4 | 0 | 38 | 42 | 1928 | 1928 |
| | 17:00 | - | 18:00 | 57 | 706 | 0 | 763 | 0 | 806 | 9 | 815 | 0 | 0 | 0 | 0 | 4 | 0 | 20 | 24 | 1602 | 1602 |
| | 18:00 | - | 19:00 | 39 | 363 | 0 | 402 | 0 | 507 | 6 | 513 | 0 | 0 | 0 | 0 | 3 | 0 | 23 | 26 | 941 | 941 |
| | | | | | | | | | | | | | | | | | | | | | |

**LUC 210** **Columbia Bluffs - Phases 1-3**

**Residential Single-family Detached** **236 Dwelling Units**

**Daily Traffic** **2223**

| Time | | | Hourly Distributi | Enter % | Exit % | Hourly Traffic | Enter | Exit |
|---|---|---|---|---|---|---|---|---|
| 6:00 | - | 7:00 | | 1.6% | 5.8% | 82 | 17 | 65 |
| 7:00 | - | 8:00 | | 3.1% | 10.0% | 145 | 34 | 111 |
| 8:00 | - | 9:00 | | 3.8% | 8.5% | 137 | 42 | 95 |
| 9:00 | - | 10:00 | | 3.3% | 5.8% | 101 | 37 | 64 |
| 10:00 | - | 11:00 | | 4.2% | 5.6% | 109 | 47 | 62 |
| 11:00 | - | 12:00 | | 5.4% | 5.1% | 117 | 60 | 57 |
| 12:00 | - | 13:00 | | 5.7% | 5.7% | 127 | 64 | 63 |
| 13:00 | - | 14:00 | | 6.1% | 6.0% | 135 | 68 | 67 |
| 14:00 | - | 15:00 | | 7.1% | 6.1% | 147 | 79 | 68 |
| 15:00 | - | 16:00 | | 8.7% | 6.2% | 166 | 97 | 69 |
| 16:00 | - | 17:00 | | 10.5% | 7.4% | 199 | 117 | 82 |
| 17:00 | - | 18:00 | | 10.0% | 7.3% | 192 | 111 | 81 |
| 18:00 | - | 19:00 | | 8.5% | 5.9% | 160 | 95 | 65 |

Total Trip Gen

| Street | | | | Bear Creek Pike | | | | Bear Creek Pike | | | | Site Access 1 | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly Total | Hour Total |
| TOD | Hourly Increment | | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | | |
| | Enter % | | | | | 65% | | 30% | | | | | | | | | 5% | | | | |
| | Exit % | | | | | | | | | | | 65% | 5% | 30% | | | | | | | |
| AM | 6:00 | - | 7:00 | 0 | 0 | 11 | 11 | 5 | 0 | 0 | 5 | 42 | 3 | 20 | 65 | 0 | 1 | 0 | 1 | 82 | 82 |
| | 7:00 | - | 8:00 | 0 | 0 | 22 | 22 | 10 | 0 | 0 | 10 | 72 | 6 | 33 | 111 | 0 | 2 | 0 | 2 | **145** | 145 |
| | 8:00 | - | 9:00 | 0 | 0 | 27 | 27 | 13 | 0 | 0 | 13 | 62 | 5 | 29 | 96 | 0 | 2 | 0 | 2 | 138 | 138 |
| | 9:00 | - | 10:00 | 0 | 0 | 24 | 24 | 11 | 0 | 0 | 11 | 42 | 3 | 19 | 64 | 0 | 2 | 0 | 2 | 101 | 101 |
| | 10:00 | - | 11:00 | 0 | 0 | 31 | 31 | 14 | 0 | 0 | 14 | 40 | 3 | 19 | 62 | 0 | 2 | 0 | 2 | 109 | 109 |
| Midday | 11:00 | - | 12:00 | 0 | 0 | 39 | 39 | 18 | 0 | 0 | 18 | 37 | 3 | 17 | 57 | 0 | 3 | 0 | 3 | 117 | 117 |
| | 12:00 | - | 13:00 | 0 | 0 | 42 | 42 | 19 | 0 | 0 | 19 | 41 | 3 | 19 | 63 | 0 | 3 | 0 | 3 | 127 | 127 |
| | 13:00 | - | 14:00 | 0 | 0 | 44 | 44 | 20 | 0 | 0 | 20 | 44 | 3 | 20 | 67 | 0 | 3 | 0 | 3 | 134 | 134 |
| | 14:00 | - | 15:00 | 0 | 0 | 51 | 51 | 24 | 0 | 0 | 24 | 44 | 3 | 20 | 67 | 0 | 4 | 0 | 4 | 146 | 146 |
| PM | 15:00 | - | 16:00 | 0 | 0 | 63 | 63 | 29 | 0 | 0 | 29 | 45 | 3 | 21 | 69 | 0 | 5 | 0 | 5 | 166 | 166 |
| | 16:00 | - | 17:00 | 0 | 0 | 76 | 76 | 35 | 0 | 0 | 35 | 53 | 4 | 25 | 82 | 0 | 6 | 0 | 6 | 199 | 199 |
| | 17:00 | - | 18:00 | 0 | 0 | 72 | 72 | 33 | 0 | 0 | 33 | 53 | 4 | 24 | 81 | 0 | 6 | 0 | 6 | **192** | 192 |
| | 18:00 | - | 19:00 | 0 | 0 | 62 | 62 | 29 | 0 | 0 | 29 | 42 | 3 | 20 | 65 | 0 | 5 | 0 | 5 | 161 | 161 |

**LUC 215** **Columbia Bluffs - Phases 1-3**

**Residential Single-family Attached (Townhomes)** **94 Dwelling Units**

**Daily Traffic** **666**

| Time | | | Hourly Distributi | Enter % | Exit % | Hourly Traffic | Enter | Exit |
|---|---|---|---|---|---|---|---|---|
| 6:00 | - | 7:00 | | 1.1% | 5.8% | 23 | 4 | 19 |
| 7:00 | - | 8:00 | | 2.7% | 13.2% | 53 | 9 | 44 |
| 8:00 | - | 9:00 | | 3.8% | 9.3% | 44 | 13 | 31 |
| 9:00 | - | 10:00 | | 3.7% | 6.9% | 35 | 12 | 23 |
| 10:00 | - | 11:00 | | 4.0% | 4.3% | 27 | 13 | 14 |
| 11:00 | - | 12:00 | | 4.8% | 5.7% | 35 | 16 | 19 |
| 12:00 | - | 13:00 | | 5.4% | 5.1% | 35 | 18 | 17 |
| 13:00 | - | 14:00 | | 4.5% | 4.8% | 31 | 15 | 16 |
| 14:00 | - | 15:00 | | 5.5% | 6.0% | 38 | 18 | 20 |
| 15:00 | - | 16:00 | | 8.2% | 4.8% | 43 | 27 | 16 |
| 16:00 | - | 17:00 | | 9.8% | 5.1% | 50 | 33 | 17 |
| 17:00 | - | 18:00 | | 12.1% | 6.8% | 63 | 40 | 23 |
| 18:00 | - | 19:00 | | 9.8% | 6.6% | 55 | 33 | 22 |

Total Trip Gen

| Street | | | | Bear Creek Pike | | | | Bear Creek Pike | | | | Site Access 1 | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly Total | Hour Total |
| TOD | Hourly Increment | | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | | |
| | Enter % | | | | | 65% | | 30% | | | | | | | | | 5% | | | | |
| | Exit % | | | | | | | | | | | 65% | 5% | 30% | | | | | | | |
| AM | 6:00 | - | 7:00 | 0 | 0 | 3 | 3 | 1 | 0 | 0 | 1 | 12 | 1 | 6 | 19 | 0 | 0 | 0 | 0 | 23 | 23 |
| | 7:00 | - | 8:00 | 0 | 0 | 6 | 6 | 3 | 0 | 0 | 3 | 29 | 2 | 13 | 44 | 0 | 0 | 0 | 0 | **53** | 53 |
| | 8:00 | - | 9:00 | 0 | 0 | 8 | 8 | 4 | 0 | 0 | 4 | 20 | 2 | 9 | 31 | 0 | 1 | 0 | 1 | 44 | 44 |
| | 9:00 | - | 10:00 | 0 | 0 | 8 | 8 | 4 | 0 | 0 | 4 | 15 | 1 | 7 | 23 | 0 | 1 | 0 | 1 | 36 | 36 |
| | 10:00 | - | 11:00 | 0 | 0 | 8 | 8 | 4 | 0 | 0 | 4 | 9 | 1 | 4 | 14 | 0 | 1 | 0 | 1 | 27 | 27 |
| Midday | 11:00 | - | 12:00 | 0 | 0 | 10 | 10 | 5 | 0 | 0 | 5 | 12 | 1 | 6 | 19 | 0 | 1 | 0 | 1 | 35 | 35 |
| | 12:00 | - | 13:00 | 0 | 0 | 12 | 12 | 5 | 0 | 0 | 5 | 11 | 1 | 5 | 17 | 0 | 1 | 0 | 1 | 35 | 35 |
| | 13:00 | - | 14:00 | 0 | 0 | 10 | 10 | 5 | 0 | 0 | 5 | 10 | 1 | 5 | 16 | 0 | 1 | 0 | 1 | 32 | 32 |
| | 14:00 | - | 15:00 | 0 | 0 | 12 | 12 | 5 | 0 | 0 | 5 | 13 | 1 | 6 | 20 | 0 | 1 | 0 | 1 | 38 | 38 |
| PM | 15:00 | - | 16:00 | 0 | 0 | 18 | 18 | 8 | 0 | 0 | 8 | 10 | 1 | 5 | 16 | 0 | 1 | 0 | 1 | 43 | 43 |
| | 16:00 | - | 17:00 | 0 | 0 | 21 | 21 | 10 | 0 | 0 | 10 | 11 | 1 | 5 | 17 | 0 | 2 | 0 | 2 | 50 | 50 |
| | 17:00 | - | 18:00 | 0 | 0 | 26 | 26 | 12 | 0 | 0 | 12 | 15 | 1 | 7 | 23 | 0 | 2 | 0 | 2 | **63** | 63 |
| | 18:00 | - | 19:00 | 0 | 0 | 21 | 21 | 10 | 0 | 0 | 10 | 14 | 1 | 7 | 22 | 0 | 2 | 0 | 2 | 55 | 55 |

**LUC 251** **Columbia Bluffs - Phases 1-3**

**Senior Adult Housing - Single Family** **200 Dwelling Units**

**Daily Traffic** **593**

| Time | | | Hourly Distributi | Enter % | Exit % | Hourly Traffic | Enter | Exit |
|---|---|---|---|---|---|---|---|---|
| 6:00 | - | 7:00 | | 1.0% | 3.7% | 14 | 3 | 11 |
| 7:00 | - | 8:00 | | 2.8% | 8.0% | 32 | 8 | 24 |
| 8:00 | - | 9:00 | | 3.9% | 8.8% | 38 | 12 | 26 |
| 9:00 | - | 10:00 | | 5.2% | 8.4% | 41 | 16 | 25 |
| 10:00 | - | 11:00 | | 6.1% | 8.1% | 42 | 18 | 24 |
| 11:00 | - | 12:00 | | 7.1% | 7.9% | 45 | 21 | 24 |
| 12:00 | - | 13:00 | | 7.8% | 7.9% | 46 | 23 | 23 |
| 13:00 | - | 14:00 | | 7.3% | 7.3% | 44 | 22 | 22 |
| 14:00 | - | 15:00 | | 7.8% | 7.0% | 44 | 23 | 21 |
| 15:00 | - | 16:00 | | 9.0% | 6.8% | 47 | 27 | 20 |
| 16:00 | - | 17:00 | | 9.4% | 6.2% | 47 | 28 | 19 |
| 17:00 | - | 18:00 | | 9.4% | 6.1% | 46 | 28 | 18 |
| 18:00 | - | 19:00 | | 7.2% | 5.3% | 37 | 21 | 16 |

Total Trip Gen

| Street | | | | Bear Creek Pike | | | | Bear Creek Pike | | | | Site Access 1 | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly Total | Hour Total |
| TOD | Hourly Increment | | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | | |
| | Enter % | | | | | 65% | | 30% | | | | | | | | | 5% | | | | |
| | Exit % | | | | | | | | | | | 65% | 5% | 30% | | | | | | | |
| AM | 6:00 | - | 7:00 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 1 | 7 | 1 | 3 | 11 | 0 | 0 | 0 | 0 | 14 | 14 |
| | 7:00 | - | 8:00 | 0 | 0 | 5 | 5 | 2 | 0 | 0 | 2 | 16 | 1 | 7 | 24 | 0 | 0 | 0 | 0 | **31** | 31 |
| | 8:00 | - | 9:00 | 0 | 0 | 8 | 8 | 4 | 0 | 0 | 4 | 17 | 1 | 8 | 26 | 0 | 1 | 0 | 1 | 39 | 39 |
| | 9:00 | - | 10:00 | 0 | 0 | 10 | 10 | 5 | 0 | 0 | 5 | 16 | 1 | 8 | 25 | 0 | 1 | 0 | 1 | 41 | 41 |
| | 10:00 | - | 11:00 | 0 | 0 | 12 | 12 | 5 | 0 | 0 | 5 | 16 | 1 | 7 | 24 | 0 | 1 | 0 | 1 | 42 | 42 |
| Midday | 11:00 | - | 12:00 | 0 | 0 | 14 | 14 | 6 | 0 | 0 | 6 | 16 | 1 | 7 | 24 | 0 | 1 | 0 | 1 | 45 | 45 |
| | 12:00 | - | 13:00 | 0 | 0 | 15 | 15 | 7 | 0 | 0 | 7 | 15 | 1 | 7 | 23 | 0 | 1 | 0 | 1 | 46 | 46 |
| | 13:00 | - | 14:00 | 0 | 0 | 14 | 14 | 7 | 0 | 0 | 7 | 14 | 1 | 7 | 22 | 0 | 1 | 0 | 1 | 44 | 44 |
| | 14:00 | - | 15:00 | 0 | 0 | 15 | 15 | 7 | 0 | 0 | 7 | 14 | 1 | 6 | 21 | 0 | 1 | 0 | 1 | 44 | 44 |
| PM | 15:00 | - | 16:00 | 0 | 0 | 18 | 18 | 8 | 0 | 0 | 8 | 13 | 1 | 6 | 20 | 0 | 1 | 0 | 1 | 47 | 47 |
| | 16:00 | - | 17:00 | 0 | 0 | 18 | 18 | 8 | 0 | 0 | 8 | 12 | 1 | 6 | 19 | 0 | 1 | 0 | 1 | 46 | 46 |
| | 17:00 | - | 18:00 | 0 | 0 | 18 | 18 | 8 | 0 | 0 | 8 | 12 | 1 | 5 | 18 | 0 | 1 | 0 | 1 | **45** | 45 |
| | 18:00 | - | 19:00 | 0 | 0 | 14 | 14 | 6 | 0 | 0 | 6 | 10 | 1 | 5 | 16 | 0 | 1 | 0 | 1 | 37 | 37 |

**LUC 565** **Columbia Bluffs - Phases 1-3**

**Day Care Center** **14,000 s.f.**

**Daily Traffic** **667**

| Time | | | Hourly Distributi | Enter % | Exit % | Hourly Traffic | Enter | Exit |
|---|---|---|---|---|---|---|---|---|
| 6:00 | - | 7:00 | | 6.2% | 4.3% | 35 | 21 | 14 |
| 7:00 | - | 8:00 | | 19.5% | 16.3% | 119 | 65 | 54 |
| 8:00 | - | 9:00 | | 13.2% | 12.8% | 87 | 44 | 43 |
| 9:00 | - | 10:00 | | 5.4% | 4.6% | 33 | 18 | 15 |
| 10:00 | - | 11:00 | | 2.6% | 2.9% | 19 | 9 | 10 |
| 11:00 | - | 12:00 | | 2.6% | 2.6% | 18 | 9 | 9 |
| 12:00 | - | 13:00 | | 2.1% | 2.6% | 16 | 7 | 9 |
| 13:00 | - | 14:00 | | 3.0% | 3.2% | 21 | 10 | 11 |
| 14:00 | - | 15:00 | | 4.1% | 4.5% | 29 | 14 | 15 |
| 15:00 | - | 16:00 | | 7.5% | 6.9% | 48 | 25 | 23 |
| 16:00 | - | 17:00 | | 13.6% | 14.0% | 92 | 45 | 47 |
| 17:00 | - | 18:00 | | 16.7% | 18.7% | 118 | 56 | 62 |
| 18:00 | - | 19:00 | | 2.4% | 6.3% | 29 | 8 | 21 |

Total Trip Gen

| Street | | | | Bear Creek Pike | | | | Bear Creek Pike | | | | Site Access 1 | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly Total | Hour Total |
| TOD | Hourly Increment | | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | | |
| | Enter % | | | | | 65% | | 30% | | | | | | | | | 5% | | | | |
| | Exit % | | | | | | | | | | | 65% | 5% | 30% | | | | | | | |
| AM | 6:00 | - | 7:00 | 0 | 0 | 14 | 14 | 6 | 0 | 0 | 6 | 9 | 1 | 4 | 14 | 0 | 1 | 0 | 1 | 35 | 35 |
| | 7:00 | - | 8:00 | 0 | 0 | 42 | 42 | 20 | 0 | 0 | 20 | 35 | 3 | 16 | 54 | 0 | 3 | 0 | 3 | **119** | 119 |
| | 8:00 | - | 9:00 | 0 | 0 | 29 | 29 | 13 | 0 | 0 | 13 | 28 | 2 | 13 | 43 | 0 | 2 | 0 | 2 | 87 | 87 |
| | 9:00 | - | 10:00 | 0 | 0 | 12 | 12 | 5 | 0 | 0 | 5 | 10 | 1 | 5 | 16 | 0 | 1 | 0 | 1 | 34 | 34 |
| | 10:00 | - | 11:00 | 0 | 0 | 6 | 6 | 3 | 0 | 0 | 3 | 7 | 1 | 3 | 11 | 0 | 0 | 0 | 0 | 20 | 20 |
| Midday | 11:00 | - | 12:00 | 0 | 0 | 6 | 6 | 3 | 0 | 0 | 3 | 6 | 0 | 3 | 9 | 0 | 0 | 0 | 0 | 18 | 18 |
| | 12:00 | - | 13:00 | 0 | 0 | 5 | 5 | 2 | 0 | 0 | 2 | 6 | 0 | 3 | 9 | 0 | 0 | 0 | 0 | 16 | 16 |
| | 13:00 | - | 14:00 | 0 | 0 | 7 | 7 | 3 | 0 | 0 | 3 | 7 | 1 | 3 | 11 | 0 | 1 | 0 | 1 | 22 | 22 |
| | 14:00 | - | 15:00 | 0 | 0 | 9 | 9 | 4 | 0 | 0 | 4 | 10 | 1 | 5 | 16 | 0 | 1 | 0 | 1 | 30 | 30 |
| PM | 15:00 | - | 16:00 | 0 | 0 | 16 | 16 | 8 | 0 | 0 | 8 | 15 | 1 | 7 | 23 | 0 | 1 | 0 | 1 | 48 | 48 |
| | 16:00 | - | 17:00 | 0 | 0 | 29 | 29 | 14 | 0 | 0 | 14 | 31 | 2 | 14 | 47 | 0 | 2 | 0 | 2 | 92 | 92 |
| | 17:00 | - | 18:00 | 0 | 0 | 36 | 36 | 17 | 0 | 0 | 17 | 40 | 3 | 19 | 62 | 0 | 3 | 0 | 3 | **118** | 118 |
| | 18:00 | - | 19:00 | 0 | 0 | 5 | 5 | 2 | 0 | 0 | 2 | 14 | 1 | 6 | 21 | 0 | 0 | 0 | 0 | 28 | 28 |

**Intersection:** **Bear Creek Pike & Patterson Drive/Site Access 1**
Control: Two-way Stop
Day:
Date:
Count by:

**2031 Future Projected Conditions (Phases 1-3)**

| Street | | | | Bear Creek Pike | | | | Bear Creek Pike | | | | Site Access 1 | | | | Patterson Drive | | | | Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | | Hourly | Rolling |
| TOD | Hourly Increment | | | L | T | R | Total | L | T | R | Total | L | T | R | Total | L | T | R | Total | Total | Hour Total |
| AM | 6:00 | - | 7:00 | 3 | 701 | 33 | 737 | 13 | 491 | 0 | 504 | 70 | 6 | 33 | 109 | 10 | 2 | 24 | 36 | 1386 | 1386 |
| | 7:00 | - | 8:00 | 11 | 977 | 76 | 1064 | 35 | 1063 | 3 | 1101 | 152 | 12 | 69 | 233 | 15 | 5 | 64 | 84 | **2482** | 2482 |
| | 8:00 | - | 9:00 | 23 | 632 | 72 | 727 | 34 | 798 | 5 | 837 | 127 | 10 | 59 | 196 | 6 | 6 | 25 | 37 | 1797 | 1797 |
| | 9:00 | - | 10:00 | 23 | 544 | 55 | 622 | 25 | 592 | 6 | 623 | 83 | 6 | 39 | 128 | 5 | 5 | 42 | 52 | 1425 | 1425 |
| | 10:00 | - | 11:00 | 25 | 596 | 57 | 678 | 26 | 575 | 1 | 602 | 72 | 6 | 33 | 111 | 6 | 4 | 33 | 43 | 1434 | 1434 |
| Midday | 11:00 | - | 12:00 | 34 | 589 | 69 | 692 | 32 | 544 | 3 | 579 | 71 | 5 | 33 | 109 | 6 | 5 | 25 | 36 | 1416 | 1416 |
| | 12:00 | - | 13:00 | 36 | 597 | 74 | 707 | 33 | 610 | 0 | 643 | 73 | 5 | 34 | 112 | 3 | 5 | 30 | 38 | 1500 | 1500 |
| | 13:00 | - | 14:00 | 22 | 559 | 78 | 659 | 35 | 579 | 6 | 620 | 75 | 6 | 35 | 116 | 5 | 6 | 24 | 35 | 1430 | 1430 |
| | 14:00 | - | 15:00 | 22 | 748 | 88 | 858 | 40 | 716 | 6 | 762 | 81 | 6 | 37 | 124 | 1 | 7 | 38 | 46 | 1790 | 1790 |
| PM | 15:00 | - | 16:00 | 48 | 851 | 118 | 1017 | 53 | 917 | 8 | 978 | 83 | 6 | 39 | 128 | 6 | 8 | 36 | 50 | 2173 | 2173 |
| | 16:00 | - | 17:00 | 43 | 828 | 144 | 1015 | 67 | 998 | 17 | 1082 | 107 | 8 | 50 | 165 | 4 | 11 | 38 | 53 | 2315 | 2315 |
| | 17:00 | - | 18:00 | 57 | 706 | 152 | 915 | 70 | 806 | 9 | 885 | 120 | 9 | 55 | 184 | 4 | 12 | 20 | 36 | **2020** | 2020 |
| | 18:00 | - | 19:00 | 39 | 363 | 102 | 504 | 47 | 507 | 6 | 560 | 80 | 6 | 38 | 124 | 3 | 8 | 23 | 34 | 1222 | 1222 |
| | | | | | | | | | | | | | | | | | | | | | |

# APPENDIX J
# TURN LANE ANALYSIS

## Left Turn Deceleration Lane Analysis

Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide

**Bear Creek Pike & Patterson Drive/Site Access 1**
**2031 Future Projected Peak Hour Traffic Volumes (Phases 1-3)**
**Westbound Bear Creek Pike**

### AM Peak Hour

**Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.**

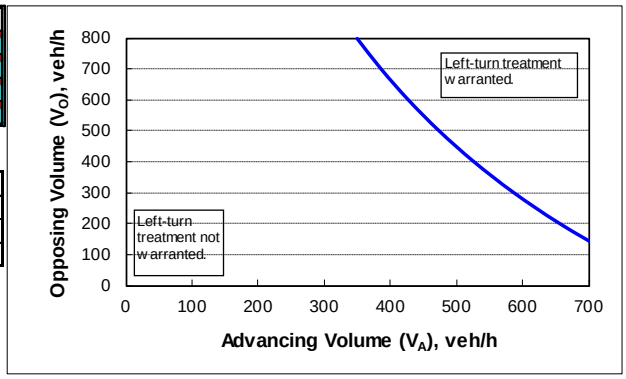
**2-lane roadway (English)**

INPUT

| Variable | Value |
|---|---|
| 85th percentile speed, mph: | 45 |
| Percent of left-turns in advancing volume ($V_A$), %: | 4% |
| Advancing volume ($V_A$), veh/h: | 1170 |
| Opposing volume ($V_O$), veh/h: | 1049 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting advancing volume ($V_A$), veh/h: | 276 |
| **Guidance for determining the need for a major-road left-turn bay:** | |
| **Left-turn treatment warranted.** | |




CALIBRATION CONSTANTS

| Variable | Value |
|---|---|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

### PM Peak Hour

**Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.**

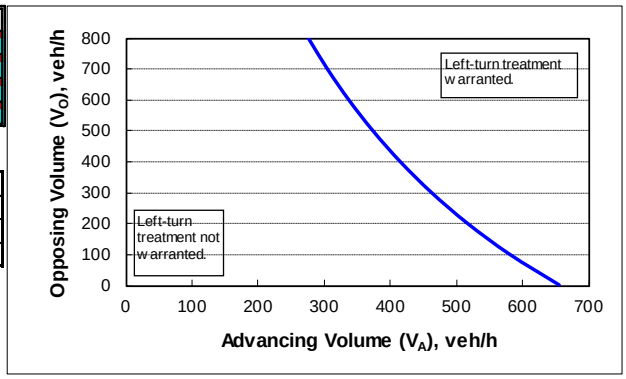
**2-lane roadway (English)**

INPUT

| Variable | Value |
|---|---|
| 85th percentile speed, mph: | 45 |
| Percent of left-turns in advancing volume ($V_A$), %: | 7% |
| Advancing volume ($V_A$), veh/h: | 1222 |
| Opposing volume ($V_O$), veh/h: | 1352 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting advancing volume ($V_A$), veh/h: | 163 |
| **Guidance for determining the need for a major-road left-turn bay:** | |
| **Left-turn treatment warranted.** | |




CALIBRATION CONSTANTS

| Variable | Value |
|---|---|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

## Left Turn Deceleration Lane Analysis

Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide

### Iron Bridge Road & Site Access 2
### 2034 Future Projected Peak Hour Traffic Volumes (Full Buildout)
### Eastbound Iron Bridge Road

### AM Peak Hour

**Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.**

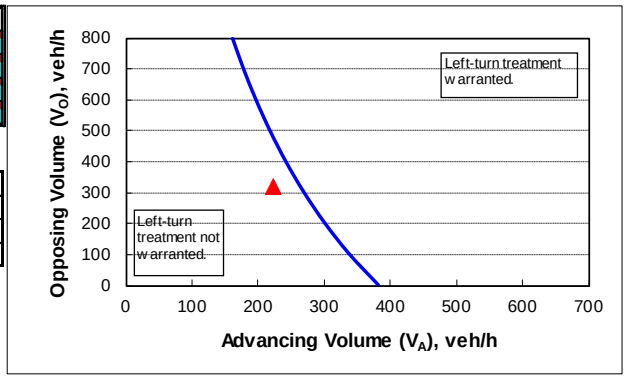
**2-lane roadway (English)**

INPUT

| Variable | Value |
|---|---|
| 85th percentile speed, mph: | 45 |
| Percent of left-turns in advancing volume ($V_A$), %: | 24% |
| Advancing volume ($V_A$), veh/h: | 224 |
| Opposing volume ($V_O$), veh/h: | 318 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting advancing volume ($V_A$), veh/h: | 264 |
| **Guidance for determining the need for a major-road left-turn bay:** | |
| **Left-turn treatment NOT warranted.** | |




CALIBRATION CONSTANTS

| Variable | Value |
|---|---|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

### PM Peak Hour

**Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.**

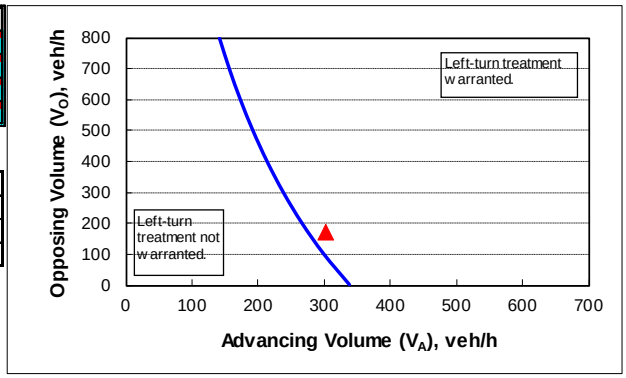
**2-lane roadway (English)**

INPUT

| Variable | Value |
|---|---|
| 85th percentile speed, mph: | 45 |
| Percent of left-turns in advancing volume ($V_A$), %: | 37% |
| Advancing volume ($V_A$), veh/h: | 303 |
| Opposing volume ($V_O$), veh/h: | 173 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting advancing volume ($V_A$), veh/h: | 274 |
| **Guidance for determining the need for a major-road left-turn bay:** | |
| **Left-turn treatment warranted.** | |




CALIBRATION CONSTANTS

| Variable | Value |
|---|---|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

## Right Turn Deceleration Lane Analysis

Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide

**Bear Creek Pike & Patterson Drive/Site Access 1**
**2031 Future Projected Peak Hour Traffic Volumes (Phases 1-3)**
**Eastbound Bear Creek Pike**

### AM Peak Hour

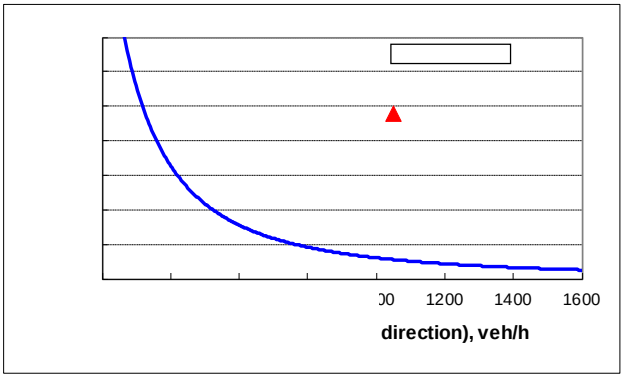
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

| Roadway geometry: | 2-lane roadway |
|---|---|
| Variable | Value |
| Major-road speed, mph: | 45 |
| Major-road volume (one direction), veh/h: | 1049 |
| Right-turn volume, veh/h: | 96 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting right-turn volume, veh/h: | 11 |
| **Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:** | |
| **Add right-turn bay.** | |




### PM Peak Hour

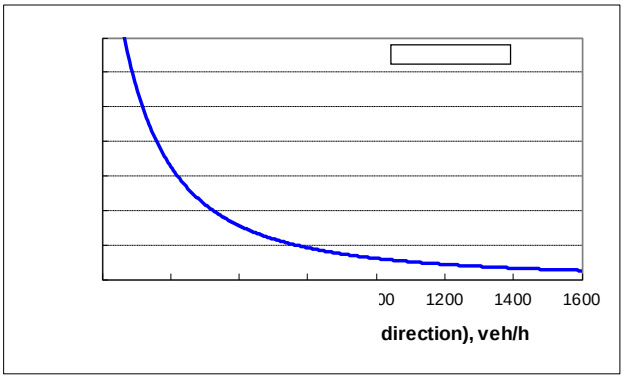
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

| Roadway geometry: | 2-lane roadway |
|---|---|
| Variable | Value |
| Major-road speed, mph: | 45 |
| Major-road volume (one direction), veh/h: | 1352 |
| Right-turn volume, veh/h: | 176 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting right-turn volume, veh/h: | 7 |
| **Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:** | |
| **Add right-turn bay.** | |



## Right Turn Deceleration Lane Analysis

Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide

**Bear Creek Pike & Patterson Drive/Site Access 1**
**2031 Future Projected Peak Hour Traffic Volumes (Phases 1-3)**
**Westbound Bear Creek Pike**

### AM Peak Hour

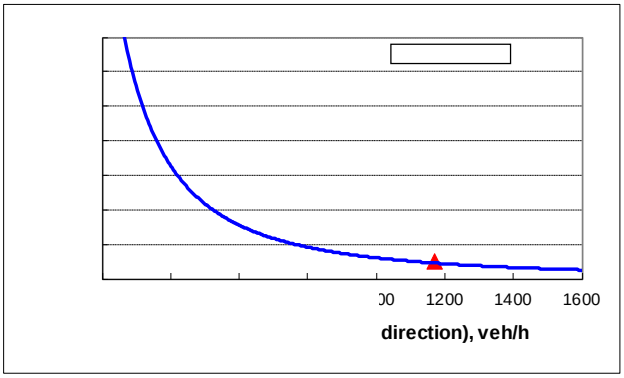
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

| Roadway geometry: | 2-lane roadway |
|---|---|
| Variable | Value |
| Major-road speed, mph: | 45 |
| Major-road volume (one direction), veh/h: | 1170 |
| Right-turn volume, veh/h: | 10 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting right-turn volume, veh/h: | 9 |
| **Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:** | |
| **Add right-turn bay.** | |




### PM Peak Hour

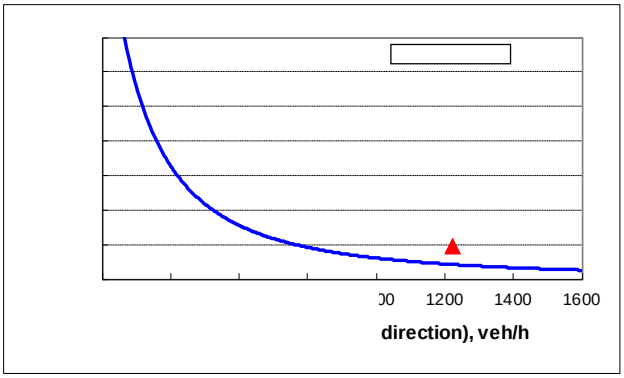
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

| Roadway geometry: | 2-lane roadway |
|---|---|
| Variable | Value |
| Major-road speed, mph: | 45 |
| Major-road volume (one direction), veh/h: | 1222 |
| Right-turn volume, veh/h: | 19 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting right-turn volume, veh/h: | 8 |
| **Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:** | |
| **Add right-turn bay.** | |



## Right Turn Deceleration Lane Analysis

Source: NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide

### Iron Bridge Road & Site Access 2
### 2034 Future Projected Peak Hour Traffic Volumes (Full Buildout)
### Westbound Iron Bridge Road

### AM Peak Hour

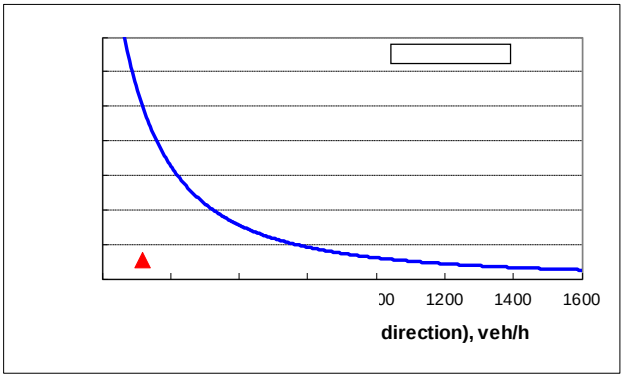
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

| Roadway geometry: | 2-lane roadway |
|---|---|
| Variable | Value |
| Major-road speed, mph: | 45 |
| Major-road volume (one direction), veh/h: | 318 |
| Right-turn volume, veh/h: | 11 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting right-turn volume, veh/h: | 99 |
| **Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:** | |
| **Do NOT add right-turn bay.** | |




### PM Peak Hour

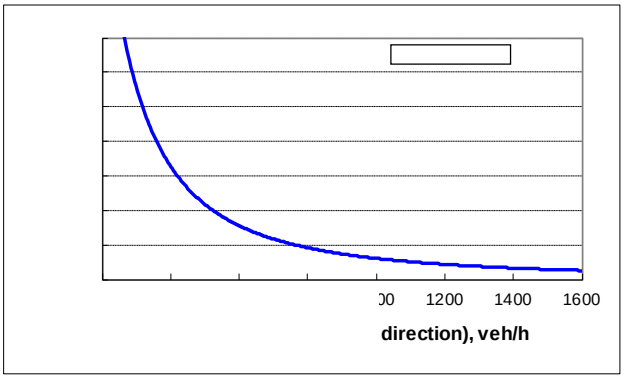
**Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.**

INPUT

| Roadway geometry: | 2-lane roadway |
|---|---|
| Variable | Value |
| Major-road speed, mph: | 45 |
| Major-road volume (one direction), veh/h: | 173 |
| Right-turn volume, veh/h: | 23 |

OUTPUT

| Variable | Value |
|---|---|
| Limiting right-turn volume, veh/h: | 302 |
| **Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:** | |
| **Do NOT add right-turn bay.** | |



# APPENDIX K
# RECOMMENDED IMPROVEMENT PHASING BY DWELLING UNIT COUNT

**COLUMBIA BLUFFS MASTER PLAN**
**RECOMMENDED IMPROVEMENT PHASING BY DWELLING UNIT COUNT**

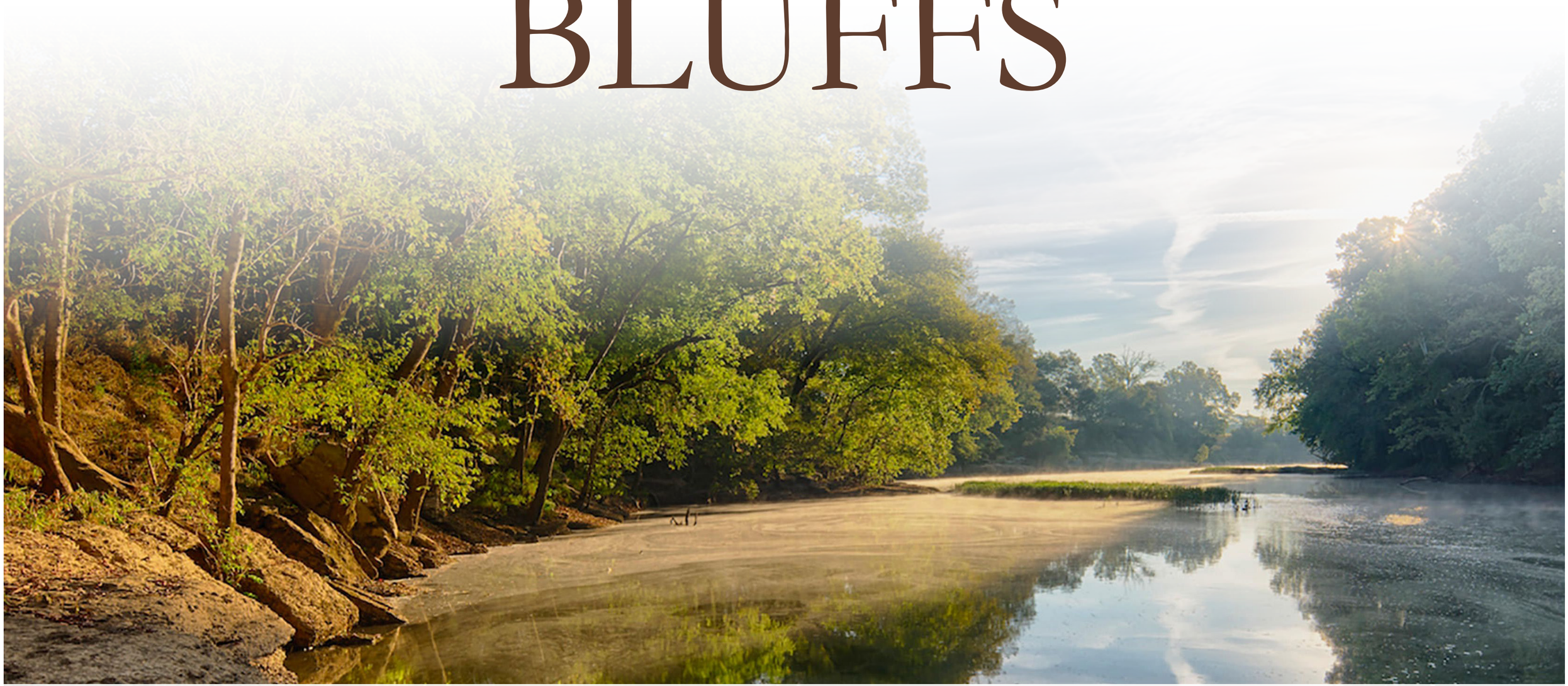
| PHASE | LOCATION | LAND USE | DENSITY | CUMULATIVE DENSITY |
|---|---|---|---|---|
| 1 | North | Single-family Housing (Attached or Detatched) | 143 DU | 143 DU |
| 2 | North | Single-family Housing (Attached or Detatched) | 143 DU | 286 DU |
| 3 | North | Single-family Housing (Attached or Detatched) | 143 DU | 429 DU |
| 3B | North | Day Care Center | 14,000 SF | 429 DU + 14,000 SF |
| 4 | South | Single-family Housing (Attached or Detatched) | 143 DU | 572 DU + 14,000 SF |
| 5 | South | Single-family Housing (Attached or Detatched) | 143 DU | 715 DU + 14,000 SF |
| 6 | South | Single-family Housing (Attached or Detatched) | 145 DU | 860 DU + 14,000 SF |

| | INTERSECTION & IMPROVEMENTS | DWELLING UNIT OCCUPANCY COUNT | NOTES |
|---|---|---|---|
| #1 | **Nashville Highway (US 31) and Bear Creek Pike/US 43** | | |
| - | Laneage improvements by the City and/or TDOT are planned for the intersection. | NA | By Others |
| - | Modify the signal design and timing to provide lead/lag left turn phasing for the eastbound and westbound approaches. | NA | By Others |
| | | | |
| #2 | **Bear Creek Pike and Tom J Hitch Parkway** | | |
| - | Construct the northbound right turn lane with approximately 100 feet of storage and 60 feet of taper. Restripe northbound approach to 1 left, 1 through, 1 right turn lane. | 429 DU | |
| - | Modify signal design and phasing to provide northbound right turn overlap. | 429 DU | |
| - | Reassign the northbound through to a shared left turn/through lane. | 850 DU | Can be completed with Bear Creek Pk widening by Others. |
| - | Modify the signal design and phasing to provide split phaseing for the northbound and southbound approaches. | 850 DU | Can be completed with Bear Creek Pk widening by Others. |
| | | | |
| #3 | **Bear Creek Pike and Patterson Drive/Site Access 1** | | |
| - | Construct Site Access 1 with 1 entering lane and 2 exiting lanes. | 1 DU | |
| - | Construct eastbound right turn deceleration lane. | 143 DU | |
| - | Construct westbound left turn deceleration lane. | 143 DU | |
| - | Construct westbound right turn deceleration lane. | 429 DU | |
| - | Install at traffic signal. | 286 DU | |
| - | Widen Patterson Drive to provide a separate left turn lane. | 429 DU + 14,000 SF Day Care | |
| | | | |
| #4 | **Bear Creek Pike and Mt Olivet Road/School Access** | | |
| - | Restripe southbound approach to provide a shared left turn/through lane and a right turn only lane. | 429 DU | |
| - | Modify traffic signal design to provide protected/permissive left turn signal phasing and southbound right turn overlap phasing. | 429 DU | |
| | | | |
| #5 | **Tom J Hitch Parkway and Iron Bridge Road** | | |
| - | No Improvements Recommended. | NA | |
| | | | |
| #6 | **Iron Bridge Road and Mt Olivet Road** | | |
| - | No Improvements Recommended. | NA | |
| | | | |
| #7 | **James Campbell Boulevard and Tom J Hitch Parkway** | | |
| - | Install at traffic signal with protected/permissive left turn signal phasing for the eastbound approach and a southbound right turn overlap. | 429 DU | |
| | | | |
| #8 | **Iron Bridge Road and Site Access 2** | | |
| - | Construct Site Access 2 aligned with Yanahli Park Access. | 430 DU | |
| - | Construct eastbound left turn deceleration lane on Iron Bridge Road. | 715 DU | |

# COLUMBIA

*City of Columbia, Tennessee*

# BLUFFS



## Architectural Review Team Submittal




# COLUMBIA BLUFFS ARCHITECTURE

**DEVELOPER**
JIM HARVEY
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TAMPA, FL 33637

**ENGINEER**
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NASHVILLE, TN 37211

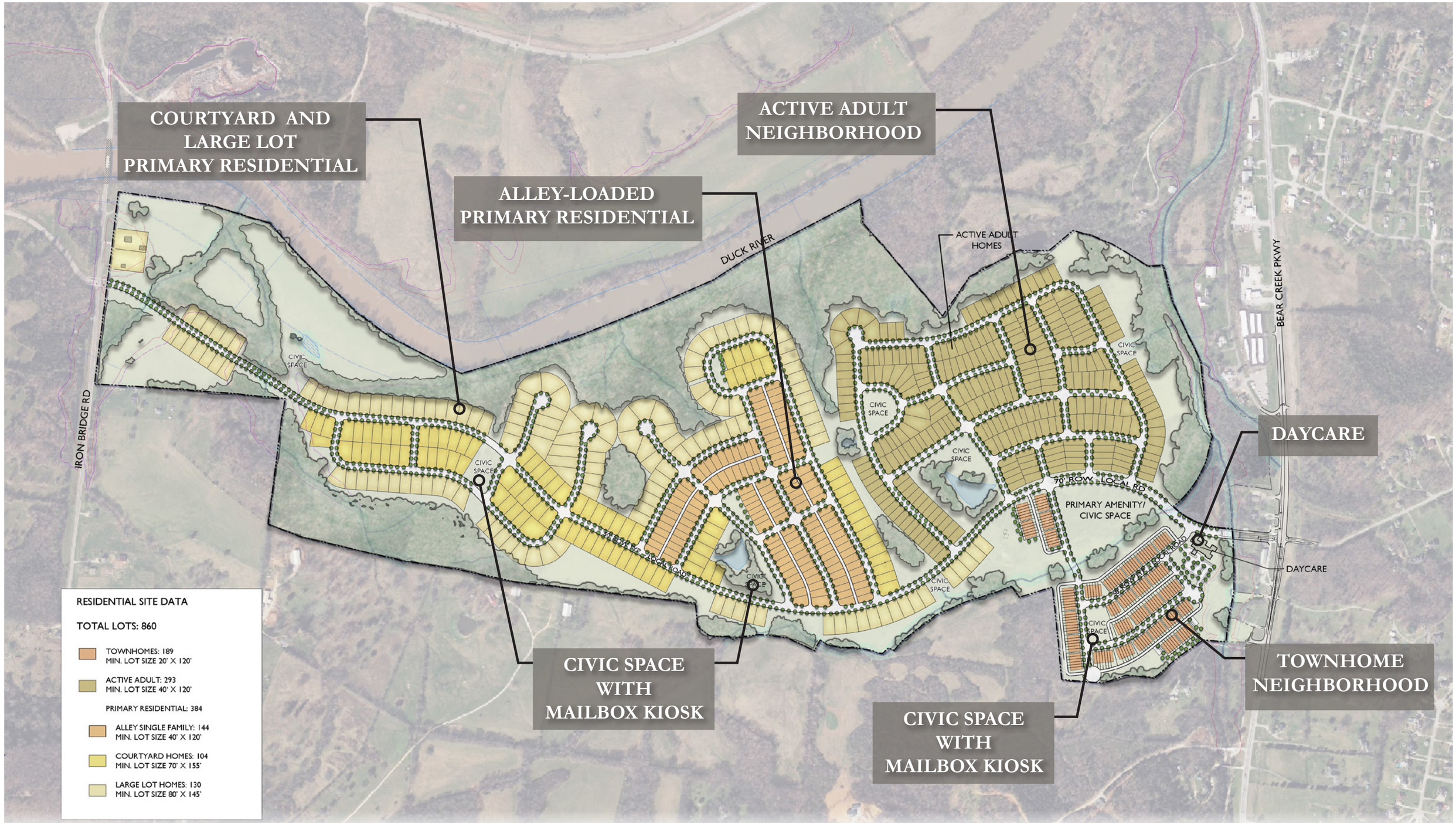
**LANDSCAPE ARCHITECT**
GREG GAMBLE
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37069

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11. ALLEY-LOADED PRIMARY RESIDENTIAL
13. TOWNHOMES
15. DAYCARE
11. MAIN AMENITY ARCHITECTURE
12. CIVIC SPACE ARCHITECTURE

**SUBMITTED: 10/16/2023**

# DEVELOPMENT TEAM




# MASTER DEVELOPEMNT PLAN

| | Single Family & Townhomes | Active Adult Single Family |
|---|---|---|
| **Building Height and Massing** | • Primarily a mix of 1-story and 2-story, with a maximum of 3-story<br>• Attached garages encouraged | |
| **Building Separation** | • Single Family: 10' minimum<br>• Townhomes: 15' minimum | • Single Family: 10' minimum |
| **Street Facades** | • Maximize frontage and orientation onto residential streets<br>• Porches should orient to residential streets<br>• Entries visible from residential streets | • Maximize frontage and orientation onto residential streets<br>• Porches should orient to residential streets<br>• Entries visible from residential streets |
| **Building Entries** | • Porches minimum 6' deep and 6' wide | |
| **Roof Forms** | • Roofs may vary in style, but should be designed to create unity to the full community<br>• All roof forms to be reviewed and approved by the master developer | • Roofs may vary in style, but should be designed to create unity to the full community<br>• All roof forms to be reviewed and approved by the master developer |
| **Roof Detail** | • All roofs should create eaves for shadow and rain protection<br>• Where used, gutters should be expressed as positive elements adding desirable detail | • All roofs should create eaves for shadow and rain protection<br>• Where used, gutters should be expressed as positive elements adding desirable detail |
| **Parking** | • Garage-parked<br>• Garages minimum depth of 22'<br>• Garage doors with windows required | • Garage-parked<br>• Garages minimum depth of 22'<br>• Garage doors should have windows |

## ARCHITECTURAL GUIDELINE NOTE:

The architectural guidelines and conceptual elevations are intended to convey the architectural quality and design intent. Final elevations and color schemes will be brought back to be approved by the ADRT at final PUD-R Development Plan.

## COMPLIANCE NOTE:

The architectural guidelines as shown in this pattern book represent compliance with the standards set by the Zoning Ordinance except in areas requesting a modification of standards which are requeted to be approved through the PUD-R Preliminary Development Plan process.

**Architectural Building Materials**

In keeping with the upscale project image, the materials used for structures at Columbia Bluffs should be appropriate for the individual building design concepts and shall be consistent with the project theme. Materials shall be selected and used with consideration to building scale, color scheme, mass, and the surrounding environment.

**Roofing Materials**

Permitted:
- Dimensional Asphalt Shingles
- Laminated Shingles
- Copper Finishes
- Standing Seam Metal Roofs

Not Permitted:
- Rolled Asphalt
- Asbestos Cement Shingles
- Brightly Colored Metal Roofing

**Exterior Siding Materials**

Permitted:
- Brick
- Stone
- Natural Wood Accents
- Stucco
- Hardie Plank/Panels
- Cementitious Fiber Siding/Cladding

Not Permitted:
- All Plastics (including vinyl)
- Plywood
- Exposed Concrete Block

**Awnings**

Permitted:
High Quality Heavy Canvas
Illuminated Awnings
Metal Awnings

**Colors**

Permitted:
- Muted
- Natural
- Earth Tones

Conditional Permitted:
- Bright
- Primary Colors (per review and approval of the Master Developer)

Building Requirements:
- Maximum Height (Stories) 3 stories

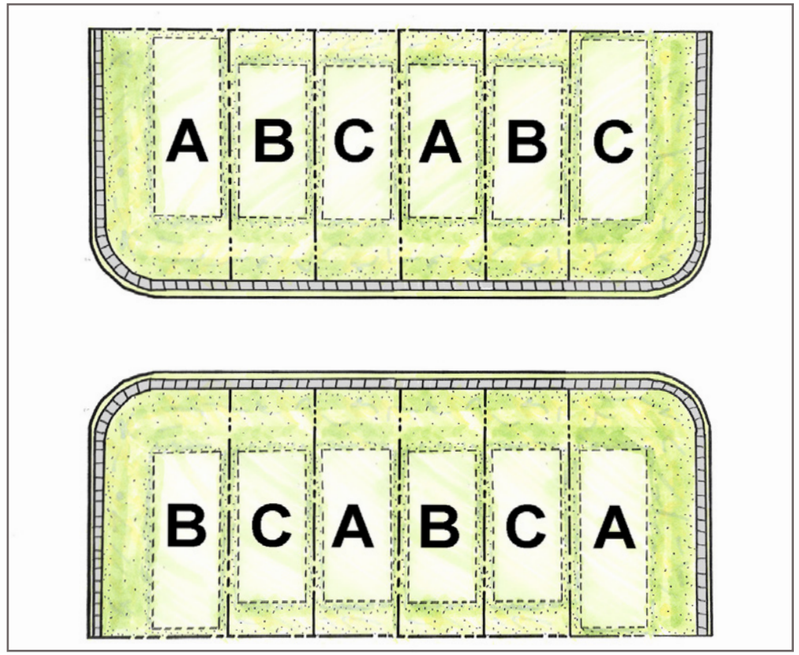








IMAGE OF HOMES REPRESENT AN EXAMPLE OF FACADE VARIETY ALONG SAME STREET. FINAL SELECTION OF MATERIALS AND STYLES TO BE APPROVED AT FMDP.




In order to avoid monotony of architectural design, no approval shall be issued for the construction of a dwelling if it is substantially like any proposed neighboring building for which on approval has already been issued or is being concurrently considered.

- A building shall be considered neighboring if it fronts on the same street as the building under construction or an intersecting street; no building elevation may be repeated across from, adjacent to, or diagonal to a similar building elevation. There shall be a minimum of a 2-lot gap between each similar building elevation (see diagram to above in which A, B, and C represent different elevation styles).
- Vary garage door locations to the front facade of the house when possible. Avoid continuous runs of garages in the same unbroken plain.
- Vary roof orientation, ridge lines, and eave heights between each lot when possible.
- Building facade colors and design elements should vary between each lot with a variation of massing and architectural details on each block.
- Landscaping should vary in composition from building to building when possible.

Final determination of the appropriate elevation pattern and variety is subject to review by the Architectural Design Review Team.

# FACADE VARIETY













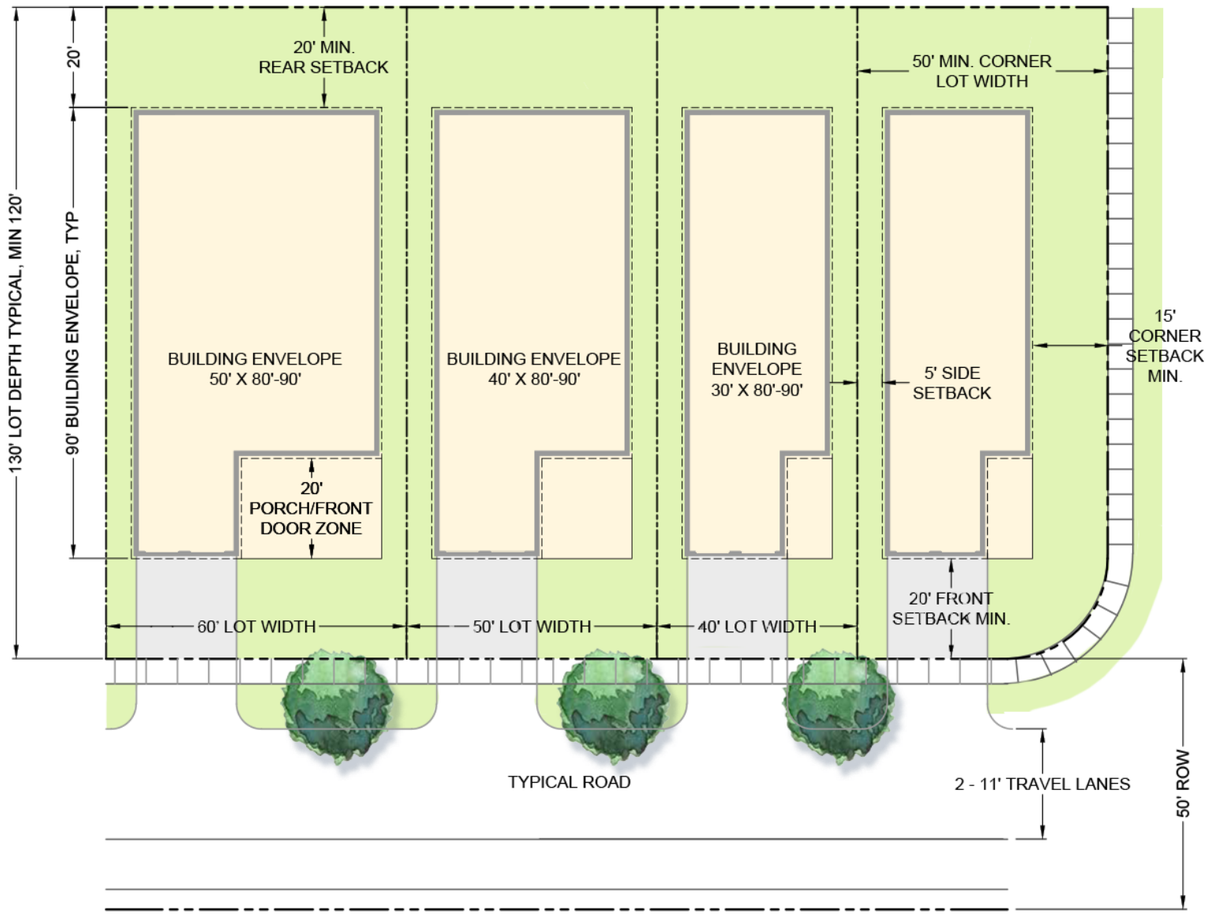






# ACTIVE ADULT SINGLE FAMILY

COLOR RENDERING PRESENTS AN
ILLUSTRATIVE DEPICTION OF ARCHITECTURE
AND LANDSCAPE MATERIAL







## LOT RANGE: 40'-60'
## 208 HOMES

BUILDING SETBACKS:
- FRONT: 20'
- REAR: 20'
- SIDE: 5'
- CORNER: 15'

ALL LOTS TO HAVE FRONT LOADED GARAGES
- MINIMUM 20' OF DRIVEWAY ON LOT
- MINIMUM 22' DEPTH FOR ALL GARAGES

SITE SETBACKS ARE DUE TO ALL INCLUSIVE MAINTENANCE APPLICATION GOVERNED BY THE PROPOSED HOA, TO BE DEED RESTRICTED.

# ACTIVE ADULT SINGLE FAMILY





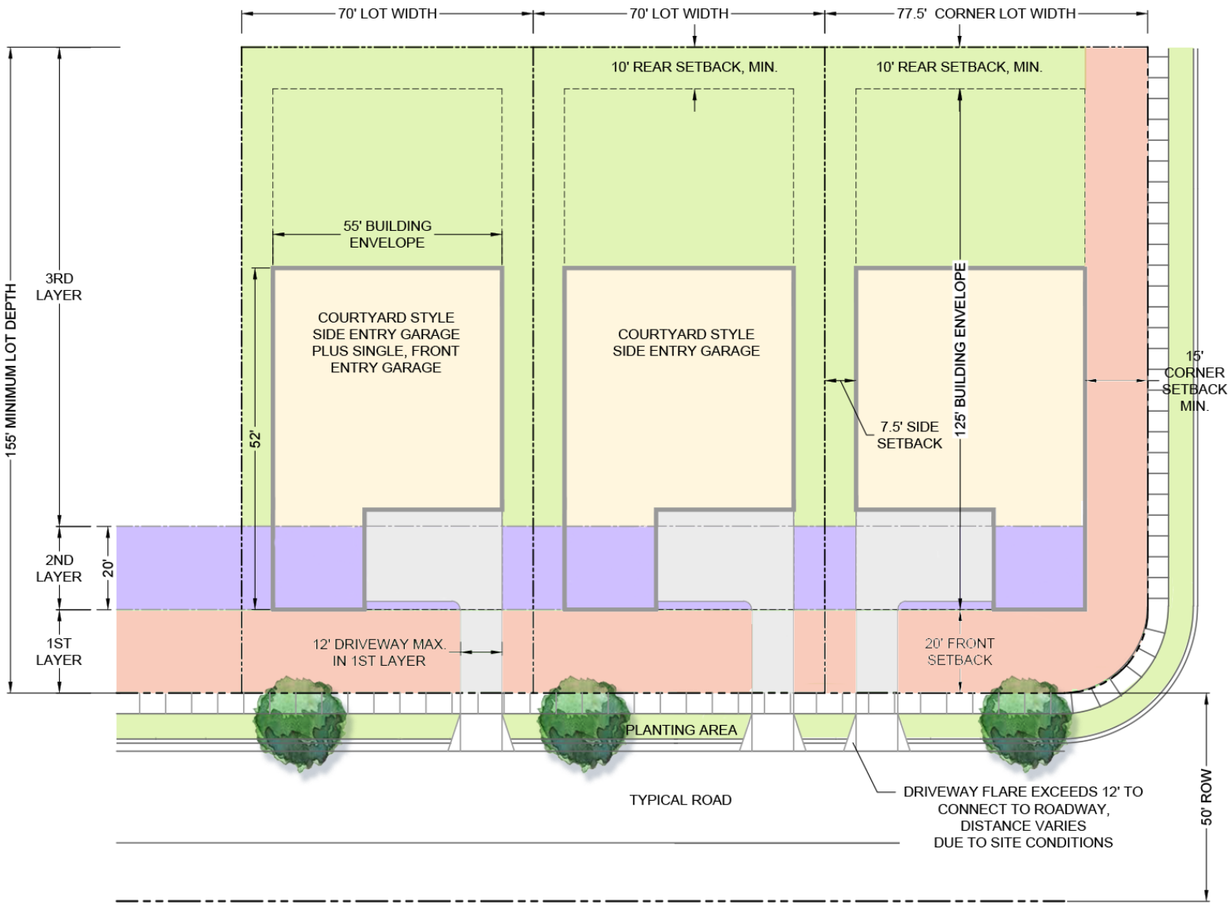







COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL

# COURTYARD HOMES







## LOT: 70' MINIMUM

**104**

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 20' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

ALL LOTS TO HAVE SIDE LOADED GARAGES WITH THE OPTION OF A SINGLE, FRONT-LOADED GARAGE IN THE 3RD LAYER.

- MINIMUM 20' LENGTH OF DRIVEWAY ON LOT
- MINIMUM 22' DEPTH FOR ALL GARAGES

# COURTYARD HOMES











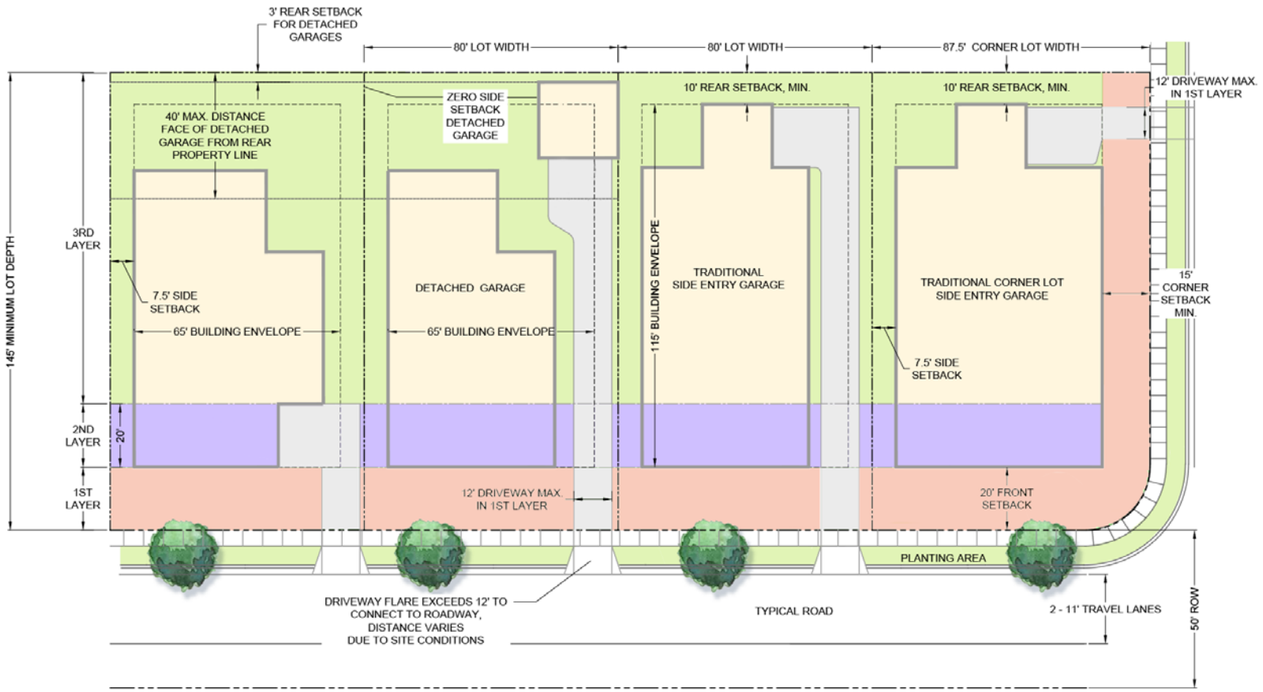







# LARGE LOT HOMES

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL







## LOTS: 80' MINIMUM
## 130 HOMES

BUILDING SETBACKS:

| | |
|---|---|
| FRONT: | 20' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

LOTS WILL HAVE A MIX OF GARAGE LOCATIONS, ATTACHED AND DETACHED
- MINIMUM 20' OF DRIVEWAY ON LOT
- MINIMUM 22' DEPTH FOR ALL GARAGES

# LARGE LOT HOMES



















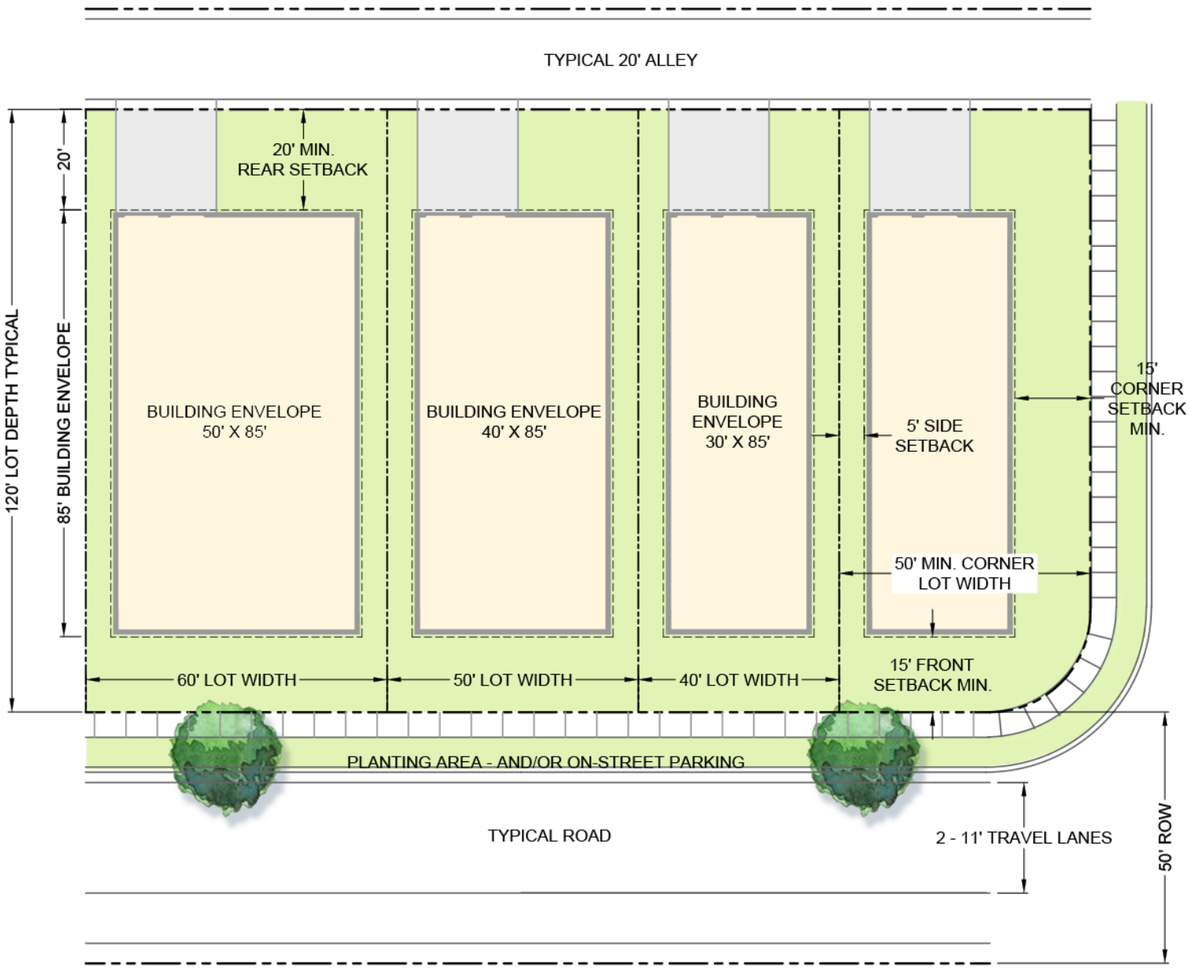







# SINGLE-FAMILY ALLEY LOADED

COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL







**LOT RANGE: 40’-60’**
**144 HOMES**

BUILDING SETBACKS:
- FRONT: 15’
- REAR: 20’
- SIDE: 5’
- CORNER: 15’

ALL LOTS TO HAVE REAR LOADED GARAGES
- MINIMUM 20’ LENGTH OF DRIVEWAY ON LOT
- MINIMUM 22’ DEPTH FOR ALL GARAGES

# SINGLE-FAMILY ALLEY LOADED









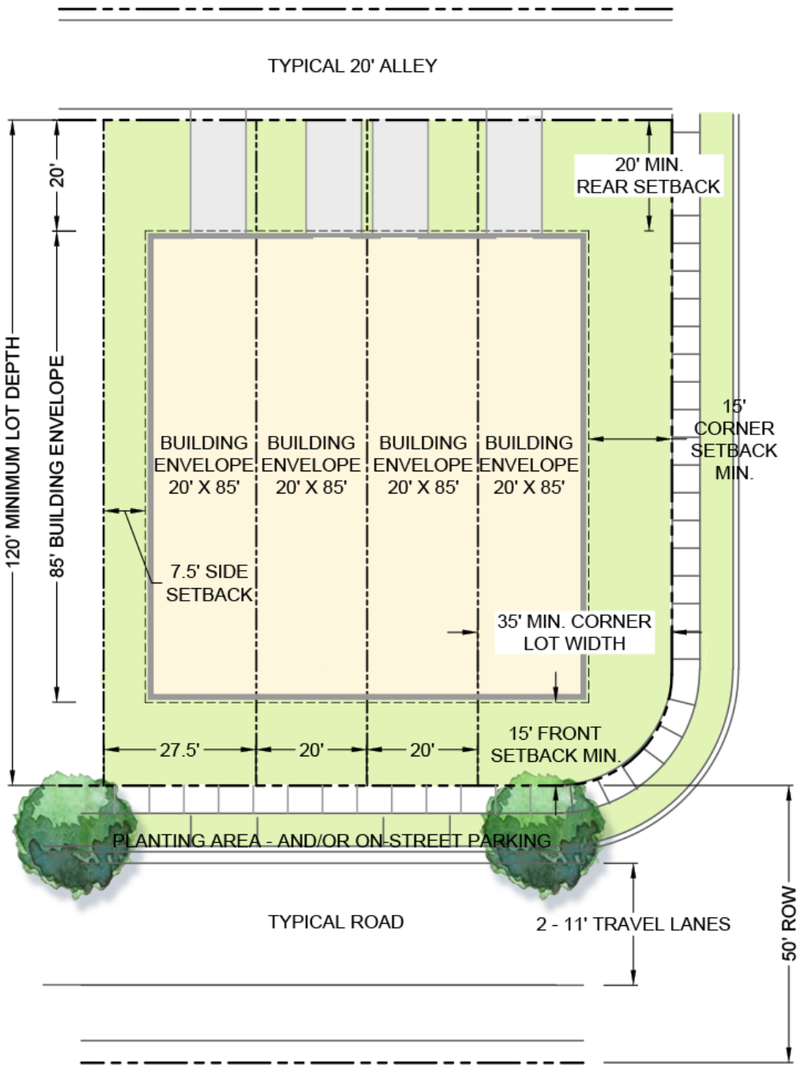


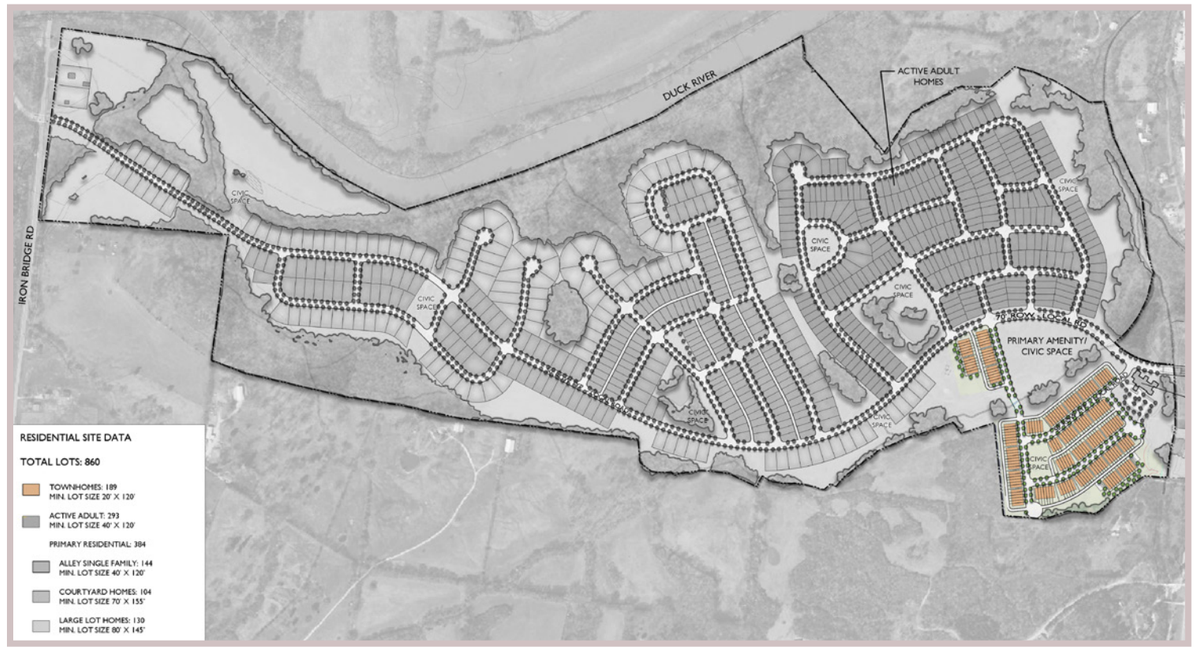






COLOR RENDERING PRESENTS AN ILLUSTRATIVE DEPICTION OF ARCHITECTURE AND LANDSCAPE MATERIAL




## LOTS: 20' MINIMUM
## 189 HOMES

BUILDING SETBACKS:

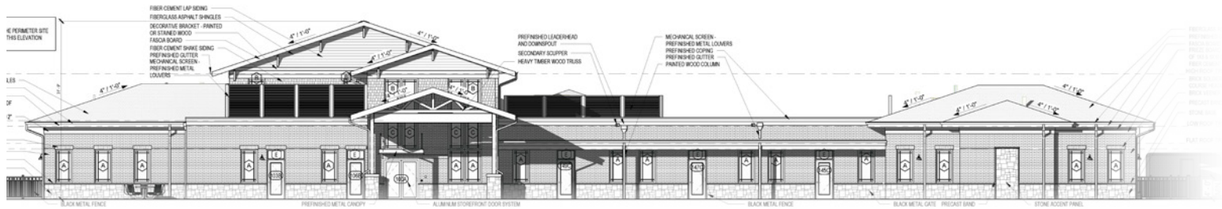
| | |
|---|---|
| FRONT: | 15' |
| REAR: | 20' |
| SIDE: | 7.5' |
| CORNER: | 15' |

ALL LOTS TO HAVE REAR LOADED GARAGES
- MINIMUM 20' LENGTH OF DRIVEWAY ON LOT
- MINIMUM 22' DEPTH FOR ALL GARAGES

TOWNHOME BUILDINGS WILL CONSIST OF 4, 6, 7, AND 8 UNIT BUILDINGS.

# TOWNHOMES

# DAYCARE ELEVATIONS




WEST ELEVATION




EAST ELEVATION

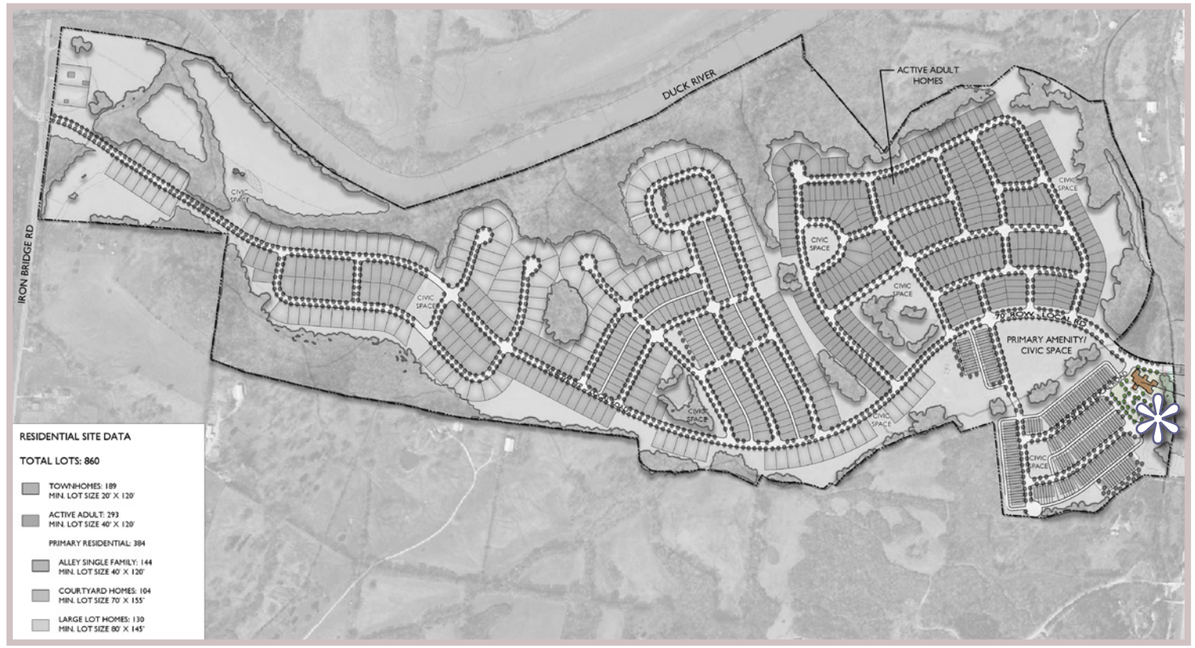



SOUTH ELEVATION




NORTH ELEVATION

ELEVATIONS ARE CONCEPTUAL.
FINAL APPROVALS TO BE DETERMINED WITH FMDP.




## DAYCARE

CHILD DAYCARE TO BE APPROXIMATELY 12,000-14,000 SQFT., AND WILL SERVE AS A BENEFIT NOT ONLY TO THE LOCAL NEIGHBORHOOD BUT TO THE COMMUNITY AS WELL.

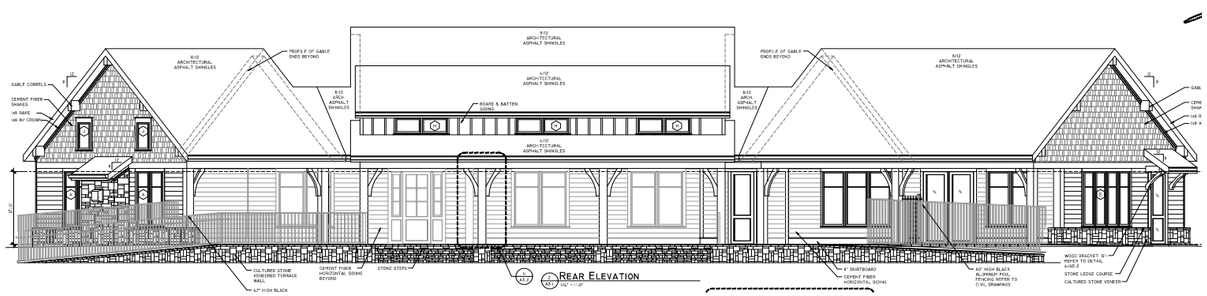
## AMENITY PHOTOGRAPHS



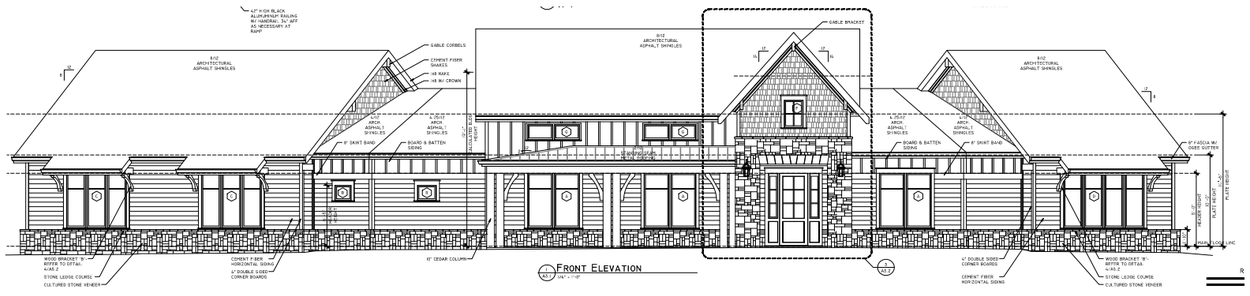


POOL AND CLUBHOUSE FROM SIMILAR KOLTER PROJECT

# AMENITY ELEVATIONS




REAR ELEVATION




FRONT ELEVATION

IMAGES AND ELEVATIONS ARE CONCEPTUAL.
FINAL APPROVALS TO BE DETERMINED WITH FMDP.









5 CIVIC SPACES ARE PLANNED FOR THIS SITE.

THREE OF THESE SITES WILL HAVE COVERED MAILBOX KIOSKS. COVERED SEATING WILL BE PROVIDED IN MOST PARKS.

IMAGES ARE TO PROVIDE EXAMPLES OF TYPES OF COVERED SEATING AND MAILBOX KIOSKS, BUT COULD BE SUBJECT TO REVISIONS AT FMDP APPROVALS.

# CIVIC SPACE ARCHITECTURE




1 / LI.1 KEY MAP N.T.S

NEIGHBORHOOD CLUBHOUSE





PICKLE BALL COURTS



DOG PARK

WALKING PATHS





SWING BENCH



POOL



PICKLE BALL COURTS




2 / LI.1 CIVIC SPACE - A
CONCEPTUAL PLAN

0' 50' 100'

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE TENNESSEE REGISTERED LANDSCAPE ARCHITECT 10-10-23

Date: October 16, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

OVERALL CIVIC SPACE PLAN

SHEET LI.1




1 LI.2 KEY MAP N.T.S




2 LI.2 CIVIC SPACE - B

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



BENCHES



FORMAL LAWN



FORMAL PLANTING



WALKING PATH




3 LI.2 CIVIC SPACE - C

CONCEPTUAL PLAN NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'

PLAYGROUND





FORMAL PLANTING

PLAYGROUND



GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT TENNESSEE 2100

Date: October 16, 2023

Revision Date

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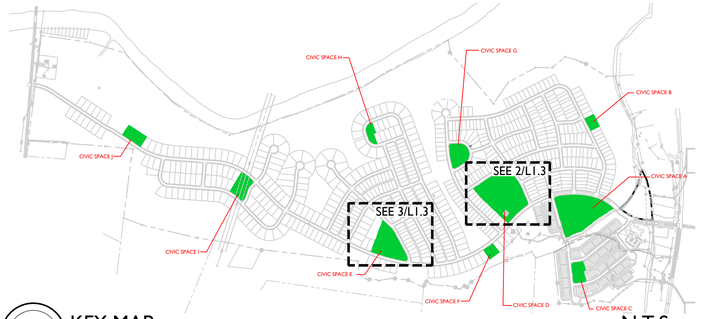
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OVERALL CIVIC SPACE PLAN

SHEET LI.2




1 / L1.3 KEY MAP N.T.S




2 / L1.3 CIVIC SPACE - D
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

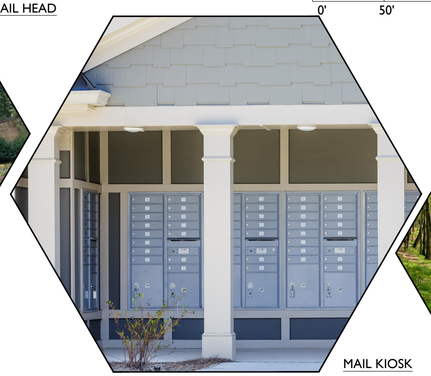
0' 50' 100'



POND



TRAIL HEAD



MAIL KIOSK

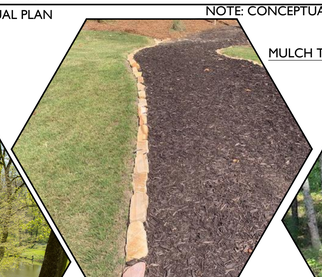
3 / L1.3 CIVIC SPACE - E
CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

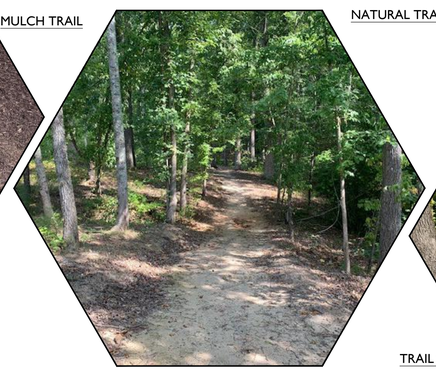
0' 30' 60'



NATURAL POND



MULCH TRAIL



NATURAL TRAIL




TRAIL SIGN

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE — TENNESSEE — REGISTERED LANDSCAPE ARCHITECT — No. 00328

Date: October 16, 2023
Revision Date
△
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△

OVERALL CIVIC SPACE PLAN
SHEET
L1.3




2 LI.4 CIVIC SPACE - F

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



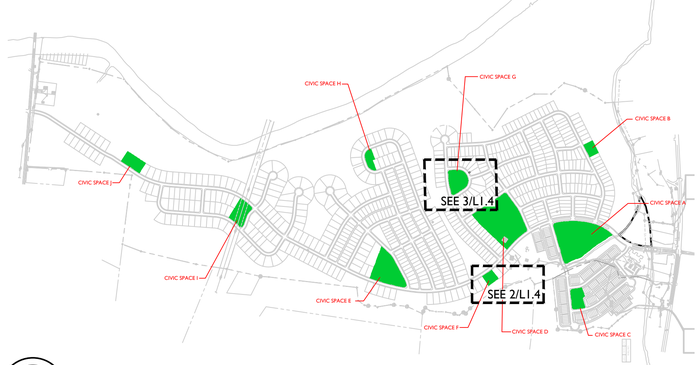
SWINGS



FORMAL PARK



PLAYGROUND




1 LI.4 KEY MAP N.T.S




3 LI.4 CIVIC SPACE - G

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



FORMAL PARK



COMMUNITY GARDEN



DOG PARK

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
# PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE REGISTERED LANDSCAPE ARCHITECT TENNESSEE 10/16/23

Date: October 16, 2023

Revision Date

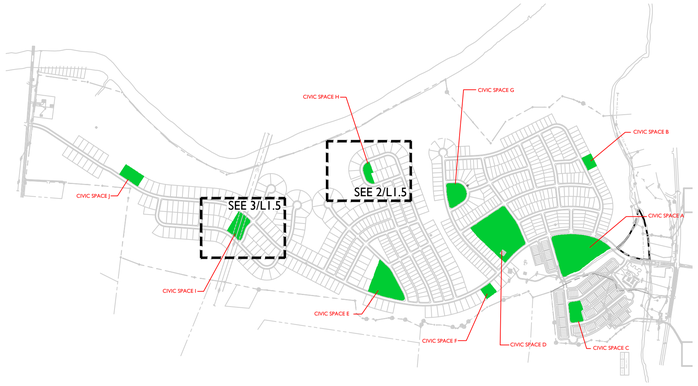
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OVERALL CIVIC SPACE PLAN

SHEET LI.4




1 LI.5 KEY MAP N.T.S




2 LI.5 CIVIC SPACE - H

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



SWINGS



PLAYGROUND



PLAYGROUND




3 LI.5 CIVIC SPACE - I

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 30' 60'



SWINGS



MAIL KIOSK



FORMAL PLANTING

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST

400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE — REGISTERED LANDSCAPE ARCHITECT

Date: October 16, 2023

| Revision Date |
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| △ |

OVERALL CIVIC SPACE PLAN

SHEET LI.5




2 / L1.6 CIVIC SPACE - J

CONCEPTUAL PLAN

NOTE: CONCEPTUAL PLANS AND CHARACTER IMAGES TO DISPLAY DESIGN INTENT.

0' 100' 200'



KAYAK LAUNCH

NOTE: PRIMITIVE WALKING TRAILS AND KAYAK LAUNCH TO BE FIELD LOCATED.



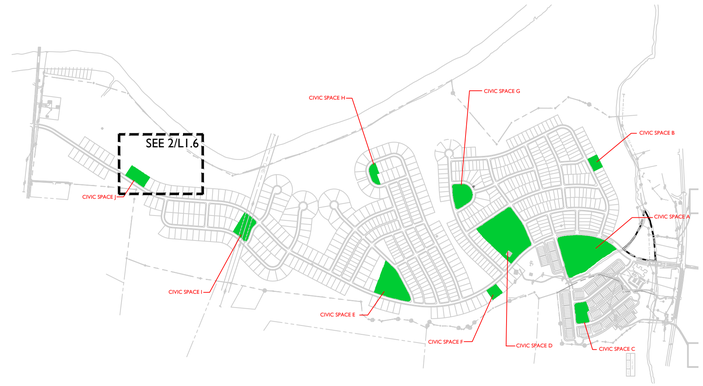
OPEN FIELD



TRAIL HEAD



MULTI-PURPOSE FIELD




1 / L1.6 KEY MAP N.T.S

GAMBLE DESIGN COLLABORATIVE

DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
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Date: October 16, 2023

| Revision | Date |
|---|---|
| △ | |
| △ | |
| △ | |

OVERALL CIVIC SPACE PLAN

SHEET L1.6

This Instrument Was Prepared by:
J. Bryan Echols
Thompson Burton PLLC
6100 Tower Circle, Suite 200
Franklin, Tennessee 37067

# DISTRICT DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS FOR ***ACTIVE ADULT NEIGHBORHOOD*** AT COLUMBIA BLUFFS

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DISTRICT DECLARATION OF COVENANTS,
CONDITIONS, AND RESTRICTIONS FOR
THE ACTIVE ADULT NEIGHBORHOOD DISTRICT AT NEXUS

This DISTRICT DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS (this "Declaration") is made effective as of _____, 2023, by _____, _____ ("District Declarant").

**W I T N E S S E T H:**

WHEREAS, District Declarant is the owner of the real property located in the Columbia , Maury County, Tennessee, described in Exhibit A attached hereto and incorporated herein by reference (the "Property"). The Property, and additional real property now or hereafter subjected to this Declaration, is intended to be developed pursuant to a master plan as a multi-use community including residential properties including multi-family and single-family products encompassing all or portions of the Property (the "District"), to be known as **"CBAA"** _____, and is a part of the Development known as Columbia Bluffs, with various open spaces, common facilities, and Common Area for the benefit of said community; and

WHEREAS, District Declarant desires to provide a flexible and ordered procedure for the overall development of the Property and the District and to establish a method for the administration, maintenance, preservation, use and enjoyment of such portions of the District as are now or may hereafter be submitted to this Declaration; and

WHEREAS, District Declarant intends by this Declaration to impose upon the District mutually beneficial restrictions under a general plan of improvements for the benefit of all owners and/or occupants of property within the Property and all persons or entities having any interest in the Property, by the recording of this Declaration; and

WHEREAS, District Declarant intends that the Property will be developed in phases and that individual phases may be subjected to one or more declarations of restrictive covenants; and

WHEREAS, District Declarant desires that the Property be held, sold and conveyed subject to the provisions of this Declaration.

NOW, THEREFORE, District Declarant hereby declares that all of the Property and any additional property as may by Supplemental Declaration be added to the Property and subjected to this Declaration shall be held, sold, and conveyed subject to the following easements, restrictions, covenants and conditions. Such easements, restrictions, covenants and conditions are for the purpose of protecting the value and desirability of the Property, and shall run with the real property submitted to this Declaration. They shall be binding on all parties having any right, title, or interest in the Property, or any part thereof, their heirs, successors, successors in title, and assigns, and shall inure to the benefit of each owner thereof.

## ARTICLE I
## DEFINITIONS

Section 1. Age-Qualified Occupant: Any individual (i) 50 years of age or older who owns and occupies the improvements on a Lot and was the original purchaser of the Lot from the

District Declarant; or (ii) 55 years of age or older who occupies the improvements on a Lot. The terms "occupy," occupies,"or "occupancy" shall mean staying overnight in the improvements on a Lot for at least ninety (90) days in any consecutive twelve (12) month period.

Section 2. "Amenity Center" means any clubhouses or centers within the Development, in each case to be a portion of the Common Area, designed to provide, among other things, meeting space, recreational facilities, swimming pools, playgrounds or other amenities to serve the residents within the Development, and may also include offices for the Association manager, Declarant or other persons.

Section 3. "Assessments" shall mean assessments for Common Expenses provided for herein or by any amendment hereto, which shall be used for the purposes of promoting the recreation, health, safety, welfare, common benefit, and enjoyment of the Owners and occupants of all or any portion of the District and of maintaining the District, all as may be specifically authorized from time to time by the Board of Directors and as more specifically authorized below. The term "Assessments" shall include, without limitation, General Assessments, Special Assessments, Common Maintenance Parcel Assessments, and Special Use Assessments, and any other assessments now or hereafter established under this Declaration.

Section 4. Articles of Organization" shall mean the Articles of Organization of the District Association, to be recorded in the Office of the Judge of Probate for Maury County, Tennessee, as may be amended from time to time.

Section 5. "Board of Directors" or "Board" shall be the body responsible for managing the affairs of the District Association. Actions required of or permitted by the Board herein may be taken or fulfilled by a committee or other designee as may be established or appointed by the Board in accordance with the Bylaws of the District Association.

Section 6. "Common Area" shall mean those portions of the Property and any improvements thereto, and components thereof and easements appurtenant thereto, now or hereafter owned by the District Association or designated on any development plan or plat for future use for the common use and enjoyment of the Owners, including, but not limited to, any common open space as set forth on a final development plan, the Common Area shown on any recorded plat of the Property and any and all pedestrian bridges, roadways, alley ways, parking areas, lakes, waterways, landscaping and irrigation systems, fences, structures, sidewalks, community signage, walls, monuments, illumination of Common Area, common utilities, storm water system, wells, fountains, amenity center and other improvements located on such Common Area, but excluding any Master Common Area and such areas that are intended to be or now or hereafter designated as a common area serving only a particular portion of the District or to be conveyed to a Sub-District Association. District Declarant shall hereafter convey the Common Area or portions thereof to the District Association, or Sub-District Association, as applicable, and the District Association or Sub-District Association shall accept such conveyance.

Section 7. "Common Elements" shall include all Common Maintenance Areas and all facilities, utilities and other improvements found or located in Common Maintenance Areas, but excluding any Common Maintenance Areas that are within the authority or responsibility of the Master Association.

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Section 8. "Common Expenses" shall mean and include the actual and estimated expenses of operating the District Association and maintaining the Common Elements, including any reasonable reserves therefor, all as may be found to be necessary and appropriate by the Board pursuant to this Declaration and the Articles of Organization of the District Association, and including without limitation any District Assessment imposed by the Master Association.

Section 9. "Common Maintenance Area" shall mean the Common Area and any portion of the Property for which the District Association has assumed or has been designated as the responsible party for maintenance obligations or otherwise designated by this Declaration or any Supplemental Declaration or a Sub-District Declaration as a Common Maintenance Parcel.

Section 10. "Common Maintenance Parcel Assessments" are Assessments to which Common Maintenance Parcels are subjected, in addition to any General Assessments.

Section 11. "Common Maintenance Parcel" shall mean any Lot designated by this Declaration or any Supplemental Declaration as a Common Maintenance Parcel, but excluding any Common Maintenance Parcels that are within the authority or responsibility of the Master Association or within the authority or responsibility of a Sub-District Association.

Section 12. "Community-Wide Standard" shall mean the standard of conduct, maintenance, or other activity generally prevailing in the Development as established in the reasonable discretion of the Master Declarant, District Declarant or the applicable Board of Directors.

Section 13. "District Association" shall mean _____ District Owners Association, a Tennessee nonprofit corporation, its successors and assigns.

Section 14. "District Declarant" means _____, a _____ limited liability company, its successors and assigns.

Section 15. "Declarant Control Period" means the period ending on the earlier to occur of: (i) the date that the District Declarant voluntarily relinquishes control of the Association; and (ii) when homes have been completed on eighty (80%) of the lots within the District and such lots have been conveyed to third party residential owners.

Section 16. "Development" means the mixed use community to be developed on real property that includes, among other areas, the District, to be known as Town Columbia , and shall be deemed to include the real property described in the Master Declaration, as may be modified, amended, expanded or contracted from time to time.

Section 17. "District" shall have the meaning given in the premises of this Declaration.

Section 18. "District Assessment" means the Assessment to be paid by the District to the Master Association as set forth in the Master Declaration or Supplemental Declaration.

Section 19. "District Representative" means the Person selected by the Board of Directors to be the representative of the District in meetings or otherwise with the Master Association.

Section 20. "District Design Guidelines" shall mean the aesthetic and functional plan for the District, to be implemented through the regulation of land use, landscaping, architecture and such other matters as may be included in the District Design Guidelines. The District Design Guidelines is originally adopted by the District Declarant and may be amended by the District Declarant or District Design Review Committee, with the consent of District Declarant and Master Declarant during the applicable Declarant Control Period, from time to time. The District Design Guidelines does not need to be recorded to be effective but shall be available from the District Design Review Committee.

Section 21. "Final Plat" means, collectively, all plats of a portion of the Property from time to time recorded in the real estate records of the Office of the Judge of Probate for Maury County, Tennessee, as such may be amended from time to time as the Property is developed. The term "Final Plat" may include a plat established by a condominium regime.

Section 22. "Improvements" shall mean buildings, outbuildings, underground installations, grading, slope and drainage alterations, roads, driveways, parking areas, fences, screening walls and barriers, retaining walls, stairs, decks, windbreaks, landscaping, plantings, planted trees and shrubs, poles, signs, lighting, loading areas, and all other man-made changes to the natural configuration and vegetation of the Property, whether above or below the land surface.

Section 23. "Lot" or "Lots" shall mean a separate parcel of the Property now or hereafter set forth as a Lot on any Final Plat, including without limitation open space, conservation areas, or Common Area within a District, or separate parcels conveyed by other property description if no Final Plat has been recorded, and shall be deemed to refer to any and all Improvements located thereon or comprising such Lot.

Section 24. "Master Association" shall mean and refer to the Columbia Bluffs Master Association, Inc., a Tennessee nonprofit corporation, its successors and assigns**, IF REQUIRED**.

Section 25. "Master Declarant" shall mean the Declarant of the Master Declaration, its successors and assigns.

Section 26. "Master Declaration shall mean that certain Master Declaration of Covenants, Conditions, and restrictions for Columbia Bluffs, of record at Book _____, page _ _____, Maury County Register's Office, as may be supplemented, amended, or revised from time to time.

Section 27. "Master Design Guidelines" shall mean the aesthetic and functional plan for the Development, to be implemented through the regulation of land use, landscaping, architecture and such other matters as may be included in the Master Design Guidelines. The Master Design Guidelines is originally adopted by the Master Declarant and may be amended from time to time by the Master Declarant or Master Design Review Committee, with the consent of Master Declarant during the Declarant Control Period applicable to the Master Declaration. The Master Design Guidelines does not need to be recorded to be effective but shall be available from the Master Design Review Committee.

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Section 28. "Mortgage" shall include a deed of trust or mortgage encumbering any Unit.

Section 29. "Mortgagee" shall include a beneficiary under or holder of a note secured by a Mortgage who has provided actual, written notice to the Master Association of such interest.

Section 30. "Mortgagor" shall include the trustor or grantor of a Mortgage.

Section 31. "Operating Budget" shall have the meaning given in Article IX, Section 2 of this Declaration.

Section 32. "Owner" shall mean and refer to one or more Persons or entities, including District Declarant or Master Declarant, who holds or hold the record title to any Lot, but excluding in all cases any party holding an interest merely as security for the performance of an obligation.

Section 33. "Person" shall mean a natural person, a corporation, a partnership, a limited liability company, a trust, a trustee, or any other legal entity.

Section 34. "Property" shall mean and refer to the real property described in Exhibit A attached hereto, and any additional real property submitted to this Declaration from time to time pursuant to a Supplemental Declaration and added to the District.

Section 35. "Resident" or "Qualified Resident" shall mean any of the following persons occupying a Lot: (i) any Age-Qualified Occupant; (ii) any person 19 years of age or older occupying a Lot with an Age-Qualified Occupant; and (iii) any person 19 years of age or older who occupied a Lot with an Age-Qualified Occupant and who continues, without interruption, to occupy the same Lot after termination of the Age-Qualified Occupant's occupancy thereof.

Section 36. "Special Assessment" shall have the meaning given in Article IX, Section 5 of this Declaration.

Section 37. "Special Use Assessment" shall mean the Assessment applied to a Special Use Parcel by Supplemental Declaration, which may be in lieu of all other Assessments; subject to the provisions of Article IX.

Section 38. "Special Use Parcel" shall mean a Lot of unconventional size, shape, location or use that calls for special design and assessment considerations as designated by Master Declarant or District Declarant. Typically, a Special Use Parcel will be used for commercial purposes, civic purposes, an age-restricted neighborhood, multi-family residential, or community or recreational facilities.

Section 39. "Streetscape, Pedestrian, Utility and Street Maintenance Easement" shall include all streetscape, pedestrian, utility and street easements located adjacent to street rights-of-way and medians in public rights of way.

Section 40. "Sub-District Association" shall mean an owners association established to maintain or regulate only a portion of the District pursuant to a Sub-District Declaration, such

as a condominium association, if any, with the prior consent of Master Declarant and District Declarant.

Section 41. "Sub-District" shall mean a portion of the District that has been subjected to particular restrictions, covenants or regulations by Supplemental Declaration or a Sub-District Declaration, , if any, and may be maintained or regulated by a Sub-District Association.

Section 42. "Sub-District Declaration" shall mean a declaration of restrictive covenants and other matters applicable only to a Sub-District.

Section 43. "Supplemental Declaration" shall mean an amendment to this Declaration, including the addition of additional property, Lots or Master Common Area subjected to this Declaration. Such Supplemental Declaration may, but is not required to, impose, expressly or by reference, additional restrictions and obligations to the provisions of this Declaration, or to exempt such property from certain provisions and restrictions of this Declaration. The term "Declaration" as used herein shall include this Declaration, together with any and all Supplemental Declaration, together with any amendments, restatements or other additions or removals thereto.

Section 44. "Telecommunication Services" shall mean residential and commercial services involving the provision of voice, internet, entertainment, television or other related services.

Section 45. Defined Terms. Capitalized terms used herein and not otherwise defined shall have the meaning given in the Master Declaration.

## ARTICLE II
## DISTRICT AND SUB-DISTRICT ASSOCIATIONS

Section 1. Establishment. This Declaration is a District Declaration as referred to in the Master Declaration, and is established by District Declarant with the consent of Master Declarant.

Section 2. District Sub-District Associations. District Declarant or other Persons may from time to time, with the consent of Master Declarant and District Declarant, establish Sub-Districts within the District to be governed by a Sub-District Association by filing a Sub-District Declaration, Supplemental Declaration, or other means of record. Each area within a Sub-District may consist of one or more Lots within the District, one or more parcels described by property description (each of which will be deemed a Lot), one or more uses, or otherwise as determined by the applicable declarant, District Declarant, or Master Declarant, in their sole discretion, but subject in each case to the consent of Master Declarant and District Declarant. Upon establishment of a Sub-District, and at any time and from time to time, the applicable declarant may but shall not be required to impose additional restrictive covenants that are applicable to such Sub-District or to exempt all or a portion of the Sub-District from one or more provisions of this Declaration, with the consent of the Master Declarant and District Declarant. The applicable declarant may establish, or cause the Sub-District to establish, one or more Sub-District Associations for the management and preservation of such Sub-District, each with the power to establish and collect Assessments for, among other things, the payments of

Assessments to the Master Association or District Association s as may be in the Master Declaration, this Declaration, or in this Declaration.

Section 3. Sub-District Declaration. A Sub-District shall be entitled to establish one or more Sub-District Declarations applicable to a Sub-District and a Sub-District Association for the administration thereof, but such Sub-District Declarations and all Sub-District Associations shall in each case be subject to the prior review and approval of District Declarant and Master Declarant in their respective sole discretion, and shall be deemed subordinate to the Master Declaration and this Declaration.

Section 4. Sub-District Representatives. Unless otherwise established by the declarant in a Sub-District Declaration, it shall be the responsibility of Owners within a Sub-District to establish equitable, fair and representative procedures for the selection of any representative to the District Association as may be established, in each case to be approved by District Declarant. If applicable, no voting or representative rights shall be available to a Sub-District until such time as a Sub-District Representative has been duly selected. Each Sub-District will be governed, controlled and subject to the powers and authority vested in the Master Association and the District Association, whether or not the District has elected a District Representative.

## ARTICLE III
## PROPERTY RIGHTS AND EASEMENTS

Section 1. Common Area. Every Owner shall have a right and easement of enjoyment in and to the Common Area that is appurtenant to the title to such Owner's Lot, subject to any restrictions or limitations contained in the Master Declaration, this Declaration or in any Deed or amendment thereto conveying the Common Area to the District Association or subjecting the Common Area to this Declaration. Any Owner may delegate his or her right of enjoyment to their family, tenants, customers, and invitees, as applicable, subject to reasonable regulation by the Board and in accordance with procedures the Board may adopt from time to time.

Section 2. Exceptions to Rights. The Owner's right granted in Section 1 above shall be subject to the following:

(a) The right of the Master Association or District Association to dedicate or transfer all or any part of the Common Area to any public body, agency, authority, or utility for such purposes as are consistent with the purposes of the Master Association set forth in the Master Declaration or the District Association set forth in this Declaration.

(b) The limitation of Owner rights only to those areas of the Common Area for which such Owner shall pay a portion of the Common Expenses related thereto.

(c) Each Owner's responsibility to pay for Common Expenses, fees, Fines and other charges hereunder assessed by the Board or the District Association against an Owner's Lot.

(d) The right of Master Declarant, District Declarant or other declarant under a Sub-District Declaration to limit, restrict, or regulate the use of the Common Area in their sole discretion.

Section 3. Owner Easements. Subject to the limitations of Section 2 above, every Owner, its successors and assigns, shall have the following perpetual easements with respect to the Property; provided, that for purposes of this Section 3, Common Area shall be deemed to include Common Area that is now or hereafter created within a District, without regard to whether the District Association has ownership of such areas or responsibilities for maintenance or otherwise with respect such areas:

(a) A non-exclusive easement of ingress and egress to its Lot over, across and through the Common Area and Streetscape, Pedestrian and Utility Maintenance Easements.

(b) A perpetual easement in common with the Owners of all other Lots to use all pipes, wires, cables, public utility lines and other Common Elements serving its Lot.

(c) A nonexclusive, perpetual and reciprocal access easement for ingress and egress in common with the Owners of all other Lots for access over any drive aisles or alleys located, constructed and available on or within any Lot, but expressly excluding private driveways constructed solely for internal use only within a Lot, and any areas excluded from use by a Supplemental Declaration, this Declaration, or a Sub-District Declaration.

(d) A perpetual and non-exclusive easement in, over and through all Common Area and to use the entranceways, pedestrian systems and other common improvements within the Property subject to the right of the Board to:

(i) promulgate rules and regulations for the use and enjoyment thereof; and,

(ii) suspend the enjoyment and voting rights of any Owner for any period during which any Assessment for Common Expenses or Fine or other charge or fee hereunder remains unpaid, or for any period during which any infraction of its published rules and regulations continues, it being understood that any suspension for either non-payment of any assessment or a breach of the rules and regulations of the District Association shall not constitute a waiver or discharge of the Owner's obligation to pay the assessment..

Section 4. District Declarant and District Association Easements. The District Declarant and the District Association, their successors and assigns, and their contractors and agents shall have the following perpetual easements with respect to the Property:

(a) A perpetual and non-exclusive easement for the maintenance of any Common Elements and Streetscape, Pedestrian, and Utility Maintenance Easements, which may presently, or hereinafter encroach upon a Lot.

(b) A perpetual and non-exclusive right of access to each Lot: (1) to inspect same for the purpose of verifying conformance with this Declaration and any rules and

regulations of the District Association, (2) to remedy any violations set forth in this Declaration or in any rules and regulations of the District Association, and (3) to perform any operations required in connection with the maintenance, repairs or replacements of or to the Common Area, or any equipment, facilities or fixtures affecting or serving other lot(s) or the Common Elements; provided that requests for entry are made in advance and that any such entry is at a time reasonably convenient to the Owner. In the case of an emergency, such right of entry shall be immediate, whether Owner is present at the time or not.

(c) A perpetual and non-exclusive easement in, over, upon, across and through the Common Area for surface water runoff and drainage caused by natural forces and elements, grading, and/or the improvements located upon the Property. No individual Owner shall directly or indirectly interfere with or alter the drainage and runoff patterns and systems within the Property without written approval of the Master Association.

(d) A perpetual and non-exclusive easement in, upon, over, across and through the Common Area for the purpose of installation, maintenance, repair, service and replacement of all sewer, water, power and telephone pipes, lines, mains, conduits, waters, poles, transformers, meters, and any and all other equipment or machinery necessary or incidental to the proper functioning of any utility company or other entity that requires same for the purpose of furnishing one or more of the foregoing services as determined and authorized by the Master Association.

(e) A perpetual and non-exclusive easement of unobstructed ingress and egress in, upon, over, across and through the Common Area to the District Association, the Master Association, and their respective officers, agents and employees and all police, fire, and ambulance personnel in the proper performance of their respective duties (including but not limited to emergency or other necessary repairs to a lot upon which the Owner has failed to perform) and for repair and maintenance of the Common Elements. Except in the event of emergencies, the rights accompanying the easements provided for in this subsection shall be exercised only during reasonable daylight hours and then, whenever practical, only after advance notice to the Owner(s) directly affected thereby.

(f) The District Declarant reserves the right and easement, which shall be a covenant running with the land, for and to the benefit of District Declarant and District Association for the installation and use of entrance Improvements to be located on the entrances to the District. The estimated and actual cost of operating and maintaining any improvement thereon will be the responsibility of the District Association. Excluding the Master Declarant or District Declarant, and any of their respective affiliates, the publication or display of any signage or other matter by any Person, whether or not such Person is a Member of the District Association, upon any Improvement on the entry feature easement will be subject to contract with the District Association for the reasonable compensation for services and operating expenses in connection therewith.

Section 5. Easement Related to Infrastructure and Other Improvements. Notwithstanding the foregoing or anything else contained herein to the contrary, District

Declarant and/or the District Association shall have and hereby retain the right, but not the obligation, to create, install, construct, modify, repair, replace and maintain certain forms of infrastructure for the District that may consist of curbs, streets, service drives, sidewalks, and other hardscape, landscaping, street trees, street lights, irrigation systems, brick pads, benches, bridges, street furniture, walking paths, parks, trash receptacles, drainage facilities, signage, utilities, and any apparatuses related thereto, as well as other improvements not necessarily enumerated above. Said improvements may be installed along the roads or within any Lot or in the Common Area of the District if deemed necessary or desirable by the District Declarant and/or the District Association, in their sole and absolute discretion, for the overall functionality or aesthetics of the District. Continued maintenance, repair and replacement of any of the aforementioned infrastructure or improvements, if and once installed, shall be the responsibility of the Lot Owner if located within said Owner's Lot, or the responsibility of the applicable District Association if located within the Common Area of the District or the responsibility of the Master Association if located within the Master Common Area. Any costs and expense associated with this right may be reallocated and assessed by the District Association as a Common Expense. Notwithstanding the foregoing, when exercising said right, neither District Declarant nor the District Association shall do anything which may reduce the number of parking spaces within the Lot. In addition, neither District Declarant nor the District Association shall have the right to modify an existing building located on a Lot without the consent of the Lot Owner. An easement is hereby granted to the District Declarant, the District Association and to any construction or management company selected by the District Declarant or the District Association to enter in or cross over the Common Area or to enter or cross over any Lot to create, install, construct, modify, repair, replace and maintain any of the aforementioned forms of infrastructure or improvements located within any portion of the District.

Section 6. Easements for Utilities and Related Purposes. The District Association is authorized and empowered to grant (and shall from time to time grant) such licenses, easements and/or rights of way for sewer lines, water lines, electrical cables, telephone cables, television and other communication cables, internal and external wiring and antennae, gas lines, drainage, slopes, storm drains, regulatory signage, street lights, underground conduits and/or such other purposes related to the provision of public utilities and other common services to the District as may be considered necessary, appropriate or desirable by the Board for the orderly maintenance, preservation and enjoyment of the Common Area or for the preservation of the health, safety, convenience and/or welfare of the Owners of the lots and District Declarant. A ten (10) foot nonexclusive underground utility easement for the District Association is reserved along all the frontage (but behind right of way), both sides, and rear of all Lots, and on both sides of the sidelines of all comer Lots. Additional easements are reserved on the recorded plat(s), as amended from time to time. Within these easements, no construction of any kind shall be placed or permitted to remain which will in any way damage or interfere with the installation or maintenance of utilities.

Section 7. Streetscape, Pedestrian, Utility, and Street Maintenance Easements. Streetscape, Pedestrian, Utility, and Street Maintenance Easements shall include all streetscape, pedestrian, utility, and street maintenance easements located adjacent to street rights-of-way, and required pavers and medians in public rights-of-way.

Section 8. Easements of Encroachment. There shall be reciprocal appurtenant easements of encroachment as between each Lot and such portion or portions of the

Improvements adjacent thereto or as between adjacent Lots due to unintentional placement or settling or shifting of Improvements constructed, reconstructed or altered thereon.

Section 9. General Easement. The District Declarant, so long as it shall retain record title to any Lot or other tract within the District or the Common Area, and the District Association, reserve the right and easement to the use of the Common Area and any Lot (regardless of ownership) or any portion thereof, as may be needed for repair, maintenance or construction on such Lot or any other Lot or the Common Area.

Section 10. Revision of Common Area. Notwithstanding any other provision of this Declaration, District Declarant shall have the right by recording a Final Plat or otherwise to revise any Common Area, in whole or in part, including without limitation the conversion to other types or uses of property, the increase or decrease in size, or the granting of easements or construction of improvements in such Common Area.

## ARTICLE IV
## MEMBERSHIP AND VOTING RIGHTS

Section 1. Membership in the District Association. Every Person who is the record owner of a joint or undivided fee interest in any Lot shall be deemed to be a member of the Association (each such person or entity, a "Member"). Membership shall be appurtenant to and may not be separated from such fee interest ownership, and any transfer of a Lot shall operate automatically to transfer to the new record owner thereof the membership in the Association appurtenant thereto. The foregoing is not intended to include persons who hold an interest merely as security for the performance of an obligation, and the giving of a security interest shall not terminate that Member's membership.

Section 2. Assignment by Declarant. Notwithstanding the foregoing, District Declarant may at any time assign, pledge, hypothecate or alienate its membership and/or District Declarant's rights as District Declarant herein, but any transfer by District Declarant of title to a Lot shall automatically transfer the membership in the Association appurtenant thereto, free and clear from any such assignment, pledge, hypothecation or alienation.

Section 3. Voting Rights. Voting and other rights of the Members shall be as set forth in the By-Laws of the Association.

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## ARTICLE V
## MAINTENANCE

Section 1. District Association's Responsibility. The District Association shall maintain and keep in good repair the Common Maintenance Area. Subject to the provisions of any Supplemental Declaration or Sub-District Declaration, such maintenance may include, without limitation, maintaining, repairing, and replacing, subject to any insurance then in effect, all trees, landscaping and other flora, structures, irrigation system, storm water control and any other Improvements situated upon the Common Area or the Common Maintenance Area, and the maintenance of non-public streets, parking areas, or driveways, street or entrance lighting, signage, including without limitation directional signage.

Section 2. Common Maintenance Parcels. The District Association shall maintain those portions of Common Maintenance Parcels as this Declaration or any Supplemental Declaration establishes as a District Association responsibility, and may charge to the Owners of such Common Maintenance Parcel a Common Maintenance Parcel Assessment, as appropriate.

(a) Unless otherwise established by Supplemental Declaration, the District Association shall provide for the maintenance, care, repair, and replacement of the following portions of the Common Maintenance Parcels, to be funded by Common Maintenance Parcel Assessments: the exterior landscaping (except such landscaping installed by, or on behalf of, the Lot Owner and such landscaping enclosed by a fence, if any), walkways, and porches located upon or about each Common Maintenance Parcel. The District Association also shall maintain the exterior of each Common Maintenance Parcel as follows: painting, maintenance, and repair of exterior building surfaces as the Board shall deem necessary and proper, including roofs, gutters, downspouts, exterior building surfaces, trees, shrubs, grass, walks, replacement of trim, caulking and other repairs to roof covers (to include the repair and replacement of all components of the roof of each Common Maintenance Parcel), and other miscellaneous repairs. Such exterior maintenance shall not include glass surfaces (weather windows or sliding glass doors), HVAC equipment, storm doors, front or rear entry doors, garage doors, fences, screens, or patio covers. The balance of the improvements located on the respective Common Maintenance Parcels shall be maintained by the Owner of the particular Lot involved. For the sole purpose of performing the exterior maintenance upon each Lot required by this Article V, the duly authorized employees or agents of the District Association shall have the right, after reasonable notice to the Owner, to enter upon any Lot and into any Lot at reasonable hours of any day.

(b) Notwithstanding any foregoing provision to the contrary, the duly authorized agents or employees of the District Association shall have the right to enter in or upon any Lot or into any structure or located on a Lot, without notice to the Owner thereof, when, in the judgment of the District Association, acting through its Board of Directors, such entrance is necessary to prevent damage to such Lot or surrounding Lots or Common Area by fire, criminal act, natural disaster, or other similar emergency.

(c) Notwithstanding the obligations of the District Association with respect to maintenance of certain portions of the exterior of certain Lots, the District Association shall have no obligation to repair interior or structural portions of any Lot or personal

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property that is lost or damaged as a result of construction defects, damage or maintenance issues of exterior portions of any Lot, including without limitation damage resulting from water leaks, foundational issues, or settling or structural matters. Each Owner shall bear full responsibility for obtaining and maintaining such insurance as may be desired for protection against such losses.

(d) Notwithstanding the foregoing, if the need for exterior maintenance and repair of Common Maintenance Parcels by the District Association as required by this section is caused by the willful or grossly negligent conduct or act an Owner, his/her family, guest, invitees, or other Persons using or occupying his/her Lot with his/her express or implied permission, the cost of such repair or maintenance may be assessed against such Owner as a Special Assessment of this Declaration upon a finding by the Board, which shall be due and payable thirty (30) days from the date of notice thereof, such Assessment to be collected and enforced as provided in this Declaration. Such Special Assessment shall not require the approval of any of the Members; provided, however, that any Owner against which any such Assessment is levied shall be entitled to notice, a hearing at a time and place set by the Board in its sole discretion, and an opportunity to do the corrective work required (provided that the work is performed by a competent contractor mutually agreeable to both parties and in a manner and quality agreed to by the Board), prior to a Special Assessment being levied against such Owner in accordance with the provisions of this subsection.

Section 3. Owner's Responsibility. Except as provided in the foregoing Section 1. Section 2. or otherwise set forth in a District Declaration, the Owner of each Lot shall have the sole responsibility for maintenance of all exterior and interior portions of the Lot, all Improvements located thereon, the land, flora, irrigation, and landscaping within the boundaries of the Lot; and other improvements not maintained by the District Association. Each Owner shall maintain its Lot in a manner consistent with the Community Wide Standard, the applicable covenants set forth in this Declaration, and such rules and regulations as may be established by the Board from time to time.

## ARTICLE VI
## INSURANCE AND CASUALTY LOSSES

Section 1. Insurance. The Board of Directors for the District Association, or its duly authorized agent, shall have the authority to and shall obtain insurance for all insurable improvements on the Common Area against loss or damage by fire or other hazards, including extended coverage, vandalism, and malicious mischief. This insurance shall be in an amount sufficient to cover the full replacement costs of any repair or reconstruction in the event of damage or destruction from any such hazard.

(a) The Board shall also obtain a public liability policy covering the Common Area and District Association for all damage or injury caused by the negligence of the District Association or any of its employees or agents. The public liability policy shall have at least a One Million Dollar ($1,000,000.00) single person limit as respects bodily injury and property damage, a One Million Dollar ($1,000,000.00) limit per occurrence, and a Five Hundred Thousand Dollar ($500,000.00) minimum property damage limit. The policy or policies may contain a reasonable deductible, and the

amount thereof shall be added to the face amount of the policy in determining whether the insurance at least equals the full replacement cost.

(b) In addition to the other insurance required by this Section, the Board shall obtain, as a Common Expense, worker's compensation insurance, if and to the extent necessary, and a fidelity bond or bonds on directors, officers, employees, and other persons handling or responsible for the District Association's funds. The amount of fidelity coverage shall be determined in the directors' best business judgment, but may not be less than three months' Assessments, plus reserves on hand. Bonds shall contain a waiver of all defenses based upon the exclusion of persons serving without compensation and may not be canceled or substantially modified without at least thirty (30) days' prior written notice to the District Association. The Board shall also obtain, as a Common Expense, a reasonably available amount of Directors and Officers Errors and Omissions insurance.

(c) Premiums for all insurance required by this Article VI, shall be Common Expenses of the District Association and shall be included in the General Assessment.

Section 2. Insurance; Common Maintenance Parcels.

(a) The District Association shall, as a Common Expense applicable only to Lots that are Common Maintenance Parcels, obtain and continue in effect adequate blanket all-risk casualty insurance, if reasonably available, and if not reasonably available, fire and extended coverage, in such form as the Board deems appropriate for one hundred (100%) percent of the replacement cost of the Lots that are Common Maintenance Parcels, excluding the replacement of any finishes, fixtures, cabinets, appliances, flooring, or other improvements installed or supplied by the Owners, or their tenants, or personal property of the Owners, or their tenants, guests, and invitees located within such Lots.

(b) Neither the District Declarant nor the District Association has constructed the Lots on the Common Maintenance Parcels, and neither District Declarant nor the District Association shall be liable for any claims or causes of action of any kind whatsoever in law or in equity arising from or in any way relating to the construction of improvements upon the Common Maintenance Parcels that was performed by parties other than District Declarant, its agents, employees, subsidiaries or other affiliated entities.

(c) Premiums for all insurance required by this Article VI, Section 2, shall be Common Expenses of the Association applicable only to Common Maintenance Parcels and shall be included in the Common Maintenance Parcel Assessment. The policy or policies may contain a reasonable deductible, and the amount thereof shall be added to the face amount of the policy in determining whether the insurance at least equals the full replacement cost.

Section 3. Disbursement of Proceeds. Proceeds of insurance policies with respect to Common Area shall be disbursed as follows:

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(a) If the damage or destruction for which the proceeds are paid is to be repaired or reconstructed, the proceeds, or such portion thereof as may be required for such purpose, shall be disbursed in payment of such repairs or reconstruction as hereinafter provided. Any proceeds remaining after defraying such costs of repairs or reconstruction to the Common Area or, in the event no repair or construction is made shall be retained by and for the benefit of the District Association and placed in a capital improvements account.

(b) If it is determined that the damage or destruction to the Common Area for which the proceeds are paid shall not be repaired or reconstructed, such proceeds shall be disbursed in the manner as provided for excess proceeds in Section 2(a) above.

Section 4. Repair and Reconstruction. If the damage or destruction to the Common Area for which the insurance proceeds are paid is to be repaired or reconstructed, and such proceeds are not sufficient to defray the cost thereof, the Board of Directors may use reserve or capital improvements account funds, or may levy a Special Assessment against all Lots. Additional Assessments may be made in like manner at any time during or following the completion of any repair or reconstruction.

Section 5. Annual Review of Policies. At least annually, the Board shall review all insurance policies that are required by this Article VI to be maintained by the District Association in order to ascertain whether the coverage contained in the policies is sufficient. If the Board deems such coverage to be insufficient, the Board may expand the coverage to the extent it reasonably deems necessary.

## ARTICLE VII
## NO PARTITION

Whenever all or any part of the Common Area shall be taken (or conveyed in lieu of and under threat of condemnation by the Board) by any authority having the power of condemnation or eminent domain, the award made for such taking shall be payable to the District Association as Trustee for all Owners to be disbursed as follows: If the taking involves a portion of the Common Area on which Improvements have been constructed, then, unless within sixty (60) days after such taking the District Declarant or the District Association shall otherwise agree, the District Association shall restore or replace such Improvements so taken on the remaining land included in the Common Area to the extent lands are available therefor, in accordance with plans approved by the Board and the District Design Review Committee. If such Improvements are to be repaired or restored, the above provisions in Article V hereof regarding the disbursement of funds in respect to casualty damage or destruction shall apply. If the taking does not involve any Improvements on the Common Area, or if there is a decision made not to repair or restore, or if there are net funds remaining after any such restoration or replacement is completed, then such award or net funds shall be disbursed to the District Association and used for such purposes as the Board shall determine.

## ARTICLE VIII
## RIGHTS AND OBLIGATIONS OF THE DISTRICT ASSOCIATION

In addition to the powers delegated to the District Association by its Articles of Organization or the laws of the State of Tennessee, the District Association shall be empowered to perform each of the following duties related to the Property and Common Area:

Section 1. Operation and Maintenance of Common Maintenance Area. To operate, maintain and otherwise manage or provide for the operation, maintenance and management of the Common Maintenance Area, together with all easements for operation and maintenance purposes and for the benefit of the District Association or the Owners over and within the Common Area; to keep all Improvements, if any, of whatever purpose from time to time located on the Common Area in good order, condition, and repair.

Section 2. Title. Any other provision of this Declaration or the Bylaws notwithstanding, the District Association always shall maintain lien free title to the Common Area, excepting only a lien for current year taxes, provided, however, that the District Association may mortgage or convey the Common Area with an affirmative vote of at least sixty-seven percent (67%) of the Directors; and provided, further, that the District Association may accept a conveyance of the Common Area subject to a lien or other encumbrance.

Section 3. Seasonal or Other Decorations. To install and maintain seasonal and other decorations, lighting, street banners, and other items designed to enhance the appearance or attractiveness of the District or the enjoyment or experience of those living, shopping or otherwise participating in the District, in the sole discretion of the District Declarant or Board of Directors, the cost of which shall be a Common Expense. Common Maintenance Parcels are not allowed to attach anything or drill holes into the outside walls of the building.

Section 4. Water and Other Utilities. To acquire, provide, and/or pay for, water, sewerage, garbage disposal, electrical, telephone, gas, and other necessary utility services for the Common Area.

Section 5. Taxes and Assessments. To pay all real and personal property taxes and assessments separately levied upon or assessed against the District Association and/or the property owned by the District Association. Such taxes and assessments may be contested or compromised by the District Association; provided, however, that they are paid or a bond in an amount at least equal to such taxes and assessments is posted prior to the sale or other disposition of any property to satisfy the payment of such taxes or assessments.

Section 6. Insurance. To obtain from reputable insurance companies qualified to do business in the State of Tennessee the insurance set forth in this Declaration, and to maintain in force at all times such insurance as is required by this Declaration.

Section 7. Personal Property and Real Property for Common Use. The District Association, through action of its Board of Directors, may acquire, hold, and dispose of tangible and intangible personal property and real property. The Board, acting on behalf of the District Association, shall accept any real or personal property, leasehold, or other property interests within Maury County conveyed to it by the District Declarant as permitted herein.

Section 8. Rules and Regulations. The District Association, through its Board of Directors or otherwise, may make and enforce reasonable rules and regulations governing the use of the Property, which rules and regulations shall be consistent with the rights and duties established by this Declaration. Sanctions for violations of the rules and regulations may include reasonable monetary Fines (as hereinafter defined) and suspension of the right to use the Common Area. The Board shall, in addition, have the power to seek relief in any court for violations or to abate nuisances. In addition, the District Association, through the Board or

otherwise, may, by contract or other agreement, enforce city or county ordinances or permit the City of Columbia or Maury County to enforce ordinances on the Property for the benefit of the District Association and the Owners.

Section 9. Traffic Control. The Board may make rules and regulations concerning driving and parking within the Property, subject to applicable governmental requirements and restrictions. Without limiting the foregoing, to the extent permitted by local governmental authority, the District Association may construct traffic calming devices and post speed limits or other traffic signs and take other measures deemed necessary to discourage excessive speed and to promote a safe environment. The District Association may enforce such rules and regulations with penalties, Fines or towing, and shall have all remedies set forth in this Declaration.

Section 10. Implied Rights. The District Association may exercise any other right or privilege given to it expressly by this Declaration or the Bylaws, any law, statute or ordinance, and every other right or privilege reasonably to be implied from the existence of any right or privilege given to it herein or reasonably necessary to effectuate any such right or privilege.

## ARTICLE IX
## ASSESSMENTS

Section 1. Creation of Assessments. There shall be created annual Assessments as may be from time to time specifically authorized by the Board of Directors as follows (collectively, the "Annual Assessments"):

(a) The Board may levy general assessments for expenses determined by the Board to benefit the District Association and/or the District as a whole, including without limitation, expenses incurred by the District Association in fulfilling its maintenance obligations set forth in this Declaration or otherwise expressly or implicitly authorized by this Declaration, reserves as deemed appropriate by the Board, and the District Assessment ("General Assessments").

(b) The Board may levy a Common Maintenance Parcel Assessment against Common Maintenance Parcels for expenses determined by the Board to benefit only such Common Maintenance Parcels, including without limitation, expenses incurred by the District Association in fulfilling its maintenance or service obligations with respect to such Common Maintenance Parcels. Common Maintenance Parcels may be established with different levels of services and maintenance obligations for the District Association, and the Common Maintenance Parcel Assessment applicable to Common Maintenance Parcels may reflect such differences.

(c) The Board may levy a Special Use Assessment to the extent established by a Supplemental Declaration for any Special Use Parcel. In the event a Special Use Assessment is established, the General Assessments shall not apply to such Special Use Parcels. If no Special Use Assessment is established in a Supplemental Declaration by oversight or error, then the Declarant or the Board may at any time thereafter establish a Special Use Assessment in the Declarant's or the Board's discretion, to be applied to such Special Use Assessment from after the date of such establishment. The Special Use Assessment may include maintenance or landscaping responsibilities for areas within the District but not located within the Special Use Parcel.

Section 2. Operating Budget. It shall be the duty of the Board to prepare a budget covering the estimated costs of operating the District Association during the coming year, including without limitation Common Expenses and Common Maintenance expenses (the "Operating Budget").

Section 3. Capital Budget and Contribution. The Board of Directors shall annually prepare a capital budget that shall take into account the number and nature of replaceable assets, the expected life of each asset, and the expected repair or replacement cost (the "Capital Budget"). The Board shall set the required capital contribution, if any, in an amount sufficient to permit meeting the projected capital needs of the District Association, as shown on the Capital Budget, with respect both to amount and timing by Assessments over the period of the Budget. The capital contribution required shall be fixed by the Board and included within the Operating Budget and Assessment. The Capital Budget shall also provide for the establishment of separate reserve accounts to hold the proceeds of the Assessments imposed for capital expenditures.

Section 4. Allocation of General Assessments. Unless otherwise set forth in any Supplemental Declaration or District Declaration, General Assessments shall be allocated against all Lots (other than Special Use Parcels) within the District equally. Assessments for Special Use Parcels may include the responsibility for specific areas or maintenance or landscaping within the Development that shall not be considered in setting the General Assessments.

The Board shall set Assessments based on the Operating Budget and the Capital Budget. The Board shall cause a copy of the Operating Budget, the Capital Budget, and the amount of each General Assessment to be communicated to the Members of the District Association at least ten (10) days prior to the year for which Assessments shall be made. The Operating Budget, together with the Capital Budget and the Annual Assessments (collectively, the "Budget"), shall be adopted by the Board at a duly called meeting of the Board. Notwithstanding the foregoing, however, in the event a Budget is not established for any reason for any year, then and until such time as a Budget shall have been determined as provided herein, the Budget in effect for the then current year shall continue for the succeeding year. No failure to provide the Operating Budget or Assessments as required hereunder shall relieve any Lot Owner from payment of such Assessments once established.

Section 5. Special Assessments. In addition to the Annual Assessments authorized above, the Board may levy, during any calendar year, special assessments, applicable only to that year, to be used solely to defray, in whole or in part, the cost of any construction, reconstruction, or unexpected repair or replacement of a capital improvement, including the necessary fixtures and personal property related thereto ("Special Assessments"). The Board may levy a Special Assessment against all Lots for such expenses determined by the Board to benefit the District Association and/or the District as a whole, and may levy a Special Assessment against particular Lots for such expenses as may be determined by the Board to benefit less than the Master Association or District as a whole.

Section 6. Assessment Obligation. Assessments against each Lot shall commence on recording of a Supplemental Declaration, District Declaration or Sub-District Declaration applicable to such Lot, provided, however, that the applicable Supplemental Declaration or District Declaration or Sub-District Declaration may, with the approval of Master Declarant and District Declarant, suspend or delay the payment of Assessments as set forth therein. Each Owner, by acceptance of his or her Deed, is deemed to covenant and agree to pay all

Assessments levied by the District Association, whether or not such obligation is so expressed in such Deed. Each Owner shall be deemed a direct beneficiary of the Common Expenses of the Master Association, which are made for the benefit of the entire Development, and apportionment of the District Assessment shall be payable be each Lot Owner. Notwithstanding any other provision of this Declaration, no Assessments shall be levied against Lots or other Property owned by the District Declarant, its successors or assigns.

(a) All Assessments, together with interest at the highest rate allowable under the laws of Tennessee from time to time relating to usury (or if no such rate is established, sixteen percent (16%) per annum) ("Interest"), costs, and reasonable attorneys' fees, shall be a charge on the land and shall be a continuing lien upon the Lots within the District against which each Assessment is made. Each Assessment, together with Interest, costs, and reasonable attorneys' fees, shall also be the personal obligation of the Person who was the Owner of such Lot at the time the Assessment arose, and his or her grantee shall be jointly and severally liable for such portion thereof as may be due and payable at the time of conveyance, except no first Mortgagee who obtains title to a Lot pursuant to the remedies provided in the Mortgage shall be liable for unpaid Assessments which accrued prior to such acquisition of title in excess of six (6) months accrued Assessments.

(b) Assessments shall be paid in such manner and on such dates as may be fixed by the Board. The manner of payment fixed by the Board may include, without limitation, acceleration of the Assessment levied on a particular Lot on account of delinquent payment of such Assessment or monthly installment thereof. Unless the Board otherwise provides, Annual Assessments shall be paid in quarterly installments. Without limiting the foregoing, the Board may also levy a late charge on Assessments not timely paid, in the discretion of the Board.

Section 7. Lien for Assessments. To secure the payment of any Assessment and/or fine imposed by the District Association pursuant to this Declaration (each such fine, a "Fine"), a lien is expressly retained in favor of the District Association on each and every Lot or Special Use Parcel in the District Association. Such lien shall be prior and superior to all other liens, except all taxes, bonds, assessments, first mortgage liens, liens in favor of the Master Association, and other levies which by law would be superior thereto.

Section 8. Start-up Assessment. Each Lot Owner who takes title to a Lot shall pay to the District Association at closing a start-up assessment fee in an amount established by the Board from time to time (the "Start-up Assessment"). This one time Start-up Assessment shall be in addition to and not a prepayment of the regular Assessments provided for above. The District Declarant may, by Supplemental Declaration, Sub-District Declaration, contract, or otherwise, exempt certain properties from the Start-Up Assessment, limit the payment of the Start-Up Assessment to certain transactions, or otherwise alter the general obligations set forth hereunder.

Section 9. Transfer Assessment. The Board may establish an Assessment to be paid by the purchaser of any Lot within the Property on transfer or conveyance of such Lot from time to time (the "Transfer Assessment"). The amount of such Transfer Assessment shall be established by the Board from time to time. The Transfer Assessment shall not be due on any closing of a Lot in which the Start-Up Assessment is paid. District Declarant may, by

Supplemental Declaration, Sub-District Declaration, contract, or otherwise, exempt certain properties from the Transfer Assessment, limit the payment of the Transfer Assessment to certain transactions, or otherwise alter the general obligations set forth hereunder.

Section 10. Administrative Fee. In addition to the Start-Up Assessment and Transfer Assessment, the Board may establish an administrative fee that the purchaser of any Lot within the Property shall be obligated to pay. The purpose of the Administrative Fee is to pay for the administrative expenses of the District Association or its agent resulting from the change in Lot ownership.

Section 11. Use of Assessments and Fees. The Start-Up Assessment and Transfer Assessment collections may be used as the Board of the District Association shall deem appropriate, which use may include, without limitation, operating costs of the District Association, the payment for capital improvements of the District Association, the establishment of reserves, or the establishment of a fund, account or nonprofit corporation formed for the purpose of enhancing, directly or indirectly, the District and the Owner, including the support of charitable, educational, social or beneficial organizations, causes, events or scholarships.

Section 12. Certificate of Payment. The Board shall, upon request and for a reasonable charge, furnish to any Person a certificate, signed by an officer of the District Association, setting forth whether or not all Assessments, whether General or Special, or other applicable fees or Interest, on a specified Lot or Special Use Parcel have been paid. Such certificate shall be conclusive evidence of payment of any Assessment therein stated to have been paid.

Section 13. Legal Fees for Enforcement. Any legal fees incurred in relation to the resolution of a violation enforcement action will automatically be considered an Assessment therefore will carry the same collection powers of a regular assessment.

## ARTICLE X
## CONSTRUCTION AND ARCHITECTURAL STANDARDS

Section 1. Construction Standards. Owners shall construct all Improvements on Lots in accordance with plans and specifications approved by the City of Columbia , Tennessee (the "City"). Further, no Person shall construct any Improvements upon a Lot, or after completion of such Improvements, make any modifications, additions or alterations to such Improvements, without the prior written approval of the Master Design Review Committee and District Design Committee (as defined below). In no event shall the District Design Review Committee approve any plans violating the use restrictions set forth in Article XI below, and no purported approval shall constitute a waiver of such restrictions.

Section 2. Design Review Committee. The District Declarant or Board, as applicable, shall designate a site and architectural review board (the "District Design Review Committee") consisting of up to five (5) persons, one of which may be an architect selected by District Declarant (a "Qualified Architect"), to exercise the Board's authority under this Article. The District Design Review Committee shall promulgate detailed standards and procedures in implementing the requirements of this Article, in addition to the Design Guidelines. So long as District Declarant owns any land within the District or subject to this Declaration or remains the District Declarant, the District Declarant may select the membership of the District Design

Review Committee. Thereafter, the Board shall select the membership of the District Design Review Committee. The District Design Review Committee shall also have the authority to hire such contractors or employees in support of its review and administration obligations as it may reasonably determine to be necessary or appropriate, the costs of which shall be paid by the applicants or included in Common Expenses. This Article shall be effective, and may not be amended without the prior written consent of District Declarant, so long as District Declarant owns any land subject to this Declaration or subject to annexation by this Declaration.

Section 3. Construction Subject to Review.

(a) Review of Plans. Prior to construction of any exterior improvement, the District Design Review Committee must review and approve construction plans and specifications for all Improvements on any Lot within the Property. No construction on any Lot shall begin and no Improvements on any Lot shall be modified except in accordance with an approved plan. Once a plan is approved, any modification to that plan, or any modification to the finished Improvement, must also be reviewed and approved.

(b) Common Area. Construction of any Improvement upon the Common Area (other than initial construction by the Declarant), or modification of any existing structure, as well as any material alteration of the landscaping or topography of any Common Area, must be approved in advance by the Design Review Committee.

(c) Scope. The Design Guidelines shall set standards for all aspects or improvement on any Lot visible from the outside, including without limitation the size and shape of any building, its roof, windows, doors, porches and other components, placement on the Lot, fences, drainage, paving and landscaping and all finish materials. The Design Guidelines may also regulate the type, placement and number of Improvements that may be constructed on a Lot and the uses to which those Lots may be put. Review shall include materials and color selection and selection and placement of any ornamentation or functional accessories, including but not limited to the following:

(i) Materials and color selection for the main building and any outbuilding (including roof, doors, windows and trim);

(ii) Driveways, walks, patios and other ground surface materials;

(iii) Parking areas and drive through lanes;

(iv) Outdoor eating areas;

(v) Lighting;

(vi) Signage of any type;

(vii) Antennas, satellite dishes or receivers, solar panels or other devices that are visible from outside the Lot;

(viii) Fountains, swimming pools, or other water features;

(ix) Privacy walls or other fences and gates;

(x) Awnings, flower boxes, shelves, statues, or other outdoor ornamentations, and window coverings visible through the window;

(xi) Construction trailers or other trailers, temporary structures, tents, shacks, and sheds;

(xii) Grills or fire pits; and

(xiii) Permanent or semi-permanent play equipment, whether or not secured, such as tree houses, trampolines, basketball hoops, skateboard ramps and swing sets.

The listing of a category does not imply that such construction is permitted.

(d) Exception. Interior construction and modifications not affecting the external structure or appearance of any building and not visible from the exterior are not subject to review. However, construction drawings are required as part of the review process to assist in interpreting the design.

(e) Trees. Owners may be required to plant street trees on their Lot or within Common Area or public rights-of-way adjacent to their Lot, in accordance with the direction of the District Design Review Committee, to maintain trees and to replace trees that die or that become damaged or diseased, or the District Association may elect to take such actions for the benefit of Owners, the cost of which will be part of the Common Expenses. The cutting, removal or intentional damage of new or existing trees (including neglect, excessive pruning or failure to use due care with equipment or when removing other trees permitted to be removed) shall be prohibited and subject to enforcement under this Declaration. The District Design Review Committee may require the relocation and replanting of trees that must be removed for construction. If particularly significant trees are found within a Lot, the District Design Review Committee shall determine whether the placement of the building should be altered to accommodate the trees, or whether the trees may be removed. If trees or other growth block sidewalks or other areas, the Owner may be required to prune, trim or remove such growth. The Master Association may also take action to keep sidewalks and other areas clear, including pruning, trimming and removal of limbs on trees within a Lot, and may enter any Lot for such purpose.

(f) Drainage. All plans shall comply with and Owners shall be solely responsible for applicable drainage, water conservation, erosion control and stormwater detention requirements. No alteration of existing grade or any planting, fences or other improvements that alter the flow of water shall be permitted without the express consent of the District Design Review Committee, which approval shall be for the exclusive benefit of the Declarant or District Association, as applicable, and shall not remove or alter the responsibility of any Owner or builder for compliance with such requirements. Notwithstanding any other provision of this Declaration, neither District Declarant nor the District Association shall have the responsibility to ensure that drainage or grading of Lots is properly accomplished. Each Owner shall be solely responsible to ensure that grading and drainage are in compliance with all applicable

laws, codes, regulations and other requirements, including without limitation any easements for drainage, whether or not shown on any recorded plat and must provide a as-built drawing of finished grading and drainage to ensure these items are in compliance. The Homeowner will be charged in the event they do not provide the approved as-builts to the Committee, and any costs to the developer to fix any grading or drainage that were not caused by the developer.

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(h) Modifications. Modifications after completion of construction, or additions or changes to the approved plans during construction, must be reviewed and approved. However, review is not required to paint with originally approved materials and colors, or to replace the roof or other components with duplicates of the original material. Significant new landscaping, grading and any removal of trees or plants must be approved in advance.

Section 4. Review Procedure.

(a) Application. The plans to be submitted for approval shall include (i) the construction plans and specifications, including all materials and colors, (ii) elevations of all proposed improvements (iii) proposed clearing, grading and landscaping, and (iv) all other items required by the District Design Review Committee. Plans and specifications for review shall be submitted in the form required by the District Design Review Committee.

(b) Uniform Procedures. The District Design Review Committee may establish forms and procedures for the review of applications, including review costs and fees, if any, to be paid by the applicant, which may include costs for the Qualified Architect. The District Design Review Committee may provide lists of approved materials and may allow for staff review and approval of routine or minor matters.

(c) Basis for Decision. Applications shall be approved or denied based upon overall quality of design, including purely aesthetic considerations at the discretion of the District Design Review Committee. If the District Design Review Committee rejects an application due to overall design quality or aesthetic considerations, despite compliance with the Design Guidelines, the District Design Review Committee may make suggestions for improving the design.

(d) Variances. The District Design Review Committee may grant approvals notwithstanding normal guidelines based on existing topographical or landscape conditions, existing trees, or architectural merit. Any such variance must be in writing. Approval of a variance does not constitute a precedent for other applications, and such requests may be arbitrarily denied. Notwithstanding the foregoing, the District Design Review Committee shall not have the right to waive any guidelines imposed by the Master Design Review Committee, the Master Declaration, or other requirement established by Master Declarant or the Master Association without their prior written consent.

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(e) Notification; Construction; Inspection. The District Design Review Committee shall make best efforts to notify the applicant of its decision within the time allowances set out in its design approval process guidelines. However, a delay in reviewing an application shall not be deemed consent to construction. If approval is given, construction of the Improvements may begin. All construction must comply with the submitted plans. The District Design Review Committee or its agent may inspect the property during construction but has no obligation to make any such inspection. Any inspection made by the District Design Review Committee is made for the benefit of the District Design Review Committee or District Declarant, and is not made for the benefit of or to be relied upon by any third party or Owner.

(f) Completion. When the primary building and landscaping are completed in substantial compliance with the approved plans and specifications, the District Design Review Committee may on request issue a Certificate of Substantial Conformance. The Certificate shall describe any areas of deficiency that need to be corrected. All Fines and other enforcement shall be waived so long as the deficiencies are corrected within sixty (60) days. Upon correction of all deficiencies, the District Design Review Committee shall issue a Certificate of Completion and Release in recordable form. If no Certificate of Substantial Conformance is requested, the District Design Review Committee shall not be estopped from later determining that a deficiency needs correction, and reserves all rights of Fines and enforcement.

(g) Governmental Compliance. Owners are responsible for making sure that construction conforms to governmental regulations and all local building codes. If the District Design Review Committee notes noncompliance, the Owner will be required to make the necessary changes. However, the District Design Review Committee is not responsible for compliance with governmental requirements.

Section 5. Approval of Architects, Builders. District Declarant shall have the right to approve any and all architects or builders in all or any portion of the District, in its sole discretion. District Declarant's approval of an architect, builder or other design professional shall not constitute any representation or endorsement of such professional's character, experience or professional capabilities.

Section 6. Enforcement.

(a) Fines. The District Design Review Committee may require the Builder or Owner to post a deposit from which the District Design Review Committee may deduct Fines for failure to comply with the approved plans and specifications, tree regulations and rules for builder conduct. The collection of a Fine shall not in any way diminish the available remedies at law or equity.

(b) Suit Permitted. If any construction is begun that has not been approved or that deviates from approved plans and specifications, the District Design Review Committee, District Declarant or the District Association may require the Owner to resolve the dispute through binding arbitration or may bring suit seeking damages, specific performance, declaratory decree and/or injunction, or any other remedy at law or in equity. The Board shall be empowered to bring suits on behalf of the District Association. If suit is brought and the court finds that the construction was not

approved or that the construction deviated from the approved plans or specifications, then the party bringing suit shall also be awarded reasonable attorney's fees, even if the relief requested is not granted.

(c) Trees and Hedges. Improper cutting, removal, lack of care or intentional damage to existing trees and hedges may be subject to the imposition of Fines plus a requirement that the tree be replaced with an approved species of comparable caliper, or, if approved by the District Design Review Committee, a combination of trees totaling the caliper of the removed tree, or that hedges be replaced with an approved hedge plant. Fines shall be set by the District Design Review Committee.

(d) Drainage. After reasonable notice (except in an emergency), District Declarant or the District Association shall have the right but not the obligation to enter onto a Lot and correct improper grading or other modification to the Lot which causes drainage problems. Such corrections shall be made at the cost and expense of the Owner of the Lot, who shall promptly reimburse District Declarant or the District Association, as applicable. The Lot shall be subject to a lien for the cost if not paid. District Declarant or the District Association, as applicable, shall not be required to repair or replace landscaping or other improvements after such action.

(e) No Waiver. Failure to enforce any provision of this Declaration shall not be deemed a waiver of the right to do so at any time thereafter.

Section 7. Liability. District Declarant and District Design Review Committee and its inspectors are concerned primarily with aesthetic considerations, and are not responsible for compliance with governmental requirements or design or construction defects or use of materials affecting the safety or structural integrity of the building. Approval by the District Design Review Committee of an application shall not constitute a basis for any liability of the Qualified Architect, District Declarant, members of the District Design Review Committee, the Directors of the Board or the District Association for failure of the plans to conform to any applicable building codes or inadequacy or deficiency in the plans resulting in defects in the improvements, or for the performance or quality of work of any builder or architect approved by it, or for non-compatible or unstable soil conditions or soil erosion, or any other condition of the property.

## ARTICLE XI
## USE RESTRICTIONS

Section 1. Use Restrictions. In addition to all other covenants contained herein, the use of the Property is subject to the following; provided, however, that if any Supplemental Declaration or Sub-District Declaration expressly permits uses or matters that would otherwise be prohibited, with the express consent of District Declarant, then such Supplemental Declaration or Sub-District Declaration shall control over this Declaration for purposes of this Article XI:

(a) Maintenance of Exterior and Interior. Except as provided in this District Declaration or any Supplemental Declaration, each Owner shall be responsible for the maintenance of, and shall maintain, the exterior and interior of its Lot and any Improvements in a clean, sanitary, and attractive condition, and shall (1) keep its Lot free from rubbish, litter, and noxious weeds; (2) maintain, cultivate, and keep in good

condition and repair shrubs, trees, grass, lawns, plantings, and other landscaping located, or from time to time placed, within the bounds of its Lot; and (3) replace dead plants, shrubs, trees, grass, or landscaping of the same or similar type. If any irrigation system is in place on any Lot, the Master Association may require that the Owner maintain such irrigation system and keep such system in use to the extent required to keep a maintain healthy landscaping.

(b) Association to Landscape Common Area. Except as otherwise provided herein, the District Association shall have the right and the obligation at any time to plant, replace, maintain, and cultivate shrubs, trees, grass, plantings, and other landscaping upon the Common Maintenance Area located on the Property. No Owner shall remove, alter, or injure in any way any shrubs, trees, grass, plants or other landscaping placed upon or about a Lot by District Declarant or the District Association, without first obtaining the written consent of the Board.

(c) Signs and Billboards; Exterior Lights. No sign or billboard of any kind shall be displayed to the public view on any portion of the Common Area, except for (1) directional or informational signs, established by District Declarant or the District Association, (2) signs used by District Declarant, or by its successors or assigns, to advertise the Property, provided such signs are located on the Common Area, and (3) signs permitted under any Supplemental Declaration or Sub-District Declaration, provided that the Board may establish or require a common signage system for such purposes and such system shall prevail over the general provisions of this subsection.

(d) Quiet Enjoyment. No noxious, offensive or illegal activity shall be carried on, in or upon any Lot or any part of the Property, nor shall anything be done thereon that may be or may become an annoyance or nuisance to the neighborhood, that shall interfere in any way with any Owner's quiet enjoyment of its respective Lot, or that shall increase the rate of insurance in any way.

(e) Temporary Structures. No structure of a temporary character or other out-building shall be used on any Lot or the Common Area at any time as a residence or otherwise, either temporarily or permanently. Notwithstanding the foregoing, District Declarant or its agents shall have the right to conduct any business necessary for the sale of Lots, including showing model Lots and maintaining a sales and/or construction office on the Common Area or in any Lot owned by Declarant. In furtherance thereof Declarant shall have an easement over all of the Common Area for ingress, egress and parking for itself, its agents, employees, and prospective buyers of Lots for so long as District Declarant or any subsidiary or affiliated company owns any interest in the Property, and District Declarant may block or restrict access over and across roadways so long as access to a particular Lot owned by a Person other than District Declarant is not prohibited.

(f) Animals. No animals, reptiles, rodents, livestock, birds, or poultry of any kind shall be raised, bred or kept in or on any Lots, other than bona fide service animals or household pets. No household pets shall be kept outside the dwelling or housing unit, and any outside activity shall be under the active control I.E. leashed, of the Owner or one acting on the Owner's behalf. Without limiting the foregoing, animals who repeatedly bark, are aggressive, or other create a negative impact on other Owners

or other persons may be subject to further restrictions and, in the discretion of the Board, removed from the Development. No animal may be kept in a manner that, in the sole determination of the Board, is unhealthy or cruel for such animal, including without limitation keeping animals tied up or tethered for extended periods of time. In making any determination of cruelty or unhealthy conditions, the Board shall have the right but not the obligation to consult governmental or private animal control or shelter organizations. The Board may permit variances to the restrictions set forth in this subsection in the Board's sole discretion. The Board may establish further rules and regulations for control of animals and household pets, and may impose Fines for violations of the foregoing or additional rules and regulations in addition to requiring removal of animals from the Development.

(g) Vehicles. No truck, trailer, camper, boat, van or similar equipment or disabled vehicle shall be permitted to remain upon or within the Common Area or public streets unless on a space designated for such use by the District Association. No such equipment may be stored or permitted to remain upon a Lot or any portion of the Common Area or public streets for more than forty-eight (48) hours unless stored in an enclosed garage.

(h) Exterior Structures. No fences, ornamental screens, awnings, screen doors, sunshades except as approved by or under general rules adopted by the District Design Review Committee.

(i) Garbage Collection. All rubbish, trash, and garbage shall be removed from the Property regularly and shall not be allowed to accumulate thereon. All refuse containers, clothes lines, woodpiles, storage areas, machinery, or equipment shall be kept in such a manner as not to be visible from neighboring property or contiguous streets. No incinerators shall be kept or maintained on any Lot. Refuse containers shall not be placed outside for trash pickup prior to 6:00 p.m. on the day prior to such pickup, and shall be returned to non-visible areas no later than the end of the day on which pickup is made. No debris, trash, ashes, lawn clippings, leaves, leaf bags or other refuse may be thrown or dumped on any of the Lots or Common Area. Debris and trash during the construction of an Owner's Improvements shall be collected by each Owner (or his or her representative) in containers approved by the District Design Review Committee and periodically removed so that no unsightly condition occurs on the Lot or adjoining Lots.

(j) Taxes and Utilities. Each Owner shall pay any real and personal property taxes or charges assessed against their respective Lot and Improvements and the utility charges for said Improvements.

(k) Infections, Plant Diseases or Insects. No Owner shall permit anything or condition to exist upon any portion of such Owner's Lot that shall induce, breed, or harbor infections, plant diseases, vermin or noxious insects.

(l) Reasonable Inspection and Entry. The Board shall have the right of inspection and entry onto Lots in order to perform the duties and obligations of the Board under this Declaration and under the Bylaws. In addition, District Declarant, the District Association, and their designees shall have the right to enter upon a Lot for the

purpose of cutting grass, hedges and shrubbery and providing maintenance agreed upon with the Owner thereof.

(m) Trade or Business. No gainful profession, occupation, trade or other nonresidential use shall be conducted in any Lot designated for residential purposes or upon the District Common Area or any portion thereof without the prior approval of the Board. Special Use Parcels or areas in which a mix of business and residential purposes are appropriate shall be governed by the provisions of any Supplemental Declaration or Sub-District Declaration covering such portions of the Development. The Board may disapprove such a trade or business in the event that it determines that the trade or business would have a negative impact on the Property, including, without limitation, creating problems related to traffic, parking or security. In determining whether to approve a trade or business conducted in a residential Lot, the Board shall be provided with detailed information on (i) the type of trade or business and (ii) the activities related thereto that could potentially affect the Property. In the event that the Board approves a certain trade or business (the "Approved Use"), then so long as the activities related to that Approved Use do not materially change from the activities described to and approved by the Board, the Board (whether or not the composition of the Board changes) shall not have the right to disapprove the Approved Use after the date of the original approval, subject to subparagraph (s) below. Notwithstanding the foregoing, an Owner or occupant residing in a unit within the Development may conduct business activities within the unit so long as: (a) the existence or operation of the business activity is not apparent or detectable by sight, sound, signage or smell from outside the Unit; (b) the business activity conforms to all applicable zoning, law, statute or ordinance requirements; (c) the business activity does not involve persons coming onto the Development who do not reside in the Development or door-to-door solicitation of residents of the Development; and (d) the business activity is consistent with the residential character of the Property and does not constitute a nuisance, or a hazardous or offensive use, or threaten the security or safety of other residents of the Development, as may be determined in the sole discretion of the Board. The terms "business" and "trade", as used in this provision, shall be construed to have their ordinary, generally accepted meanings, and shall include, without limitation, any occupation, work or activity undertaken on an ongoing basis which involves the provision of goods or services to persons other than the provider's family and for which the provider receives a fee, compensation, or other form of consideration, regardless of whether: (i) such activity is engaged in full or part-time; (ii) such activity is intended to or does generate a profit; or (iii) a license is required therefor.

(n) Compliance with Law. The District Association and each Owner shall comply promptly with all laws, statutes, ordinances, rules and regulations of federal, state or municipal governments or authorities applicable to use, occupancy, construction and maintenance of any Improvements upon the Lots, including without limitation any zoning or other approvals or restrictions.

(o) Damage from Plants. No Owner shall permit any plant, tree, shrubbery or other similar item to exist upon any portion of such Owner's Lot that shall damage or create a nuisance on another Lot or that has not been approved by the District Design Review Committee. The Board shall determine conclusively, in its sole and absolute

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discretion, whether, for the purpose of this paragraph, a particular plant, tree, shrubbery, or other similar item is a nuisance and therefore to be removed from the Property.

(p) Wells. No private wells may be drilled or maintained on any Lot without the prior written consent of the District Design Review Committee.

(q) Laundry. Without the express permission of the District Design Review Committee, no Owner, guest, or tenant, shall hang laundry from any area within or outside the Improvements on a Lot if such laundry is within the public view, or hang laundry in full public view to dry, such as on balcony or terrace railings.

(r) Firearms and Other Weapons. Discharge of firearms and other weapons is prohibited; provided, the Board shall have no obligation to take action to prevent or stop such discharge; provided, further, however, that nothing in this provision shall be deemed to prevent the Declarant or Board, or the Declarant or Board of any Sub-Association, with the consent of Declarant or Board, from establishing or permitting facilities, Lots, or other areas where such activities may be permitted, whether on a private or retail basis. For this purpose, firearms and weapons shall be deemed to include any instrument that may or is designed to propel or discharge bullets, arrows, or other objects by use of explosive force, compressed air, elastic contraction or other means, including without limitation handguns, rifles, shotguns, pellet guns, BB guns, cross-bows, and long or compound bows. This definition shall be broadly construed, and the Declarant and Board of Directors shall have discretion to determine whether a particular object or instrument is a firearm or weapon in its sole discretion.

(s) Restriction on Rentals. No Living Unit shall be rented to a non-Owner except with the prior written consent of the Association.

(i) If an Owner shall desire to rent its Living Unit to a third-party, the Owner shall be required to submit to the Association all of the following, in form and content satisfactory to the Association:

(1) An application for rental providing, among other things, the identity of the Living Unit, the name of the proposed tenant and occupants, the proposed term of the rental, and contact information for the Owner while not occupying the Living Unit.

(2) A copy of a qualifying lease. For purposes of this section, a qualifying lease is one that is for a term not less than twelve (12) months and that expressly advises tenant that the Living Unit is subject to the Declaration and that the tenant is responsible for compliance with the Declaration and all other rules and regulations adopted by the Association from time to time.

(3) A copy of a background check on the prospective tenant and all occupants of the Living Unit provided with the written consent of the prospective tenant and that indicates no prior criminal

convictions or any sex offender status or other matter reasonably objected to by the Association.

(4) Any fee charged by the Association for review of the application and other material.

(5) Upon approval, a copy of the executed tenant lease.

(ii) A failure to procure approval prior to leasing a Living Unit shall constitute a violation of the Declaration and, among other things, the Association shall be entitled to injunctive relief against such Owner and the tenant, the Owner acknowledging that legal remedies may not be adequate. The Owner shall be subject to all expenses of the Association resulting from any such violation, including without limitation reasonable attorney fees and other costs of enforcement.

(iii) The Board shall have the power to waive the foregoing restrictions and to reduce the minimum lease term for good cause shown, in the sole discretion of the Board.

(iv) Notwithstanding the foregoing, no Owner shall lease, license for occupancy, or otherwise permit a non-Owner to remain in a Living Unit for a period of less than thirty (30) days if consideration is given for such stay or if such occupancy is advertised by any medium, including without limitation short term rentals.

Section 2. Age Restriction. The District is intended to provide housing primarily for persons 55 years of age or older, subject to the rights reserved to District Declarant as may otherwise be provided herein. The District shall be operated as an age restricted community in compliance with all applicable state and federal laws. No person under 19 years of age shall stay overnight in the improvements on any Lot for more than ninety (90) days in any consecutive twelve (12) month period unless approved by the Board for special consideration. Each Lot, if occupied, shall be occupied by at least one (1) individual 55 years of age or older; provided, however, that once a Lot is occupied by an Age-Qualified Occupant, other Qualified Residents of that Lot may continue to occupy the Lot, regardless of the termination of the Age-Qualified Occupant's occupancy. Notwithstanding the above, at all times, at least eighty percent (80%) of the Lots within the District shall be occupied by at least one (1) individual 55 years of age or older. The Board shall establish policies and procedures from time to time as necessary to monitor and maintain its status as an age restricted community under state or federal law. The Association shall provide, or contract for the provision of those facilities and services designed to meet the physical and social needs of older persons as may be required under such laws. The provisions of this Section may be enforced by the Association by an action in law or in equity, including, without limitation, an injunction requiring specific performance hereunder.

Section 3. Additional Restrictions. The Board of Directors shall be entitled to invoke additional rules and regulations from time to time for the operation, use and maintenance of the Property located within its jurisdiction, including the Lots and the Common Area, provided such rules and regulations are not inconsistent with this Declaration.

## ARTICLE XII
## GENERAL PROVISIONS

Section 1. Term. The covenants and restrictions of this Declaration shall run with and bind the Property, and shall inure to the benefit of and shall be enforceable by the District Association or the Owner of any of the Property subject to this Declaration, their respective legal representatives, heirs, successors and assigns, for a term of thirty (30) years from the date this Declaration is recorded. After the initial thirty (30) year term has expired, the term of this Declaration shall be automatically extended for successive periods of ten (10) years, unless an instrument in writing, signed by sixty-seven percent (67%) of the then Owners, has been recorded within the year preceding the beginning of each successive ten-year period, agreeing to change said covenants and restrictions, in whole or in part, or to terminate the same.

Section 2. Amendment. This Declaration may be amended by a sixty-seven percent (67%) affirmative vote of the Owners present, in person or by proxy, at any duly called meeting, and the written approval of the Master Declarant and District Declarant during the respective Declarant Control Period. During the Declarant Control Period, District Declarant may unilaterally amend this Declaration for any purpose. Any amendment shall not become effective until recorded in the Office of the Register's Office for Maury County, Tennessee. No amendment may remove, revoke, or modify any right or privilege of District Declarant without the written consent of District Declarant or the assignee of such right or privilege. After the Declarant Control Period, the Declarant may unilaterally amend this Declaration so long as such amendment is designed to comply with any law, regulation or provision of the Federal Home Loan Mortgage Corporation or Federal National Mortgage Association.

Section 3. Indemnification. The District Association shall indemnify its officers and directors against any and all expenses and liabilities, including attorney fees, reasonably incurred by or imposed upon any officer or director in connection with any action, suit, or other controversy or proceeding (including settlement of any suit or proceeding, if approved by the then Board of Directors) to which he or she may be a party, or may become involved, by reason of being or having been an officer or director of the District Association. The officers and directors shall not be liable for any mistake of judgment, negligent or otherwise, except for their own individual willful misfeasance, malfeasance, misconduct or bad faith. The officers and directors shall have no personal liability with respect to any contract or other commitment made by them, in good faith, on behalf of the District Association (except to the extent that such officers or directors may also be Members of the District Association), and the District Association shall indemnify and forever hold each such officer and director free and harmless against any and all liability to others on account of any such contract or commitment. Any right to indemnification provided for herein shall not be exclusive of any other rights to which any officer or director, or former officer or director, may be entitled. The District Association shall, as a common expense, maintain adequate general liability and officers' and directors' liability insurance to fund this obligation, if such insurance is reasonably available.

Section 4. Delegation of Use. Any Owner may delegate, in accordance with the Articles of Organization of the District Association and this Declaration, his or her right of enjoyment to the Common Area and facilities to customers, the members of his or her family, tenants and social invitees, subject to such rules and regulations as the Board of Directors may adopt.

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Section 5. Construction and Sale by District Declarant. Notwithstanding any provisions contained in this Declaration to the contrary, so long as construction and initial sale of Lots or Improvements shall continue, it shall be expressly permissible for District Declarant to construct, maintain and carry on upon portions of the Property, other than Lots owned by persons other than District Declarant, such facilities and activities as, in the sole opinion of District Declarant, may be reasonably required, convenient, or incidental to the construction or sale of such Lots, including, but not limited to, business offices, signs, utilities, model units, and sales offices, and District Declarant and its invitees shall have an easement for access to such facilities. District Declarant may further delegate all or some of the privileges set forth in this Section 8 to any Person in the sole discretion of District Declarant. This Section may not be amended without the express written consent of District Declarant.

Section 6. Severability. Invalidation of any one of these covenants or restrictions by judgment or court order shall in no way affect any other provisions, which shall remain in full force and effect. Each covenant and restrictions shall be enforced to the fullest extent permitted by law.

Section 7. Enforcement. The District Association, or any Owner, shall have the right to enforce, by any proceeding at law or in equity, all restrictions, conditions, covenants, reservations, liens and charges now or hereafter imposed by the provisions of this Declaration. Failure by the District Association or by any Owner to enforce any covenant or restriction herein contained shall in no event be deemed a waiver of the right to do so thereafter. Without limiting the foregoing, the District Association shall have the authority to enforce the restrictions, conditions, covenants and rules and regulations now or hereafter adopted pursuant to this Declaration by the imposition of Fines on Owners, which shall be established by the Board of Directors in its discretion, and enforced and collected as a Special Assessment pursuant to the Declaration. The Board of Directors may establish notice, hearing and other procedures from time to time in conjunction with the use and levying of Fines.

Section 8. Use of the Words "_____". No Person shall use the words "_____ _____" or "_____ at Columbia Bluffs" or any derivative thereof in any printed or promotional material without the prior written consent of District Declarant and Master Declarant.

Section 9. Disclosures. Each Owner acknowledges the following:

(a) The Property is located adjacent to thoroughfares that may be affected by traffic and noise from time to time and may be improved and/or widened in the future.

(b) The views from an Owner's Lot may change over time due to, among other circumstances, additional development and the removal or addition of landscaping.

(c) No representations are made regarding the zoning of adjacent property, or that the category to which adjacent property is zoned may not change in the future.

(d) No representations are made regarding the schools that currently or may in the future serve the Development or any Lot.

(e) Since in every neighborhood, there are conditions that different people may find objectionable, it is acknowledged that there may be conditions outside of the Property that an Owner may find objectionable and that it shall be the sole responsibility of the Owners to become acquainted with neighborhood conditions that could affect a Lot.

(f) All Owners acknowledge and understand that District Declarant and builders or developers will be constructing/renovating portions of the District and engaging in other construction activities related to the construction of Common Area and improvement of Lots. Such construction activities may, from time to time, produce certain conditions within the District, including, without limitation: noise or sound that is objectionable because of its volume, duration, frequency or shrillness; smoke; noxious, toxic, or corrosive fumes or gases; obnoxious odors; dust, dirt or flying ash; unusual fire or explosion hazards; temporary interruption of utilities; and/or other conditions that may threaten the security or safety of persons within the District. Notwithstanding the foregoing, all Owners agree that such conditions within the District resulting from renovation and construction activities shall not be deemed a nuisance and shall not cause District Declarant and its agents to be deemed in violation of any provision of this Declaration.

## ARTICLE XIII
## DECLARANT'S RIGHTS

Section 1. Withdrawal or Addition of Property. District Declarant reserves the right to amend this Declaration, for the purpose of removing any portion of the Property or to add additional property to be subject to this Declaration by Supplemental Declaration. Such amendment shall not require the consent of any Person other than the Owner(s) of the property to be withdrawn, if not the District Declarant. If the property is Common Area, the District Association shall consent to such withdrawal. The inclusion of real property in the term "District" shall not be deemed to obligate Declarant to acquire such real property or to include such property within the Property or the Development except in the sole discretion of Declarant.

Section 2. Marketing and Sales Activities. District Declarant and Persons authorized by District Declarant may construct and maintain upon portions of the District and the Common Area such facilities and activities as, in District Declarant's sole opinion, may be reasonably required, convenient, or incidental to the construction or sale of Lots, including, but not limited to, business offices, signs, model units, and sales offices. District Declarant and authorized Persons shall have easements for access to and use of such facilities at no charge.

Section 3. Right to Approve Changes in District Design Standards. No amendment to or modification of any restrictions and rules or architectural guidelines shall be effective without prior notice to and the written approval of District Declarant so long as District Declarant owns property subject to this Declaration or which may become subject to this Declaration in accordance with this Article.

Section 4. Provision of Telecommunication Services. District Declarant shall have the right to enter into an agreement with one or more authorized providers of Telecommunication Services pursuant to which such providers may have the exclusive right to provide

Telecommunication Services to all or a particular portion or portions of the District, subject to approval by Master Declarant.

Section 5. Right to Use of Amenity Center. District Declarant shall have the right to use any amenity center within the Development without cost at any time and to permit other parties, including without limitation builders or industry groups, the same privilege of usage at no cost.

Section 6. Right to Transfer or Assign District Declarant Rights. Any or all of District Declarant's special rights and obligations set forth in this Declaration may be transferred in whole or in part to other Persons. No such transfer or assignment shall be effective unless it is in a written instrument executed by District Declarant and recorded in the Office of the Judge of Probate. The foregoing sentence shall not preclude District Declarant from permitting other Persons to exercise any right reserved to District Declarant in this Declaration as an agent, employee or contractor of District Declarant where District Declarant does not intend to transfer such right in its entirety, and in such case it shall not be necessary to record any written assignment unless necessary to evidence District Declarant's consent to such exercise. In the event District Declarant ceases to act as District Declarant and abandons its role as District Declarant after the end of the Declarant Control Period, then the District Association shall have and may exercise all rights of District Declarant without the necessity of a written assignment by District Declarant.

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IN WITNESS WHEREOF, the undersigned Declarant has executed this Declaration effective as of the date first set forth above.

**DECLARANT:**

_____

By:_____

Print Name:_____

Title:_____

STATE OF TENNESSEE

COUNTY OF _____

Before me, the undersigned, a Notary Public in and for the State and County aforesaid, personally appeared _____ with whom I am personally acquainted, (or proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged that (s)he executed the within instrument for the purposes therein contained, and who further acknowledged that (s)he is the _____ of _____, a _____, and that (s)he as such _____executed the foregoing instrument for the purpose therein contained, being authorized so to do, to execute this instrument on behalf of _____, by signing the name of _____ , as _____.

Witness my hand, at office, this _____day of _____, 20___.

Notary Public_____

My commission expires:_____

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**EXHIBIT A**
**PROPERTY DESCRIPTION**

TO BE INSERTED UPON FORMATION OF ASSOCIATION

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**EXHIBIT B**
**CHARTER OF DISTRICT ASSOCIATION**

TO BE INSERTED UPON FORMATION OF ASSOCIATION

**EXHIBIT C**
**BY-LAWS OF DISTRICT ASSOCIATION**

TO BE INSERTED UPON FORMATION OF ASSOCIATION

This Instrument Was Prepared by:
J. Bryan Echols
Thompson Burton PLLC
6100 Tower Circle, Suite 200
Franklin, Tennessee 37067

# DISTRICT DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS FOR ***PRIMARY NEIGHBORHOOD*** AT COLUMBIA BLUFFS

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DISTRICT DECLARATION OF COVENANTS,
CONDITIONS, AND RESTRICTIONS FOR
THE PRIMARY NEIGHBORHOOD DISTRICT AT COLUMBIA BLUFFS

This DISTRICT DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS (this "Declaration") is made effective as of _____, 2023, by _____, _____ ("District Declarant").

**W I T N E S E T H:**

WHEREAS, District Declarant is the owner of the real property located in the Columbia, Maury County, Tennessee, described in Exhibit A attached hereto and incorporated herein by reference (the "Property"). The Property, and additional real property now or hereafter subjected to this Declaration, is intended to be developed pursuant to a master plan as a multi-use community including residential properties including multi-family and single-family products encompassing all or portions of the Property (the "District"), to be known as "**CBPR HOA" _____**, and is a part of the Development known as Columbia Bluffs, with various open spaces, common facilities, and Common Area for the benefit of said community; and

WHEREAS, District Declarant desires to provide a flexible and ordered procedure for the overall development of the Property and the District and to establish a method for the administration, maintenance, preservation, use and enjoyment of such portions of the District as are now or may hereafter be submitted to this Declaration; and

WHEREAS, District Declarant intends by this Declaration to impose upon the District mutually beneficial restrictions under a general plan of improvements for the benefit of all owners and/or occupants of property within the Property and all persons or entities having any interest in the Property, by the recording of this Declaration; and

WHEREAS, District Declarant intends that the Property will be developed in phases and that individual phases may be subjected to one or more declarations of restrictive covenants; and

WHEREAS, District Declarant desires that the Property be held, sold and conveyed subject to the provisions of this Declaration.

NOW, THEREFORE, District Declarant hereby declares that all of the Property and any additional property as may by Supplemental Declaration be added to the Property and subjected to this Declaration shall be held, sold, and conveyed subject to the following easements, restrictions, covenants and conditions. Such easements, restrictions, covenants and conditions are for the purpose of protecting the value and desirability of the Property, and shall run with the real property submitted to this Declaration. They shall be binding on all parties having any right, title, or interest in the Property, or any part thereof, their heirs, successors, successors in title, and assigns, and shall inure to the benefit of each owner thereof.

## ARTICLE I
## DEFINITIONS

Section 1. "Amenity Center" means any clubhouses or centers within the Development, in each case to be a portion of the Common Area, designed to provide, among

other things, meeting space, recreational facilities, swimming pools, playgrounds or other amenities to serve the residents within the Development, and may also include offices for the Association manager, Declarant or other persons.

Section 2. "Assessments" shall mean assessments for Common Expenses provided for herein or by any amendment hereto, which shall be used for the purposes of promoting the recreation, health, safety, welfare, common benefit, and enjoyment of the Owners and occupants of all or any portion of the District and of maintaining the District, all as may be specifically authorized from time to time by the Board of Directors and as more specifically authorized below. The term "Assessments" shall include, without limitation, General Assessments, Special Assessments, Common Maintenance Parcel Assessments, and Special Use Assessments, and any other assessments now or hereafter established under this Declaration.

Section 3. Articles of Organization" shall mean the Articles of Organization of the District Association, to be recorded in the Office of the Judge of Probate for Maury County, Tennessee, as may be amended from time to time.

Section 4. "Board of Directors" or "Board" shall be the body responsible for managing the affairs of the District Association. Actions required of or permitted by the Board herein may be taken or fulfilled by a committee or other designee as may be established or appointed by the Board in accordance with the Bylaws of the District Association.

Section 5. "Common Area" shall mean those portions of the Property and any improvements thereto, and components thereof and easements appurtenant thereto, now or hereafter owned by the District Association or designated on any development plan or plat for future use for the common use and enjoyment of the Owners, including, but not limited to, any common open space as set forth on a final development plan, the Common Area shown on any recorded plat of the Property and any and all pedestrian bridges, roadways, alley ways, parking areas, lakes, waterways, landscaping and irrigation systems, fences, structures, sidewalks, community signage, walls, monuments, illumination of Common Area, common utilities, storm water system, wells, fountains, amenity center and other improvements located on such Common Area, but excluding any Master Common Area and such areas that are intended to be or now or hereafter designated as a common area serving only a particular portion of the District or to be conveyed to a Sub-District Association. District Declarant shall hereafter convey the Common Area or portions thereof to the District Association, or Sub-District Association, as applicable, and the District Association or Sub-District Association shall accept such conveyance.

Section 6. "Common Elements" shall include all Common Maintenance Areas and all facilities, utilities and other improvements found or located in Common Maintenance Areas, but excluding any Common Maintenance Areas that are within the authority or responsibility of the Master Association.

Section 7. "Common Expenses" shall mean and include the actual and estimated expenses of operating the District Association and maintaining the Common Elements, including any reasonable reserves therefor, all as may be found to be necessary and appropriate by the Board pursuant to this Declaration and the Articles of Organization of the District Association, and including without limitation any District Assessment imposed by the Master Association.

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Section 8. "Common Maintenance Area" shall mean the Common Area and any portion of the Property for which the District Association has assumed or has been designated as the responsible party for maintenance obligations or otherwise designated by this Declaration or any Supplemental Declaration or a Sub-District Declaration as a Common Maintenance Parcel.

Section 9. "Common Maintenance Parcel Assessments" are Assessments to which Common Maintenance Parcels are subjected, in addition to any General Assessments.

Section 10. "Common Maintenance Parcel" shall mean any Lot designated by this Declaration or any Supplemental Declaration as a Common Maintenance Parcel, but excluding any Common Maintenance Parcels that are within the authority or responsibility of the Master Association or within the authority or responsibility of a Sub-District Association.

Section 11. "Community-Wide Standard" shall mean the standard of conduct, maintenance, or other activity generally prevailing in the Development as established in the reasonable discretion of the Master Declarant, District Declarant or the applicable Board of Directors.

Section 12. "District Association" shall mean **Columbia Bluffs Primary Residential** Owners Association, a Tennessee nonprofit corporation, its successors and assigns.

Section 13. "District Declarant" means _____, a _____ limited liability company, its successors and assigns.

Section 14. "Declarant Control Period" means the period ending on the earlier to occur of: (i) the date that the District Declarant voluntarily relinquishes control of the Association; and (ii) when homes have been completed on eighty (80%) of the lots within the District and such lots have been conveyed to third party residential owners.

Section 15. "Development" means the Residential to be developed on real property that includes, among other areas, the District, to be known as Town Columbia, and shall be deemed to include the real property described in the Master Declaration, as may be modified, amended, expanded or contracted from time to time.

Section 16. "District" shall have the meaning given in the premises of this Declaration.

Section 17. "District Assessment" means the Assessment to be paid by the District to the Master Association as set forth in the Master Declaration or Supplemental Declaration.

Section 18. "District Representative" means the Person selected by the Board of Directors to be the representative of the District in meetings or otherwise with the Master Association.

Section 19. "District Design Code" shall mean the aesthetic and functional plan for the District, to be implemented through the regulation of land use, landscaping, architecture and such other matters as may be included in the District Design Code. The District Design Code is originally adopted by the District Declarant and may be amended by the District Declarant or District Design Review Committee, with the consent of District Declarant and Master Declarant

during the applicable Declarant Control Period, from time to time. The District Design Code does not need to be recorded to be effective but shall be available from the District Design Review Committee.

Section 20. "Final Plat" means, collectively, all plats of a portion of the Property from time to time recorded in the real estate records of the Office of the Judge of Probate for Maury County, Tennessee, as such may be amended from time to time as the Property is developed. The term "Final Plat" may include a plat established by a condominium regime.

Section 21. "Improvements" shall mean buildings, outbuildings, underground installations, grading, slope and drainage alterations, roads, driveways, parking areas, fences, screening walls and barriers, retaining walls, stairs, decks, windbreaks, landscaping, plantings, planted trees and shrubs, poles, signs, lighting, loading areas, and all other man-made changes to the natural configuration and vegetation of the Property, whether above or below the land surface.

Section 22. "Lot" or "Lots" shall mean a separate parcel of the Property now or hereafter set forth as a Lot on any Final Plat, including without limitation open space, conservation areas, or Common Area within a District, or separate parcels conveyed by other property description if no Final Plat has been recorded, and shall be deemed to refer to any and all Improvements located thereon or comprising such Lot.

Section 23. "Master Association" shall mean and refer to the Columbia Bluffs Master Association, Inc., a Tennessee nonprofit corporation, its successors and assigns, **IF REQUIRED**.

Section 24. "Master Declarant" shall mean the Declarant of the Master Declaration, its successors and assigns.

Section 25. "Master Declaration shall mean that certain Master Declaration of Covenants, Conditions, and restrictions for Columbia Bluffs, of record at Book _____, page _____, Maury County Register's Office, as may be supplemented, amended, or revised from time to time.

Section 26. "Master Design Code" shall mean the aesthetic and functional plan for the Development, to be implemented through the regulation of land use, landscaping, architecture and such other matters as may be included in the Master Design Code. The Master Design Code is originally adopted by the Master Declarant and may be amended from time to time by the Master Declarant or Master Design Review Committee, with the consent of Master Declarant during the Declarant Control Period applicable to the Master Declaration. The Master Design Code does not need to be recorded to be effective but shall be available from the Master Design Review Committee.

Section 27. "Mortgage" shall include a deed of trust or mortgage encumbering any Unit.

Section 28. "Mortgagee" shall include a beneficiary under or holder of a note secured by a Mortgage who has provided actual, written notice to the Master Association of such interest.

Section 29. "Mortgagor" shall include the trustor or grantor of a Mortgage.

Section 30. "Operating Budget" shall have the meaning given in Article IX, Section 2 of this Declaration.

Section 31. "Owner" shall mean and refer to one or more Persons or entities, including District Declarant or Master Declarant, who holds or hold the record title to any Lot, but excluding in all cases any party holding an interest merely as security for the performance of an obligation.

Section 32. "Person" shall mean a natural person, a corporation, a partnership, a limited liability company, a trust, a trustee, or any other legal entity.

Section 33. "Property" shall mean and refer to the real property described in Exhibit A attached hereto, and any additional real property submitted to this Declaration from time to time pursuant to a Supplemental Declaration and added to the District.

Section 34. "Special Assessment" shall have the meaning given in Article IX, Section 5 of this Declaration.

Section 35. "Special Use Assessment" shall mean the Assessment applied to a Special Use Parcel by Supplemental Declaration, which may be in lieu of all other Assessments; subject to the provisions of Article IX.

Section 36. "Special Use Parcel" shall mean a Lot of unconventional size, shape, location or use that calls for special design and assessment considerations as designated by Master Declarant or District Declarant. Typically, a Special Use Parcel will be used for commercial purposes, civic purposes, an age-restricted neighborhood, multi-family residential, or community or recreational facilities.

Section 37. "Streetscape, Pedestrian, Utility and Street Maintenance Easement" shall include all streetscape, pedestrian, utility and street easements located adjacent to street rights-of-way and medians in public rights of way.

Section 38. "Sub-District Association" shall mean an owners association established to maintain or regulate only a portion of the District pursuant to a Sub-District Declaration, such as a condominium association, if any, with the prior consent of Master Declarant and District Declarant.

Section 39. "Sub-District" shall mean a portion of the District that has been subjected to particular restrictions, covenants or regulations by Supplemental Declaration or a Sub-District Declaration, , if any, and may be maintained or regulated by a Sub-District Association.

Section 40. "Sub-District Declaration" shall mean a declaration of restrictive covenants and other matters applicable only to a Sub-District.

Section 41. "Supplemental Declaration" shall mean an amendment to this Declaration, including the addition of additional property, Lots or Master Common Area subjected to this Declaration. Such Supplemental Declaration may, but is not required to, impose, expressly or by reference, additional restrictions and obligations to the provisions of this Declaration, or to

exempt such property from certain provisions and restrictions of this Declaration. The term "Declaration" as used herein shall include this Declaration, together with any and all Supplemental Declaration, together with any amendments, restatements or other additions or removals thereto.

Section 42. "Telecommunication Services" shall mean residential and commercial services involving the provision of voice, internet, entertainment, television or other related services.

Section 43. Defined Terms. Capitalized terms used herein and not otherwise defined shall have the meaning given in the Master Declaration.

## ARTICLE II
## DISTRICT AND SUB-DISTRICT ASSOCIATIONS

Section 1. Establishment. This Declaration is a District Declaration as referred to in the Master Declaration, and is established by District Declarant with the consent of Master Declarant.

Section 2. District Sub-District Associations. District Declarant or other Persons may from time to time, with the consent of Master Declarant and District Declarant, establish Sub-Districts within the District to be governed by a Sub-District Association by filing a Sub-District Declaration, Supplemental Declaration, or other means of record. Each area within a Sub-District may consist of one or more Lots within the District, one or more parcels described by property description (each of which will be deemed a Lot), one or more uses, or otherwise as determined by the applicable declarant, District Declarant, or Master Declarant, in their sole discretion, but subject in each case to the consent of Master Declarant and District Declarant. Upon establishment of a Sub-District, and at any time and from time to time, the applicable declarant may but shall not be required to impose additional restrictive covenants that are applicable to such Sub-District or to exempt all or a portion of the Sub-District from one or more provisions of this Declaration, with the consent of the Master Declarant and District Declarant. The applicable declarant may establish, or cause the Sub-District to establish, one or more Sub-District Associations for the management and preservation of such Sub-District, each with the power to establish and collect Assessments for, among other things, the payments of Assessments to the Master Association or District Association s as may be in the Master Declaration, this Declaration, or in this Declaration.

Section 3. Sub-District Declaration. A Sub-District shall be entitled to establish one or more Sub-District Declarations applicable to a Sub-District and a Sub-District Association for the administration thereof, but such Sub-District Declarations and all Sub-District Associations shall in each case be subject to the prior review and approval of District Declarant and Master Declarant in their respective sole discretion, and shall be deemed subordinate to the Master Declaration and this Declaration.

Section 4. Sub-District Representatives. Unless otherwise established by the declarant in a Sub-District Declaration, it shall be the responsibility of Owners within a Sub-District to establish equitable, fair and representative procedures for the selection of any representative to the District Association as may be established, in each case to be approved by District Declarant. If applicable, no voting or representative rights shall be available to a Sub-

District until such time as a Sub-District Representative has been duly selected. Each Sub-District will be governed, controlled and subject to the powers and authority vested in the Master Association and the District Association, whether or not the District has elected a District Representative.

## ARTICLE III
## PROPERTY RIGHTS AND EASEMENTS

Section 1. Common Area. Every Owner shall have a right and easement of enjoyment in and to the Common Area that is appurtenant to the title to such Owner's Lot, subject to any restrictions or limitations contained in the Master Declaration, this Declaration or in any Deed or amendment thereto conveying the Common Area to the District Association or subjecting the Common Area to this Declaration. Any Owner may delegate his or her right of enjoyment to their family, tenants, customers, and invitees, as applicable, subject to reasonable regulation by the Board and in accordance with procedures the Board may adopt from time to time.

Section 2. Exceptions to Rights. The Owner's right granted in Section 1 above shall be subject to the following:

(a) The right of the Master Association or District Association to dedicate or transfer all or any part of the Common Area to any public body, agency, authority, or utility for such purposes as are consistent with the purposes of the Master Association set forth in the Master Declaration or the District Association set forth in this Declaration.

(b) The limitation of Owner rights only to those areas of the Common Area for which such Owner shall pay a portion of the Common Expenses related thereto.

(c) Each Owner's responsibility to pay for Common Expenses, fees, Fines and other charges hereunder assessed by the Board or the District Association against an Owner's Lot.

(d) The right of Master Declarant, District Declarant or other declarant under a Sub-District Declaration to limit, restrict, or regulate the use of the Common Area in their sole discretion.

Section 3. Owner Easements. Subject to the limitations of Section 2 above, every Owner, its successors and assigns, shall have the following perpetual easements with respect to the Property; provided, that for purposes of this Section 3, Common Area shall be deemed to include Common Area that is now or hereafter created within a District, without regard to whether the District Association has ownership of such areas or responsibilities for maintenance or otherwise with respect such areas:

(a) A non-exclusive easement of ingress and egress to its Lot over, across and through the Common Area and Streetscape, Pedestrian and Utility Maintenance Easements.

(b) A perpetual easement in common with the Owners of all other Lots to use all pipes, wires, cables, public utility lines and other Common Elements serving its Lot.

(c) A nonexclusive, perpetual and reciprocal access easement for ingress and egress in common with the Owners of all other Lots for access over any drive aisles or alleys located, constructed and available on or within any Lot, but expressly excluding private driveways constructed solely for internal use only within a Lot, and any areas excluded from use by a Supplemental Declaration, this Declaration, or a Sub-District Declaration.

(d) A perpetual and non-exclusive easement in, over and through all Common Area and to use the entranceways, pedestrian systems and other common improvements within the Property subject to the right of the Board to:

(i) promulgate rules and regulations for the use and enjoyment thereof; and,

(ii) suspend the enjoyment and voting rights of any Owner for any period during which any Assessment for Common Expenses or Fine or other charge or fee hereunder remains unpaid, or for any period during which any infraction of its published rules and regulations continues, it being understood that any suspension for either non-payment of any assessment or a breach of the rules and regulations of the District Association shall not constitute a waiver or discharge of the Owner's obligation to pay the assessment..

Section 4. District Declarant and District Association Easements. The District Declarant and the District_Association, their successors and assigns, and their contractors and agents shall have the following perpetual easements with respect to the Property:

(a) A perpetual and non-exclusive easement for the maintenance of any Common Elements and Streetscape, Pedestrian, and Utility Maintenance Easements, which may presently, or hereinafter encroach upon a Lot.

(b) A perpetual and non-exclusive right of access to each Lot: (1) to inspect same for the purpose of verifying conformance with this Declaration and any rules and regulations of the District Association, (2) to remedy any violations set forth in this Declaration or in any rules and regulations of the District Association, and (3) to perform any operations required in connection with the maintenance, repairs or replacements of or to the Common Area, or any equipment, facilities or fixtures affecting or serving other lot(s) or the Common Elements; provided that requests for entry are made in advance and that any such entry is at a time reasonably convenient to the Owner. In the case of an emergency, such right of entry shall be immediate, whether Owner is present at the time or not.

(c) A perpetual and non-exclusive easement in, over, upon, across and through the Common Area for surface water runoff and drainage caused by natural forces and elements, grading, and/or the improvements located upon the Property. No individual Owner shall directly or indirectly interfere with or alter the drainage and runoff patterns and systems within the Property without written approval of the Master Association.

(d) A perpetual and non-exclusive easement in, upon, over, across and through the Common Area for the purpose of installation, maintenance, repair, service and replacement of all sewer, water, power and telephone pipes, lines, mains, conduits, waters, poles, transformers, meters, and any and all other equipment or machinery necessary or incidental to the proper functioning of any utility company or other entity that requires same for the purpose of

furnishing one or more of the foregoing services as determined and authorized by the Master Association.

(e) A perpetual and non-exclusive easement of unobstructed ingress and egress in, upon, over, across and through the Common Area to the District Association, the Master Association, and their respective officers, agents and employees and all police, fire, and ambulance personnel in the proper performance of their respective duties (including but not limited to emergency or other necessary repairs to a lot upon which the Owner has failed to perform) and for repair and maintenance of the Common Elements. Except in the event of emergencies, the rights accompanying the easements provided for in this subsection shall be exercised only during reasonable daylight hours and then, whenever practical, only after advance notice to the Owner(s) directly affected thereby.

(f) The District Declarant reserves the right and easement, which shall be a covenant running with the land, for and to the benefit of District Declarant and District Association for the installation and use of entrance Improvements to be located on the entrances to the District. The estimated and actual cost of operating and maintaining any improvement thereon will be the responsibility of the District Association. Excluding the Master Declarant or District Declarant, and any of their respective affiliates, the publication or display of any signage or other matter by any Person, whether or not such Person is a Member of the District Association, upon any Improvement on the entry feature easement will be subject to contract with the District Association for the reasonable compensation for services and operating expenses in connection therewith.

Section 5. Easement Related to Infrastructure and Other Improvements. Notwithstanding the foregoing or anything else contained herein to the contrary, District Declarant and/or the District Association shall have and hereby retain the right, but not the obligation, to create, install, construct, modify, repair, replace and maintain certain forms of infrastructure for the District that may consist of curbs, streets, service drives, sidewalks, and other hardscape, landscaping, street trees, street lights, irrigation systems, brick pads, benches, bridges, street furniture, walking paths, parks, trash receptacles, drainage facilities, signage, utilities, and any apparatuses related thereto, as well as other improvements not necessarily enumerated above. Said improvements may be installed along the roads or within any Lot or in the Common Area of the District if deemed necessary or desirable by the District Declarant and/or the District Association, in their sole and absolute discretion, for the overall functionality or aesthetics of the District. Continued maintenance, repair and replacement of any of the aforementioned infrastructure or improvements, if and once installed, shall be the responsibility of the Lot Owner if located within said Owner's Lot, or the responsibility of the applicable District Association if located within the Common Area of the District or the responsibility of the Master Association if located within the Master Common Area. Any costs and expense associated with this right may be reallocated and assessed by the District Association as a Common Expense. Notwithstanding the foregoing, when exercising said right, neither District Declarant nor the District Association shall do anything which may reduce the number of parking spaces within the Lot. In addition, neither District Declarant nor the District Association shall have the right to modify an existing building located on a Lot without the consent of the Lot Owner. An easement is hereby granted to the District Declarant, the District Association and to any construction or management company selected by the District Declarant or the District Association to enter in or cross over the Common Area or to enter or cross over any Lot to

create, install, construct, modify, repair, replace and maintain any of the aforementioned forms of infrastructure or improvements located within any portion of the District.

Section 6. Easements for Utilities and Related Purposes. The District Association is authorized and empowered to grant (and shall from time to time grant) such licenses, easements and/or rights of way for sewer lines, water lines, electrical cables, telephone cables, television and other communication cables, internal and external wiring and antennae, gas lines, drainage, slopes, storm drains, regulatory signage, street lights, underground conduits and/or such other purposes related to the provision of public utilities and other common services to the District as may be considered necessary, appropriate or desirable by the Board for the orderly maintenance, preservation and enjoyment of the Common Area or for the preservation of the health, safety, convenience and/or welfare of the Owners of the lots and District Declarant. A ten (10) foot nonexclusive underground utility easement for the District Association is reserved along all the frontage (but behind right of way), both sides, and rear of all Lots, and on both sides of the sidelines of all comer Lots. Additional easements are reserved on the recorded plat(s), as amended from time to time. Within these easements, no construction of any kind shall be placed or permitted to remain which will in any way damage or interfere with the installation or maintenance of utilities.

Section 7. Streetscape, Pedestrian, Utility, and Street Maintenance Easements. Streetscape, Pedestrian, Utility, and Street Maintenance Easements shall include all streetscape, pedestrian, utility, and street maintenance easements located adjacent to street rights-of-way, and required pavers and medians in public rights-of-way.

Section 8. Easements of Encroachment. There shall be reciprocal appurtenant easements of encroachment as between each Lot and such portion or portions of the Improvements adjacent thereto or as between adjacent Lots due to unintentional placement or settling or shifting of Improvements constructed, reconstructed or altered thereon.

Section 9. General Easement. The District Declarant, so long as it shall retain record title to any Lot or other tract within the District or the Common Area, and the District Association, reserve the right and easement to the use of the Common Area and any Lot (regardless of ownership) or any portion thereof, as may be needed for repair, maintenance or construction on such Lot or any other Lot or the Common Area.

Section 10. Revision of Common Area. Notwithstanding any other provision of this Declaration, District Declarant shall have the right by recording a Final Plat or otherwise to revise any Common Area, in whole or in part, including without limitation the conversion to other types or uses of property, the increase or decrease in size, or the granting of easements or construction of improvements in such Common Area.

## ARTICLE IV
## MEMBERSHIP AND VOTING RIGHTS

Section 1. Membership in the District Association. Every Person who is the record owner of a joint or undivided fee interest in any Lot shall be deemed to be a member of the Association (each such person or entity, a "Member"). Membership shall be appurtenant to and may not be separated from such fee interest ownership, and any transfer of a Lot shall operate automatically to transfer to the new record owner thereof the membership in the Association

appurtenant thereto. The foregoing is not intended to include persons who hold an interest merely as security for the performance of an obligation, and the giving of a security interest shall not terminate that Member's membership.

Section 2. Assignment by Declarant. Notwithstanding the foregoing, District Declarant may at any time assign, pledge, hypothecate or alienate its membership and/or District Declarant's rights as District Declarant herein, but any transfer by District Declarant of title to a Lot shall automatically transfer the membership in the Association appurtenant thereto, free and clear from any such assignment, pledge, hypothecation or alienation.

Section 3. Voting Rights. Voting and other rights of the Members shall be as set forth in the By-Laws of the Association.

## ARTICLE V
## MAINTENANCE

Section 1. District Association's Responsibility. The District Association shall maintain and keep in good repair the Common Maintenance Area. Subject to the provisions of any Supplemental Declaration or Sub-District Declaration, such maintenance may include, without limitation, maintaining, repairing, and replacing, subject to any insurance then in effect, all trees, landscaping and other flora, structures, irrigation system, storm water control and any other Improvements situated upon the Common Area or the Common Maintenance Area, and the maintenance of non-public streets, parking areas, or driveways, street or entrance lighting, signage, including without limitation directional signage.

Section 2. Common Maintenance Parcels. The District Association shall maintain those portions of Common Maintenance Parcels as this Declaration or any Supplemental Declaration establishes as a District Association responsibility, and may charge to the Owners of such Common Maintenance Parcel a Common Maintenance Parcel Assessment, as appropriate.

(a) Unless otherwise established by Supplemental Declaration, the District Association shall provide for the maintenance, care, repair, and replacement of the following portions of the Common Maintenance Parcels, to be funded by Common Maintenance Parcel Assessments: the exterior landscaping (except such landscaping installed by, or on behalf of, the Lot Owner and such landscaping enclosed by a fence, if any), walkways, and porches located upon or about each Common Maintenance Parcel. The District Association also shall maintain the exterior of each Common Maintenance Parcel as follows: painting, maintenance, and repair of exterior building surfaces as the Board shall deem necessary and proper, including roofs, gutters, downspouts, exterior building surfaces, trees, shrubs, grass, walks, replacement of trim, caulking and other repairs to roof covers (to include the repair and replacement of all components of the roof of each Common Maintenance Parcel), and other miscellaneous repairs. Such exterior maintenance shall not include glass surfaces (weather windows or sliding glass doors), HVAC equipment, storm doors, front or rear entry doors, garage doors, fences, screens, or patio covers. The balance of the improvements located on the respective Common Maintenance Parcels shall be maintained by the Owner of the particular Lot involved. For the sole purpose of performing the exterior maintenance upon each Lot required by this Article V, the duly authorized employees or agents of the District Association shall have the right, after reasonable notice to the Owner, to enter upon any Lot and into any Lot at reasonable hours of any day.

(b) Notwithstanding any foregoing provision to the contrary, the duly authorized agents or employees of the District Association shall have the right to enter in or upon any Lot or into any structure or located on a Lot, without notice to the Owner thereof, when, in the judgment of the District Association, acting through its Board of Directors, such entrance is necessary to prevent damage to such Lot or surrounding Lots or Common Area by fire, criminal act, natural disaster, or other similar emergency.

(c) Notwithstanding the obligations of the District Association with respect to maintenance of certain portions of the exterior of certain Lots, the District Association shall have no obligation to repair interior or structural portions of any Lot or personal property that is lost or damaged as a result of construction defects, damage or maintenance issues of exterior portions of any Lot, including without limitation damage resulting from water leaks, foundational issues, or settling or structural matters. Each Owner shall bear full responsibility for obtaining and maintaining such insurance as may be desired for protection against such losses.

(d) Notwithstanding the foregoing, if the need for exterior maintenance and repair of Common Maintenance Parcels by the District Association as required by this section is caused by the willful or grossly negligent conduct or act an Owner, his/her family, guest, invitees, or other Persons using or occupying his/her Lot with his/her express or implied permission, the cost of such repair or maintenance may be assessed against such Owner as a Special Assessment of this Declaration upon a finding by the Board, which shall be due and payable thirty (30) days from the date of notice thereof, such Assessment to be collected and enforced as provided in this Declaration. Such Special Assessment shall not require the approval of any of the Members; provided, however, that any Owner against which any such Assessment is levied shall be entitled to notice, a hearing at a time and place set by the Board in its sole discretion, and an opportunity to do the corrective work required (provided that the work is performed by a competent contractor mutually agreeable to both parties and in a manner and quality agreed to by the Board), prior to a Special Assessment being levied against such Owner in accordance with the provisions of this subsection.

Section 3. Owner's Responsibility. Except as provided in the foregoing Section 1. Section 2. or otherwise set forth in a District Declaration, the Owner of each Lot shall have the sole responsibility for maintenance of all exterior and interior portions of the Lot, all Improvements located thereon, the land, flora and landscaping within the boundaries of the Lot; and other improvements not maintained by the District Association. Each Owner shall maintain its Lot in a manner consistent with the Community Wide Standard, the applicable covenants set forth in this Declaration, and such rules and regulations as may be established by the Board from time to time.

## ARTICLE VI
## INSURANCE AND CASUALTY LOSSES

Section 1. Insurance. The Board of Directors for the District Association, or its duly authorized agent, shall have the authority to and shall obtain insurance for all insurable improvements on the Common Area against loss or damage by fire or other hazards, including extended coverage, vandalism, and malicious mischief. This insurance shall be in an amount sufficient to cover the full replacement costs of any repair or reconstruction in the event of damage or destruction from any such hazard.

(a) The Board shall also obtain a public liability policy covering the Common Area and District Association for all damage or injury caused by the negligence of the District Association or any of its employees or agents. The public liability policy shall have at least a One Million Dollar ($1,000,000.00) single person limit as respects bodily injury and property damage, a One Million Dollar ($1,000,000.00) limit per occurrence, and a Five Hundred Thousand Dollar ($500,000.00) minimum property damage limit. The policy or policies may contain a reasonable deductible, and the amount thereof shall be added to the face amount of the policy in determining whether the insurance at least equals the full replacement cost.

(b) In addition to the other insurance required by this Section, the Board shall obtain, as a Common Expense, worker's compensation insurance, if and to the extent necessary, and a fidelity bond or bonds on directors, officers, employees, and other persons handling or responsible for the District Association's funds. The amount of fidelity coverage shall be determined in the directors' best business judgment, but may not be less than three months' Assessments, plus reserves on hand. Bonds shall contain a waiver of all defenses based upon the exclusion of persons serving without compensation and may not be canceled or substantially modified without at least thirty (30) days' prior written notice to the District Association. The Board shall also obtain, as a Common Expense, a reasonably available amount of Directors and Officers Errors and Omissions insurance.

(c) Premiums for all insurance required by this Article VI, shall be Common Expenses of the District Association and shall be included in the General Assessment.

Section 2. Insurance; Common Maintenance Parcels.

(a) The District Association shall, as a Common Expense applicable only to Lots that are Common Maintenance Parcels, obtain and continue in effect adequate blanket all-risk casualty insurance, if reasonably available, and if not reasonably available, fire and extended coverage, in such form as the Board deems appropriate for one hundred (100%) percent of the replacement cost of the Lots that are Common Maintenance Parcels, excluding the replacement of any finishes, fixtures, cabinets, appliances, flooring, or other improvements installed or supplied by the Owners, or their tenants, or personal property of the Owners, or their tenants, guests, and invitees located within such Lots.

(b) Neither the District Declarant nor the District Association has constructed the Lots on the Common Maintenance Parcels, and neither District Declarant nor the District Association shall be liable for any claims or causes of action of any kind whatsoever in law or in equity arising from or in any way relating to the construction of improvements upon the Common Maintenance Parcels that was performed by parties other than District Declarant, its agents, employees, subsidiaries or other affiliated entities.

(c) Premiums for all insurance required by this Article VI, Section 2, shall be Common Expenses of the Association applicable only to Common Maintenance Parcels and shall be included in the Common Maintenance Parcel Assessment. The policy or policies may contain a reasonable deductible, and the amount thereof shall be added to the face amount of the policy in determining whether the insurance at least equals the full replacement cost.

Section 3. Disbursement of Proceeds. Proceeds of insurance policies with respect to Common Area shall be disbursed as follows:

(a) If the damage or destruction for which the proceeds are paid is to be repaired or reconstructed, the proceeds, or such portion thereof as may be required for such purpose, shall be disbursed in payment of such repairs or reconstruction as hereinafter provided. Any proceeds remaining after defraying such costs of repairs or reconstruction to the Common Area or, in the event no repair or construction is made shall be retained by and for the benefit of the District Association and placed in a capital improvements account.

(b) If it is determined that the damage or destruction to the Common Area for which the proceeds are paid shall not be repaired or reconstructed, such proceeds shall be disbursed in the manner as provided for excess proceeds in Section 2(a) above.

Section 4. Repair and Reconstruction. If the damage or destruction to the Common Area for which the insurance proceeds are paid is to be repaired or reconstructed, and such proceeds are not sufficient to defray the cost thereof, the Board of Directors may use reserve or capital improvements account funds, or may levy a Special Assessment against all Lots. Additional Assessments may be made in like manner at any time during or following the completion of any repair or reconstruction.

Section 5. Annual Review of Policies. At least annually, the Board shall review all insurance policies that are required by this Article VI to be maintained by the District Association in order to ascertain whether the coverage contained in the policies is sufficient. If the Board deems such coverage to be insufficient, the Board may expand the coverage to the extent it reasonably deems necessary.

## ARTICLE VII
## NO PARTITION

Whenever all or any part of the Common Area shall be taken (or conveyed in lieu of and under threat of condemnation by the Board) by any authority having the power of condemnation or eminent domain, the award made for such taking shall be payable to the District Association as Trustee for all Owners to be disbursed as follows: If the taking involves a portion of the Common Area on which Improvements have been constructed, then, unless within sixty (60) days after such taking the District Declarant or the District Association shall otherwise agree, the District Association shall restore or replace such Improvements so taken on the remaining land included in the Common Area to the extent lands are available therefor, in accordance with plans approved by the Board and the District Design Review Committee. If such Improvements are to be repaired or restored, the above provisions in Article V hereof regarding the disbursement of funds in respect to casualty damage or destruction shall apply. If the taking does not involve any Improvements on the Common Area, or if there is a decision made not to repair or restore, or if there are net funds remaining after any such restoration or replacement is completed, then such award or net funds shall be disbursed to the District Association and used for such purposes as the Board shall determine.

## ARTICLE VIII
## RIGHTS AND OBLIGATIONS OF THE DISTRICT ASSOCIATION

In addition to the powers delegated to the District Association by its Articles of Organization or the laws of the State of Tennessee, the District Association shall be empowered to perform each of the following duties related to the Property and Common Area:

Section 1. Operation and Maintenance of Common Maintenance Area. To operate, maintain and otherwise manage or provide for the operation, maintenance and management of the Common Maintenance Area, together with all easements for operation and maintenance purposes and for the benefit of the District Association or the Owners over and within the Common Area; to keep all Improvements, if any, of whatever purpose from time to time located on the Common Area in good order, condition, and repair.

Section 2. Title. Any other provision of this Declaration or the Bylaws notwithstanding, the District Association always shall maintain lien free title to the Common Area, excepting only a lien for current year taxes, provided, however, that the District Association may mortgage or convey the Common Area with an affirmative vote of at least sixty-seven percent (67%) of the Directors; and provided, further, that the District Association may accept a conveyance of the Common Area subject to a lien or other encumbrance.

Section 3. Seasonal or Other Decorations. To install and maintain seasonal and other decorations, lighting, street banners, and other items designed to enhance the appearance or attractiveness of the District or the enjoyment or experience of those living, shopping or otherwise participating in the District, in the sole discretion of the District Declarant or Board of Directors, the cost of which shall be a Common Expense.

Section 4. Water and Other Utilities. To acquire, provide, and/or pay for, water, sewerage, garbage disposal, electrical, telephone, gas, and other necessary utility services for the Common Area.

Section 5. Taxes and Assessments. To pay all real and personal property taxes and assessments separately levied upon or assessed against the District Association and/or the property owned by the District Association. Such taxes and assessments may be contested or compromised by the District Association; provided, however, that they are paid or a bond in an amount at least equal to such taxes and assessments is posted prior to the sale or other disposition of any property to satisfy the payment of such taxes or assessments.

Section 6. Insurance. To obtain from reputable insurance companies qualified to do business in the State of Tennessee the insurance set forth in this Declaration, and to maintain in force at all times such insurance as is required by this Declaration.

Section 7. Personal Property and Real Property for Common Use. The District Association, through action of its Board of Directors, may acquire, hold, and dispose of tangible and intangible personal property and real property. The Board, acting on behalf of the District Association, shall accept any real or personal property, leasehold, or other property interests within Maury County conveyed to it by the District Declarant as permitted herein.

Section 8. Rules and Regulations. The District Association, through its Board of Directors or otherwise, may make and enforce reasonable rules and regulations governing the use of the Property, which rules and regulations shall be consistent with the rights and duties established by this Declaration. Sanctions for violations of the rules and regulations may include reasonable monetary Fines (as hereinafter defined) and suspension of the right to use the Common Area. The Board shall, in addition, have the power to seek relief in any court for violations or to abate nuisances. In addition, the District Association, through the Board or otherwise, may, by contract or other agreement, enforce city or county ordinances or permit the

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City of Columbia or Maury County to enforce ordinances on the Property for the benefit of the District Association and the Owners.

Section 9. Traffic Control. The Board may make rules and regulations concerning driving and parking within the Property, subject to applicable governmental requirements and restrictions. Without limiting the foregoing, to the extent permitted by local governmental authority, the District Association may construct traffic calming devices and post speed limits or other traffic signs and take other measures deemed necessary to discourage excessive speed and to promote a safe environment. The District Association may enforce such rules and regulations with penalties, Fines, or towing, and shall have all remedies set forth in this Declaration.

Section 10. Implied Rights. The District Association may exercise any other right or privilege given to it expressly by this Declaration or the Bylaws, any law, statute, or ordinance, and every other right or privilege reasonably to be implied from the existence of any right or privilege given to it herein or reasonably necessary to effectuate any such right or privilege.

## ARTICLE IX
## ASSESSMENTS

Section 1. Creation of Assessments. There shall be created annual Assessments as may be from time to time specifically authorized by the Board of Directors as follows (collectively, the "Annual Assessments"):

(a) The Board may levy general assessments for expenses determined by the Board to benefit the District Association and/or the district as a whole, including without limitation, expenses incurred by the District Association in fulfilling its maintenance obligations set forth in this Declaration or otherwise expressly or implicitly authorized by this Declaration, reserves as deemed appropriate by the Board, and the District Assessment ("General Assessments").

(b) The Board may levy a Common Maintenance Parcel Assessment against Common Maintenance Parcels for expenses determined by the Board to benefit only such Common Maintenance Parcels, including without limitation, expenses incurred by the District Association in fulfilling its maintenance or service obligations with respect to such Common Maintenance Parcels. Common Maintenance Parcels may be established with different levels of services and maintenance obligations for the District Association, and the Common Maintenance Parcel Assessment applicable to Common Maintenance Parcels may reflect such differences.

(c) The Board may levy a Special Use Assessment to the extent established by a Supplemental Declaration for any Special Use Parcel. In the event a Special Use Assessment is established, the General Assessments shall not apply to such Special Use Parcels. If no Special Use Assessment is established in a Supplemental Declaration by oversight or error, then the Declarant or the Board may at any time thereafter establish a Special Use Assessment in the Declarant's or the Board's discretion, to be applied to such Special Use Assessment from after the date of such establishment. The Special Use Assessment may include maintenance or landscaping responsibilities for areas within the District but not located within the Special Use Parcel.

Section 2. Operating Budget. It shall be the duty of the Board to prepare a budget covering the estimated costs of operating the District Association during the coming year,

including without limitation Common Expenses and Common Maintenance expenses (the "Operating Budget").

Section 3. Capital Budget and Contribution. The Board of Directors shall annually prepare a capital budget that shall take into account the number and nature of replaceable assets, the expected life of each asset, and the expected repair or replacement cost (the "Capital Budget"). The Board shall set the required capital contribution, if any, in an amount sufficient to permit meeting the projected capital needs of the District Association, as shown on the Capital Budget, with respect both to amount and timing by Assessments over the period of the Budget. The capital contribution required shall be fixed by the Board and included within the Operating Budget and Assessment. The Capital Budget shall also provide for the establishment of separate reserve accounts to hold the proceeds of the Assessments imposed for capital expenditures.

Section 4. Allocation of General Assessments. Unless otherwise set forth in any Supplemental Declaration or District Declaration, General Assessments shall be allocated against all Lots (other than Special Use Parcels) within the District equally. Assessments for Special Use Parcels may include the responsibility for specific areas or maintenance or landscaping within the Development that shall not be considered in setting the General Assessments.

The Board shall set Assessments based on the Operating Budget and the Capital Budget. The Board shall cause a copy of the Operating Budget, the Capital Budget, and the amount of each General Assessment to be communicated to the Members of the District Association at least ten (10) days prior to the year for which Assessments shall be made. The Operating Budget, together with the Capital Budget and the Annual Assessments (collectively, the "Budget"), shall be adopted by the Board at a duly called meeting of the Board. Notwithstanding the foregoing, however, in the event a Budget is not established for any reason for any year, then and until such time as a Budget shall have been determined as provided herein, the Budget in effect for the then current year shall continue for the succeeding year. No failure to provide the Operating Budget or Assessments as required hereunder shall relieve any Lot Owner from payment of such Assessments once established.

Section 5. Special Assessments. In addition to the Annual Assessments authorized above, the Board may levy, during any calendar year, special assessments, applicable only to that year, to be used solely to defray, in whole or in part, the cost of any construction, reconstruction, or unexpected repair or replacement of a capital improvement, including the necessary fixtures and personal property related thereto ("Special Assessments"). The Board may levy a Special Assessment against all Lots for such expenses determined by the Board to benefit the District Association and/or the District as a whole, and may levy a Special Assessment against particular Lots for such expenses as may be determined by the Board to benefit less than the Master Association or District as a whole.

Section 6. Assessment Obligation. Assessments against each Lot shall commence on recording of a Supplemental Declaration, District Declaration or Sub-District Declaration applicable to such Lot, provided, however, that the applicable Supplemental Declaration or District Declaration or Sub-District Declaration may, with the approval of Master Declarant and District Declarant, suspend or delay the payment of Assessments as set forth therein. Each Owner, by acceptance of his or her Deed, is deemed to covenant and agree to pay all Assessments levied by the District Association, whether or not such obligation is so expressed in such Deed. Each Owner shall be deemed a direct beneficiary of the Common Expenses of the

Master Association, which are made for the benefit of the entire Development, and apportionment of the District Assessment shall be payable be each Lot Owner. Notwithstanding any other provision of this Declaration, no Assessments shall be levied against Lots or other Property owned by the District Declarant, its successors or assigns.

(a) All Assessments, together with interest at the highest rate allowable under the laws of Tennessee from time to time relating to usury (or if no such rate is established, sixteen percent (16%) per annum) ("Interest"), costs, and reasonable attorneys' fees, shall be a charge on the land and shall be a continuing lien upon the Lots within the District against which each Assessment is made. Each Assessment, together with Interest, costs, and reasonable attorneys' fees, shall also be the personal obligation of the Person who was the Owner of such Lot at the time the Assessment arose, and his or her grantee shall be jointly and severally liable for such portion thereof as may be due and payable at the time of conveyance, except no first Mortgagee who obtains title to a Lot pursuant to the remedies provided in the Mortgage shall be liable for unpaid Assessments which accrued prior to such acquisition of title in excess of six (6) months accrued Assessments.

(b) Assessments shall be paid in such manner and on such dates as may be fixed by the Board. The manner of payment fixed by the Board may include, without limitation, acceleration of the Assessment levied on a particular Lot on account of delinquent payment of such Assessment or monthly installment thereof. Unless the Board otherwise provides, Annual Assessments shall be paid in quarterly installments. Without limiting the foregoing, the Board may also levy a late charge on Assessments not timely paid, in the discretion of the Board.

Section 7. Lien for Assessments. To secure the payment of any Assessment and/or fine imposed by the District Association pursuant to this Declaration (each such fine, a "Fine"), a lien is expressly retained in favor of the District Association on each and every Lot or Special Use Parcel in the District Association. Such lien shall be prior and superior to all other liens, except all taxes, bonds, assessments, first mortgage liens, liens in favor of the Master Association, and other levies which by law would be superior thereto.

Section 8. Start-up Assessment. Each Lot Owner who takes title to a Lot shall pay to the District Association at closing a start-up assessment fee in an amount established by the Board from time to time (the "Start-up Assessment"). This one time Start-up Assessment shall be in addition to and not a prepayment of the regular Assessments provided for above. The District Declarant may, by Supplemental Declaration, Sub-District Declaration, contract, or otherwise, exempt certain properties from the Start-Up Assessment, limit the payment of the Start-Up Assessment to certain transactions, or otherwise alter the general obligations set forth hereunder.

Section 9. Transfer Assessment. The Board may establish an Assessment to be paid by the purchaser of any Lot within the Property on transfer or conveyance of such Lot from time to time (the "Transfer Assessment"). The amount of such Transfer Assessment shall be established by the Board from time to time. The Transfer Assessment shall not be due on any closing of a Lot in which the Start-Up Assessment is paid. District Declarant may, by Supplemental Declaration, Sub-District Declaration, contract, or otherwise, exempt certain properties from the Transfer Assessment, limit the payment of the Transfer Assessment to certain transactions, or otherwise alter the general obligations set forth hereunder.

Section 10. Administrative Fee. In addition to the Start-Up Assessment and Transfer Assessment, the Board may establish an administrative fee that the purchaser of any Lot within the Property shall be obligated to pay. The purpose of the Administrative Fee is to pay for the administrative expenses of the District Association or its agent resulting from the change in Lot ownership.

Section 11. Use of Assessments and Fees. The Start-Up Assessment and Transfer Assessment collections may be used as the Board of the District Association shall deem appropriate, which use may include, without limitation, operating costs of the District Association, the payment for capital improvements of the District Association, the establishment of reserves, or the establishment of a fund, account or nonprofit corporation formed for the purpose of enhancing, directly or indirectly, the District and the Owner, including the support of charitable, educational, social or beneficial organizations, causes, events or scholarships.

Section 12. Certificate of Payment. The Board shall, upon request and for a reasonable charge, furnish to any Person a certificate, signed by an officer of the District Association, setting forth whether or not all Assessments, whether General or Special, or other applicable fees or Interest, on a specified Lot or Special Use Parcel have been paid. Such certificate shall be conclusive evidence of payment of any Assessment therein stated to have been paid.

## ARTICLE X
## CONSTRUCTION AND ARCHITECTURAL STANDARDS

Section 1. Construction Standards. Owners shall construct all Improvements on Lots in accordance with plans and specifications approved by the City of Columbia, Tennessee (the "City"). Further, no Person shall construct any Improvements upon a Lot, or after completion of such Improvements, make any modifications, additions or alterations to such Improvements, without the prior written approval of the Master Design Review Committee and District Design Committee (as defined below). In no event shall the District Design Review Committee approve any plans violating the use restrictions set forth in Article XI below, and no purported approval shall constitute a waiver of such restrictions.

Section 2. Design Review Committee. The District Declarant or Board, as applicable, shall designate a site and architectural review board (the "District Design Review Committee") consisting of up to five (5) persons, one of which may be an architect selected by District Declarant (a "Qualified Architect"), to exercise the Board's authority under this Article. The District Design Review Committee shall promulgate detailed standards and procedures in implementing the requirements of this Article, in addition to the Design Code. So long as District Declarant owns any land within the District or subject to this Declaration or remains the District Declarant, the District Declarant may select the membership of the District Design Review Committee. Thereafter, the Board shall select the membership of the District Design Review Committee. The District Design Review Committee shall also have the authority to hire such contractors or employees in support of its review and administration obligations as it may reasonably determine to be necessary or appropriate, the costs of which shall be paid by the applicants or included in Common Expenses. This Article shall be effective, and may not be amended without the prior written consent of District Declarant, so long as District Declarant owns any land subject to this Declaration or subject to annexation by this Declaration.

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Section 3. Construction Subject to Review.

(a) Review of Plans. Prior to construction, the District Design Review Committee must review and approve construction plans and specifications for all Improvements on any Lot within the Property. No construction on any Lot shall begin and no Improvements on any Lot shall be modified except in accordance with an approved plan. Once a plan is approved, any modification to that plan, or any modification to the finished Improvement, must also be reviewed and approved.

(b) Common Area. Construction of any Improvement upon the Common Area (other than initial construction by the Declarant), or modification of any existing structure, as well as any material alteration of the landscaping or topography of any Common Area, must be approved in advance by the Design Review Committee.

(c) Scope. The Design Code shall set standards for all aspects or improvement on any Lot visible from the outside, including without limitation the size and shape of any building, its roof, windows, doors, porches and other components, placement on the Lot, fences, drainage, paving and landscaping and all finish materials. The Design Code may also regulate the type, placement and number of Improvements that may be constructed on a Lot and the uses to which those Lots may be put. Review shall include materials and color selection and selection and placement of any ornamentation or functional accessories, including but not limited to the following:

(i) Materials and color selection for the main building and any outbuilding (including roof, doors, windows and trim);

(ii) Driveways, walks, patios and other ground surface materials;

(iii) Parking areas and drive through lanes;

(iv) Outdoor eating areas;

(v) Lighting;

(vi) Signage of any type;

(vii) Antennas, satellite dishes or receivers, solar panels or other devices that are visible from outside the Lot;

(viii) Fountains, swimming pools, or other water features;

(ix) Privacy walls or other fences and gates;

(x) Awnings, flower boxes, shelves, statues, or other outdoor ornamentations, and window coverings visible through the window;

(xi) Construction trailers or other trailers, temporary structures, tents, shacks, and sheds;

(xii) Grills or fire pits; and

(xiii) Permanent or semi-permanent play equipment, whether or not secured, such as tree houses, trampolines, basketball hoops, skateboard ramps and swing sets.

The listing of a category does not imply that such construction is permitted.

(d) Exception. Interior construction and modifications not affecting the external structure or appearance of any building and not visible from the exterior are not subject to review. However, construction drawings are required as part of the review process to assist in interpreting the design.

(e) Trees. Owners may be required to plant street trees on their Lot or within Common Area or public rights-of-way adjacent to their Lot, in accordance with the direction of the District Design Review Committee, to maintain trees and to replace trees that die or that become damaged or diseased, or the District Association may elect to take such actions for the benefit of Owners, the cost of which will be part of the Common Expenses. The cutting, removal or intentional damage of new or existing trees (including neglect, excessive pruning or failure to use due care with equipment or when removing other trees permitted to be removed) shall be prohibited and subject to enforcement under this Declaration. The District Design Review Committee may require the relocation and replanting of trees that must be removed for construction. If particularly significant trees are found within a Lot, the District Design Review Committee shall determine whether the placement of the building should be altered to accommodate the trees, or whether the trees may be removed. If trees or other growth block sidewalks or other areas, the Owner may be required to prune, trim or remove such growth. The Master Association may also take action to keep sidewalks and other areas clear, including pruning, trimming and removal of limbs on trees within a Lot, and may enter any Lot for such purpose.

(f) Drainage. All plans shall comply with and Owners shall be solely responsible for applicable drainage, water conservation, erosion control and stormwater detention requirements. No alteration of existing grade or any planting, fences or other improvements that alter the flow of water shall be permitted without the express consent of the District Design Review Committee, which approval shall be for the exclusive benefit of the Declarant or District Association, as applicable, and shall not remove or alter the responsibility of any Owner or builder for compliance with such requirements. Notwithstanding any other provision of this Declaration, neither District Declarant nor the District Association shall have the responsibility to ensure that drainage or grading of Lots is properly accomplished. Each Owner shall be solely responsible to ensure that grading and drainage are in compliance with all applicable laws, codes, regulations and other requirements, including without limitation any easements for drainage, whether or not shown on any recorded plat and must provide a as-built drawing of finished grading and drainage to ensure these items are in compliance. The Homeowner will be charged in the event they do not provide the approved as-builts to the Committee, and there are costs to the developer to fix any grading or drainage that were not caused by the developer.

(g) Modifications. Modifications after completion of construction, or additions or changes to the approved plans during construction, must be reviewed and approved. However, review is not required to paint with originally approved materials and colors, or to replace the roof or other components with duplicates of the original material. Significant new landscaping, grading and any removal of trees or plants must be approved in advance.

Section 4. Review Procedure.

(a) Application. The plans to be submitted for approval shall include (i) the construction plans and specifications, including all materials and colors, (ii) elevations of all proposed improvements (iii) proposed clearing, grading and landscaping, and (iv) all other items required by the District Design Review Committee. Plans and specifications for review shall be submitted in the form required by the District Design Review Committee.

(b) Uniform Procedures. The District Design Review Committee may establish forms and procedures for the review of applications, including review costs and fees, if any, to be paid by the applicant, which may include costs for the Qualified Architect. The District Design Review Committee may provide lists of approved materials and may allow for staff review and approval of routine or minor matters.

(c) Basis for Decision. Applications shall be approved or denied based upon overall quality of design, including purely aesthetic considerations at the discretion of the District Design Review Committee. If the District Design Review Committee rejects an application due to overall design quality or aesthetic considerations, despite compliance with the Design Code, the District Design Review Committee may make suggestions for improving the design.

(d) Variances. The District Design Review Committee may grant approvals notwithstanding normal guidelines based on existing topographical or landscape conditions, existing trees, or architectural merit. Any such variance must be in writing. Approval of a variance does not constitute a precedent for other applications, and such requests may be arbitrarily denied. Notwithstanding the foregoing, the District Design Review Committee shall not have the right to waive any guidelines imposed by the Master Design Review Committee, the Master Declaration, or other requirement established by Master Declarant or the Master Association without their prior written consent.

(e) Notification; Construction; Inspection. The District Design Review Committee shall make best efforts to notify the applicant of its decision within the time allowances set out in its design approval process guidelines. However, a delay in reviewing an application shall not be deemed consent to construction. If approval is given, construction of the Improvements may begin. All construction must comply with the submitted plans. The District Design Review Committee or its agent may inspect the property during construction but has no obligation to make any such inspection. Any inspection made by the District Design Review Committee is made for the benefit of the District Design Review Committee or District Declarant, and is not made for the benefit of or to be relied upon by any third party or Owner.

(f) Completion. When the primary building and landscaping are completed in substantial compliance with the approved plans and specifications, the District Design Review Committee may on request issue a Certificate of Substantial Conformance. The Certificate shall describe any areas of deficiency that need to be corrected. All Fines and other enforcement shall be waived so long as the deficiencies are corrected within sixty (60) days. Upon correction of all deficiencies, the District Design Review Committee shall issue a Certificate of Completion and Release in recordable form. If no Certificate of Substantial Conformance is requested, the District Design Review Committee shall not be estopped from later determining that a deficiency needs correction, and reserves all rights of Fines and enforcement.

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(g) Governmental Compliance. Owners are responsible for making sure that construction conforms to governmental regulations and all local building codes. If the District Design Review Committee notes noncompliance, the Owner will be required to make the necessary changes. However, the District Design Review Committee is not responsible for compliance with governmental requirements.

Section 5. Approval of Architects, Builders. District Declarant shall have the right to approve any and all architects or builders in all or any portion of the District, in its sole discretion. District Declarant's approval of an architect, builder or other design professional shall not constitute any representation or endorsement of such professional's character, experience or professional capabilities.

Section 6. Enforcement.

(a) Fines. The District Design Review Committee may require the Builder or Owner to post a deposit from which the District Design Review Committee may deduct Fines for failure to comply with the approved plans and specifications, tree regulations and rules for builder conduct. The collection of a Fine shall not in any way diminish the available remedies at law or equity.

(b) Suit Permitted. If any construction is begun that has not been approved or that deviates from approved plans and specifications, the District Design Review Committee, District Declarant or the District Association may require the Owner to resolve the dispute through binding arbitration or may bring suit seeking damages, specific performance, declaratory decree and/or injunction, or any other remedy at law or in equity. The Board shall be empowered to bring suits on behalf of the District Association. If suit is brought and the court finds that the construction was not approved or that the construction deviated from the approved plans or specifications, then the party bringing suit shall also be awarded reasonable attorney's fees, even if the relief requested is not granted.

(c) Trees and Hedges. Improper cutting, removal, lack of care or intentional damage to existing trees and hedges may be subject to the imposition of Fines plus a requirement that the tree be replaced with an approved species of comparable caliper, or, if approved by the District Design Review Committee, a combination of trees totaling the caliper of the removed tree, or that hedges be replaced with an approved hedge plant. Fines shall be set by the District Design Review Committee.

(d) Drainage. After reasonable notice (except in an emergency), District Declarant or the District Association shall have the right but not the obligation to enter onto a Lot and correct improper grading or other modification to the Lot which causes drainage problems. Such corrections shall be made at the cost and expense of the Owner of the Lot, who shall promptly reimburse District Declarant or the District Association, as applicable. The Lot shall be subject to a lien for the cost if not paid. District Declarant or the District Association, as applicable, shall not be required to repair or replace landscaping or other improvements after such action.

(e) No Waiver. Failure to enforce any provision of this Declaration shall not be deemed a waiver of the right to do so at any time thereafter.

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Section 7. Liability. District Declarant and District Design Review Committee and its inspectors are concerned primarily with aesthetic considerations, and are not responsible for compliance with governmental requirements or design or construction defects or use of materials affecting the safety or structural integrity of the building. Approval by the District Design Review Committee of an application shall not constitute a basis for any liability of the Qualified Architect, District Declarant, members of the District Design Review Committee, the Directors of the Board or the District Association for failure of the plans to conform to any applicable building codes or inadequacy or deficiency in the plans resulting in defects in the improvements, or for the performance or quality of work of any builder or architect approved by it, or for non-compatible or unstable soil conditions or soil erosion, or any other condition of the property.

## ARTICLE XI
## USE RESTRICTIONS

Section 1. Use Restrictions. In addition to all other covenants contained herein, the use of the Property is subject to the following; provided, however, that if any Supplemental Declaration or Sub-District Declaration expressly permits uses or matters that would otherwise be prohibited, with the express consent of District Declarant, then such Supplemental Declaration or Sub-District Declaration shall control over this Declaration for purposes of this Article XI:

(a) Maintenance of Exterior and Interior. Except as provided in this District Declaration or any Supplemental Declaration, each Owner shall be responsible for the maintenance of, and shall maintain, the exterior and interior of its Lot and any Improvements in a clean, sanitary, and attractive condition, and shall (1) keep its Lot free from rubbish, litter, and noxious weeds; (2) maintain, cultivate, and keep in good condition and repair shrubs, trees, grass, lawns, plantings, and other landscaping located, or from time to time placed, within the bounds of its Lot; and (3) replace dead plants, shrubs, trees, grass, or landscaping of the same or similar type. If any irrigation system is in place on any Lot, the Master Association may require that the Owner maintain such irrigation system and keep such system in use to the extent required to keep a maintain healthy landscaping.

(b) Association to Landscape Common Area. Except as otherwise provided herein, the District Association shall have the right and the obligation at any time to plant, replace, maintain, and cultivate shrubs, trees, grass, plantings, and other landscaping upon the Common Maintenance Area located on the Property. No Owner shall remove, alter, or injure in any way any shrubs, trees, grass, plants or other landscaping placed upon or about a Lot by District Declarant or the District Association, without first obtaining the written consent of the Board.

(c) Signs and Billboards; Exterior Lights. No sign or billboard of any kind shall be displayed to the public view on any portion of the Common Area, except for (1) directional or informational signs, established by District Declarant or the District Association, (2) signs used by District Declarant, or by its successors or assigns, to advertise the Property, provided such signs are located on the Common Area, and (3) signs permitted under any Supplemental Declaration or Sub-District Declaration, provided that the Board may establish or require a common signage system for such purposes and such system shall prevail over the general provisions of this subsection.

(d) Quiet Enjoyment. No noxious, offensive or illegal activity shall be carried on, in or upon any Lot or any part of the Property, nor shall anything be done thereon that may be or may become an annoyance or nuisance to the neighborhood, that shall interfere in any way with any Owner's quiet enjoyment of its respective Lot, or that shall increase the rate of insurance in any way.

(e) Temporary Structures. No structure of a temporary character or other out-building shall be used on any Lot or the Common Area at any time as a residence or otherwise, either temporarily or permanently. Notwithstanding the foregoing, District Declarant or its agents shall have the right to conduct any business necessary for the sale of Lots, including showing model Lots and maintaining a sales and/or construction office on the Common Area or in any Lot owned by Declarant. In furtherance thereof Declarant shall have an easement over all of the Common Area for ingress, egress and parking for itself, its agents, employees, and prospective buyers of Lots for so long as District Declarant or any subsidiary or affiliated company owns any interest in the Property, and District Declarant may block or restrict access over and across roadways so long as access to a particular Lot owned by a Person other than District Declarant is not prohibited.

(f) Animals. No animals, reptiles, rodents, livestock, birds, or poultry of any kind shall be raised, bred or kept in or on any Lots, other than bona fide service animals or household pets. No household pets shall be kept outside the dwelling or housing unit, and any outside activity shall be under the active control of the Owner or one acting on the Owner's behalf. Without limiting the foregoing, animals who repeatedly bark, are aggressive, or other create a negative impact on other Owners or other persons may be subject to further restrictions and, in the discretion of the Board, removed from the Development. No animal may be kept in a manner that, in the sole determination of the Board, is unhealthy or cruel for such animal, including without limitation keeping animals tied up or tethered for extended periods of time. In making any determination of cruelty or unhealthy conditions, the Board shall have the right but not the obligation to consult governmental or private animal control or shelter organizations. The Board may permit variances to the restrictions set forth in this subsection in the Board's sole discretion. The Board may establish further rules and regulations for control of animals and household pets, and may impose Fines for violations of the foregoing or additional rules and regulations in addition to requiring removal of animals from the Development.

(g) Vehicles. No truck, trailer, camper, boat, van or similar equipment or disabled vehicle shall be permitted to remain upon or within the Common Area or public streets unless on a space designated for such use by the District Association. No such equipment may be stored or permitted to remain upon a Lot or any portion of the Common Area or public streets for more than forty-eight (48) hours unless stored in an enclosed garage.

(h) Exterior Structures. No fences, ornamental screens, awnings, screen doors, sunshades except as approved by or under general rules adopted by the District Design Review Committee.

(i) Garbage Collection. All rubbish, trash, and garbage shall be removed from the Property regularly and shall not be allowed to accumulate thereon. All refuse containers, clothes lines, woodpiles, storage areas, machinery, or equipment shall be kept in such a manner as not to be visible from neighboring property or contiguous streets. No incinerators shall be kept or maintained on any Lot. Refuse containers shall not be placed outside for trash pickup prior to

6:00 p.m. on the day prior to such pickup, and shall be returned to non-visible areas no later than the end of the day on which pickup is made. No debris, trash, ashes, lawn clippings, leaves, leaf bags or other refuse may be thrown or dumped on any of the Lots or Common Area. Debris and trash during the construction of an Owner's Improvements shall be collected by each Owner (or his or her representative) in containers approved by the District Design Review Committee and periodically removed so that no unsightly condition occurs on the Lot or adjoining Lots.

(j) Taxes and Utilities. Each Owner shall pay any real and personal property taxes or charges assessed against their respective Lot and Improvements and the utility charges for said Improvements.

(k) Infections, Plant Diseases or Insects. No Owner shall permit anything or condition to exist upon any portion of such Owner's Lot that shall induce, breed, or harbor infections, plant diseases, vermin or noxious insects.

(l) Reasonable Inspection and Entry. The Board shall have the right of inspection and entry onto Lots in order to perform the duties and obligations of the Board under this Declaration and under the Bylaws. In addition, District Declarant, the District Association, and their designees shall have the right to enter upon a Lot for the purpose of cutting grass, hedges and shrubbery and providing maintenance agreed upon with the Owner thereof.

(m) Trade or Business. No gainful profession, occupation, trade or other nonresidential use shall be conducted in any Lot designated for residential purposes or upon the District Common Area or any portion thereof without the prior approval of the Board. Special Use Parcels or areas in which a mix of business and residential purposes are appropriate shall be governed by the provisions of any Supplemental Declaration or Sub-District Declaration covering such portions of the Development. The Board may disapprove such a trade or business in the event that it determines that the trade or business would have a negative impact on the Property, including, without limitation, creating problems related to traffic, parking or security. In determining whether to approve a trade or business conducted in a residential Lot, the Board shall be provided with detailed information on (i) the type of trade or business and (ii) the activities related thereto that could potentially affect the Property. In the event that the Board approves a certain trade or business (the "Approved Use"), then so long as the activities related to that Approved Use do not materially change from the activities described to and approved by the Board, the Board (whether or not the composition of the Board changes) shall not have the right to disapprove the Approved Use after the date of the original approval, subject to subparagraph (s) below. Notwithstanding the foregoing, an Owner or occupant residing in a unit within the Development may conduct business activities within the unit so long as: (a) the existence or operation of the business activity is not apparent or detectable by sight, sound, signage or smell from outside the Unit; (b) the business activity conforms to all applicable zoning, law, statute or ordinance requirements; (c) the business activity does not involve persons coming onto the Development who do not reside in the Development or door-to-door solicitation of residents of the Development; and (d) the business activity is consistent with the residential character of the Property and does not constitute a nuisance, or a hazardous or offensive use, or threaten the security or safety of other residents of the Development, as may be determined in the sole discretion of the Board. The terms "business" and "trade", as used in this provision, shall be construed to have their ordinary, generally accepted meanings, and shall include, without limitation, any occupation, work or activity undertaken on an ongoing basis which involves the provision of goods or services to persons other than the provider's family and for which the

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provider receives a fee, compensation, or other form of consideration, regardless of whether: (i) such activity is engaged in full or part-time; (ii) such activity is intended to or does generate a profit; or (iii) a license is required therefor.

(n) Compliance with Law. The District Association and each Owner shall comply promptly with all laws, statutes, ordinances, rules and regulations of federal, state or municipal governments or authorities applicable to use, occupancy, construction and maintenance of any Improvements upon the Lots, including without limitation any zoning or other approvals or restrictions.

(o) Damage from Plants. No Owner shall permit any plant, tree, shrubbery or other similar item to exist upon any portion of such Owner's Lot that shall damage or create a nuisance on another Lot or that has not been approved by the District Design Review Committee. The Board shall determine conclusively, in its sole and absolute discretion, whether, for the purpose of this paragraph, a particular plant, tree, shrubbery, or other similar item is a nuisance and therefore to be removed from the Property.

(p) Wells. No private wells may be drilled or maintained on any Lot without the prior written consent of the District Design Review Committee.

(q) Laundry. Without the express permission of the District Design Review Committee, no Owner, guest, or tenant, shall hang laundry from any area within or outside the Improvements on a Lot if such laundry is within the public view, or hang laundry in full public view to dry, such as on balcony or terrace railings.

(r) Firearms and Other Weapons. Discharge of firearms and other weapons is prohibited; provided, the Board shall have no obligation to take action to prevent or stop such discharge; provided, further, however, that nothing in this provision shall be deemed to prevent the Declarant or Board, or the Declarant or Board of any Sub-Association, with the consent of Declarant or Board, from establishing or permitting facilities, Lots, or other areas where such activities may be permitted, whether on a private or retail basis. For this purpose, firearms and weapons shall be deemed to include any instrument that may or is designed to propel or discharge bullets, arrows, or other objects by use of explosive force, compressed air, elastic contraction or other means, including without limitation handguns, rifles, shotguns, pellet guns, BB guns, cross-bows, and long or compound bows. This definition shall be broadly construed, and the Declarant and Board of Directors shall have discretion to determine whether a particular object or instrument is a firearm or weapon in its sole discretion.

(s) Restriction on Rentals. No Living Unit shall be rented to a non-Owner except with the prior written consent of the Association.

(i) If an Owner shall desire to rent its Living Unit to a third-party, the Owner shall be required to submit to the Association all of the following, in form and content satisfactory to the Association:

(1) An application for rental providing, among other things, the identity of the Living Unit, the name of the proposed tenant and occupants, the proposed term of the rental, and contact information for the Owner while not occupying the Living Unit.

(2) A copy of a qualifying lease. For purposes of this section, a qualifying lease is one that is for a term not less than twelve (12) months and that expressly advises tenant that the Living Unit is subject to the Declaration and that the tenant is responsible for compliance with the Declaration and all other rules and regulations adopted by the Association from time to time.

(3) A copy of a background check on the prospective tenant and all occupants of the Living Unit provided with the written consent of the prospective tenant and that indicates no prior criminal convictions or any sex offender status or other matter reasonably objected to by the Association.

(4) Any fee charged by the Association for review of the application and other material.

(5) Upon approval, a copy of the executed tenant lease.

(ii) A failure to procure approval prior to leasing a Living Unit shall constitute a violation of the Declaration and, among other things, the Association shall be entitled to injunctive relief against such Owner and the tenant, the Owner acknowledging that legal remedies may not be adequate. The Owner shall be subject to all expenses of the Association resulting from any such violation, including without limitation reasonable attorney fees and other costs of enforcement.

(iii) The Board shall have the power to waive the foregoing restrictions and to reduce the minimum lease term for good cause shown, in the sole discretion of the Board.

(iv) Notwithstanding the foregoing, no Owner shall lease, license for occupancy, or otherwise permit a non-Owner to remain in a Living Unit for a period of less than thirty (30) days if consideration is given for such stay or if such occupancy is advertised by any medium, including without limitation short term rentals.

Section 2. Additional Restrictions. The Board of Directors shall be entitled to invoke additional rules and regulations from time to time for the operation, use and maintenance of the Property located within its jurisdiction, including the Lots and the Common Area, provided such rules and regulations are not inconsistent with this Declaration.

## ARTICLE XII
## GENERAL PROVISIONS

Section 1. Term. The covenants and restrictions of this Declaration shall run with and bind the Property, and shall inure to the benefit of and shall be enforceable by the District Association or the Owner of any of the Property subject to this Declaration, their respective legal representatives, heirs, successors and assigns, for a term of thirty (30) years from the date this Declaration is recorded. After the initial thirty (30) year term has expired, the term of this Declaration shall be automatically extended for successive periods of ten (10) years, unless an instrument in writing, signed by sixty-seven percent (67%) of the then Owners, has been

recorded within the year preceding the beginning of each successive ten-year period, agreeing to change said covenants and restrictions, in whole or in part, or to terminate the same.

Section 2. Amendment. This Declaration may be amended by a sixty-seven percent (67%) affirmative vote of the Owners present, in person or by proxy, at any duly called meeting, and the written approval of the Master Declarant and District Declarant during the respective Declarant Control Period. During the Declarant Control Period, District Declarant may unilaterally amend this Declaration for any purpose. Any amendment shall not become effective until recorded in the Office of the Register's Office for Maury County, Tennessee. No amendment may remove, revoke, or modify any right or privilege of District Declarant without the written consent of District Declarant or the assignee of such right or privilege. After the Declarant Control Period, the Declarant may unilaterally amend this Declaration so long as such amendment is designed to comply with any law, regulation or provision of the Federal Home Loan Mortgage Corporation or Federal National Mortgage Association.

Section 3. Indemnification. The District Association shall indemnify its officers and directors against any and all expenses and liabilities, including attorney fees, reasonably incurred by or imposed upon any officer or director in connection with any action, suit, or other controversy or proceeding (including settlement of any suit or proceeding, if approved by the then Board of Directors) to which he or she may be a party, or may become involved, by reason of being or having been an officer or director of the District Association. The officers and directors shall not be liable for any mistake of judgment, negligent or otherwise, except for their own individual willful misfeasance, malfeasance, misconduct or bad faith. The officers and directors shall have no personal liability with respect to any contract or other commitment made by them, in good faith, on behalf of the District Association (except to the extent that such officers or directors may also be Members of the District Association), and the District Association shall indemnify and forever hold each such officer and director free and harmless against any and all liability to others on account of any such contract or commitment. Any right to indemnification provided for herein shall not be exclusive of any other rights to which any officer or director, or former officer or director, may be entitled. The District Association shall, as a common expense, maintain adequate general liability and officers' and directors' liability insurance to fund this obligation, if such insurance is reasonably available.

Section 4. Delegation of Use. Any Owner may delegate, in accordance with the Articles of Organization of the District Association and this Declaration, his or her right of enjoyment to the Common Area and facilities to customers, the members of his or her family, tenants and social invitees, subject to such rules and regulations as the Board of Directors may adopt.

Section 5. Construction and Sale by District Declarant. Notwithstanding any provisions contained in this Declaration to the contrary, so long as construction and initial sale of Lots or Improvements shall continue, it shall be expressly permissible for District Declarant to construct, maintain and carry on upon portions of the Property, other than Lots owned by persons other than District Declarant, such facilities and activities as, in the sole opinion of District Declarant, may be reasonably required, convenient, or incidental to the construction or sale of such Lots, including, but not limited to, business offices, signs, utilities, model units, and sales offices, and District Declarant and its invitees shall have an easement for access to such facilities. District Declarant may further delegate all or some of the privileges set forth in this

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Section 8 to any Person in the sole discretion of District Declarant. This Section may not be amended without the express written consent of District Declarant.

Section 6. Severability. Invalidation of any one of these covenants or restrictions by judgment or court order shall in no way affect any other provisions, which shall remain in full force and effect. Each covenant and restrictions shall be enforced to the fullest extent permitted by law.

Section 7. Enforcement. The District Association, or any Owner, shall have the right to enforce, by any proceeding at law or in equity, all restrictions, conditions, covenants, reservations, liens and charges now or hereafter imposed by the provisions of this Declaration. Failure by the District Association or by any Owner to enforce any covenant or restriction herein contained shall in no event be deemed a waiver of the right to do so thereafter. Without limiting the foregoing, the District Association shall have the authority to enforce the restrictions, conditions, covenants and rules and regulations now or hereafter adopted pursuant to this Declaration by the imposition of Fines on Owners, which shall be established by the Board of Directors in its discretion, and enforced and collected as a Special Assessment pursuant to the Declaration. The Board of Directors may establish notice, hearing and other procedures from time to time in conjunction with the use and levying of Fines.

Section 8. Use of the Words "_____". No Person shall use the words "_____" or "_____ at Columbia Bluffs" or any derivative thereof in any printed or promotional material without the prior written consent of District Declarant and Master Declarant.

Section 9. Disclosures. Each Owner acknowledges the following:

(a) The Property is located adjacent to thoroughfares that may be affected by traffic and noise from time to time and may be improved and/or widened in the future.

(b) The views from an Owner's Lot may change over time due to, among other circumstances, additional development and the removal or addition of landscaping.

(c) No representations are made regarding the zoning of adjacent property, or that the category to which adjacent property is zoned may not change in the future.

(d) No representations are made regarding the schools that currently or may in the future serve the Development or any Lot.

(e) Since in every neighborhood, there are conditions that different people may find objectionable, it is acknowledged that there may be conditions outside of the Property that an Owner may find objectionable and that it shall be the sole responsibility of the Owners to become acquainted with neighborhood conditions that could affect a Lot.

(f) All Owners acknowledge and understand that District Declarant and builders or developers will be constructing/renovating portions of the District and engaging in other construction activities related to the construction of Common Area and improvement of Lots. Such construction activities may, from time to time, produce certain conditions within the District, including, without limitation: noise or sound that is objectionable because of its volume,

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duration, frequency or shrillness; smoke; noxious, toxic, or corrosive fumes or gases; obnoxious odors; dust, dirt or flying ash; unusual fire or explosion hazards; temporary interruption of utilities; and/or other conditions that may threaten the security or safety of persons within the District. Notwithstanding the foregoing, all Owners agree that such conditions within the District resulting from renovation and construction activities shall not be deemed a nuisance and shall not cause District Declarant and its agents to be deemed in violation of any provision of this Declaration.

## ARTICLE XIII
## DECLARANT'S RIGHTS

Section 1. Withdrawal or Addition of Property. District Declarant reserves the right to amend this Declaration, for the purpose of removing any portion of the Property or to add additional property to be subject to this Declaration by Supplemental Declaration. Such amendment shall not require the consent of any Person other than the Owner(s) of the property to be withdrawn, if not the District Declarant. If the property is Common Area, the District Association shall consent to such withdrawal. The inclusion of real property in the term "District" shall not be deemed to obligate Declarant to acquire such real property or to include such property within the Property or the Development except in the sole discretion of Declarant.

Section 2. Marketing and Sales Activities. District Declarant and Persons authorized by District Declarant may construct and maintain upon portions of the District and the Common Area such facilities and activities as, in District Declarant's sole opinion, may be reasonably required, convenient, or incidental to the construction or sale of Lots, including, but not limited to, business offices, signs, model units, and sales offices. District Declarant and authorized Persons shall have easements for access to and use of such facilities at no charge.

Section 3. Right to Approve Changes in District Design Standards. No amendment to or modification of any restrictions and rules or architectural guidelines shall be effective without prior notice to and the written approval of District Declarant so long as District Declarant owns property subject to this Declaration or which may become subject to this Declaration in accordance with this Article.

Section 4. Provision of Telecommunication Services. District Declarant shall have the right to enter into an agreement with one or more authorized providers of Telecommunication Services pursuant to which such providers may have the exclusive right to provide Telecommunication Services to all or a particular portion or portions of the District, subject to approval by Master Declarant.

Section 5. Right to Use of Amenity Center. District Declarant shall have the right to use any amenity center within the Development without cost at any time and to permit other parties, including without limitation builders or industry groups, the same privilege of usage at no cost.

Section 6. Right to Transfer or Assign District Declarant Rights. Any or all of District Declarant's special rights and obligations set forth in this Declaration may be transferred in whole or in part to other Persons. No such transfer or assignment shall be effective unless it is in a written instrument executed by District Declarant and recorded in the Office of the Judge of Probate. The foregoing sentence shall not preclude District Declarant from permitting other

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Persons to exercise any right reserved to District Declarant in this Declaration as an agent, employee or contractor of District Declarant where District Declarant does not intend to transfer such right in its entirety, and in such case it shall not be necessary to record any written assignment unless necessary to evidence District Declarant's consent to such exercise. In the event District Declarant ceases to act as District Declarant and abandons its role as District Declarant after the end of the Declarant Control Period, then the District Association shall have and may exercise all rights of District Declarant without the necessity of a written assignment by District Declarant.

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IN WITNESS WHEREOF, the undersigned Declarant has executed this Declaration effective as of the date first set forth above.

**DECLARANT:**

_____

By:_____

Print Name:_____

Title:_____

STATE OF TENNESSEE

COUNTY OF _____

Before me, the undersigned, a Notary Public in and for the State and County aforesaid, personally appeared _____ with whom I am personally acquainted, (or proved to me on the basis of satisfactory evidence), and who, upon oath, acknowledged that (s)he executed the within instrument for the purposes therein contained, and who further acknowledged that (s)he is the _____ of _____, a _____, and that (s)he as such _____executed the foregoing instrument for the purpose therein contained, being authorized so to do, to execute this instrument on behalf of _____, by signing the name of _____ , as _____.

Witness my hand, at office, this _____day of _____, 20___.

Notary Public_____

My commission expires:_____

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**EXHIBIT A**
**PROPERTY DESCRIPTION**

TO BE INSERTED UPON FORMATION OF ASSOCIATION

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**EXHIBIT B**
**CHARTER OF DISTRICT ASSOCIATION**

TO BE INSERTED UPON FORMATION OF ASSOCIATION

**EXHIBIT C**
**BY-LAWS OF DISTRICT ASSOCIATION**

TO BE INSERTED UPON FORMATION OF ASSOCIATION

CPWS
Columbia Power & Water Systems

201 Pickens Lane
P.O. Box 379
Columbia, TN 38402

P 931.388.4833
F 931.388.5287
www.cpws.com

October 13, 2023

Kolter Land
Joshua Gibbs
1704 Tellico Dr,
Thompsons Station, TN 37179

Re: 420 Bear Creek Pike , Columbia Bluffs

Dear Sir:

Columbia Power System has an existing power line near your proposed development.

We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction.

Yours truly,

**COLUMBIA POWER & WATER SYSTEMS**

Ryan Massey, P. E.
Manager of Power Operations

kw

CITY OF COLUMBIA
TENNESSEE

WASTEWATER DEPARTMENT

16 October 2023

Kolter Land
14025 Riveredge Drive, Suite 175
Tampa, Florida 33637
Attn: James P. Harvey

RE: "Columbia Bluffs" Tax Parcels: 090 012.01,090 012.01 001 and 090 016.00 001

Mr. Harvey,

This letter serves as confirmation that the City of Columbia Wastewater Department has the available capacity to service the above-referenced development. Major or minor improvements to existing infrastructure may or may not be necessary to satisfactorily convey the additional sanitary sewer flow from the above-referenced proposed development. Any extension to the existing sewer infrastructure will be initiated by the owner/developer, reviewed by our department and approved by the State of Tennessee. Grinder Pump systems are not allowed by the City of Columbia. The project must be advanced in accordance with local, state and federal rules, regulations and policies. Funding and construction of those improvements will remain the responsibility of the owner/developer. New customers will be required to pay all fees applicable at the time of connection. No detailed design plan for an extension of the sewer has been proposed at this time.

Donnie Boshers, Director
City of Columbia, TN
Wastewater Department

CPWS

October 13, 2023
Mr. Joshua Gibbs
Kolter Land
14025 Riveredge Drive, Suite 175
Tampa, FL 33637
***Sent via email: jgibbs@kolter.com***
**RE: Water Availability Letter**
**Big Bear Bluffs Single Family – 129 Units**
**400 Bear Creek Pike**
**Tax Map 90, Parcel 12.01**
***Columbia, Maury County, TN***

Dear Mr. Gibbs:

Columbia Power and Water Systems ("the Utility"/CPWS) is a municipal corporation authorized to provide water services in accordance with State law. CPWS has adopted rules, regulations, and standard operation procedures, prescribing the conditions under which CPWS will furnish water service. In addition, certain State laws delegate authority to the Tennessee Department of Environment and Conservation, various Planning Commissions and other authorities in Cities and Counties. These Cities and Counties have also adopted rules and regulations. Subject to the payment of all charges and fees imposed by CPWS and the approval of any and all required governmental agencies, water service will be made available on a first-come, first-served basis, subject to availability of all CPWS furnished equipment and materials appropriate for the development and provided the applicant complies with all rules and regulations of CPWS and conditions set out herein.

As submitted by the applicant, the proposed development includes up to 860 single-family residential units in townhome and detached configurations, an approximately 4,600 square-foot amenity building with pool, a daycare, and irrigation for common areas. CPWS has evaluated the projected water demands for the proposed development and is able to meet a fire-flow capacity of 1,000 gpm at 20 psi for all proposed lots (as submitted by the applicant in concept plan dated 9/29/2023) while maintaining the existing level of service and pressures in this portion of the distribution system. CPWS can provide water for the proposed development according to the following requirements:

- Water availability for the proposed 860 units is contingent upon the schedule of development as provided by the applicant. Any acceleration of the schedule (start, finish, or increased unit count per phase) will require re-evaluation of water availability. Acceptance of an accelerated schedule is not guaranteed. The schedule as provided by the applicant is as follows:

| Project Phase | Approximate Units | Sitework Started | Vertical Construction Completion | Notes |
|---|---|---|---|---|
| Phase 1 | 129 | Q1 2026 | Q2 2028 | |
| Phase 2 | 142 | Q2 2028 | Q4 2029 | Includes amenity building |
| Phase 3 | 109 | Q3 2029 | Q1 2031 | Includes daycare |
| Phase 4 | 135 | Q4 2030 | Q2 2032 | |
| Phase 5 | 112 | Q1 2032 | Q2 2033 | |
| Phase 6 | 122 | Q2 2033 | Q1 2034 | |
| Phase 7 | 94 | Q1 2030 | Q2 2033 | |

- This Water Availability Letter represents water availability for the entire development, but a new water service application and fee is required for subsequent phases. Water service is not guaranteed until the relevant impact fees are paid for each meter to be installed.
- A new 12-inch water main will be required to be installed by the Applicant from Bear Creek Pike, south through the spine road of the proposed development to Iron Bridge Road. From there a 16-inch main will be installed west to Tom J Hitch Parkway. From the intersection of Tom J Hitch Parkway and Iron Bridge Road, a new 16-inch water main will be installed north to the existing 12-inch CPWS water main located just south of the Duck River bridge on Tom J Hitch, as well as south to the existing 12-main near 1451 Tom J Hitch Parkway. The attached figure provides a visual representation of these requirements.
- A permanent, exclusive 20-foot water main easement will be provided by the developer for the new 16-inch and 12-inch water mains. Within the development, the easement may overlap the right-of-way of the spine road.
- Lane additions or other required improvements at Bear Creek Pike or other roadways may necessitate additional construction to relocate any impacted existing water mains.
- All off-site improvements must be constructed, tested per CPWS standards and deeded over to CPWS prior to connection of any domestic water meter used for full-time residence.
- The remainder of the water mains in the development shall be a minimum of 8-inch diameter with looped connections throughout the development. Final design to accommodate fire protection loads may necessitate an increase in some water main sizes in the development.

All of the above requirements are to be constructed and paid for by the Applicant and deeded over to CPWS once complete up to and including the meter. No construction of water infrastructure shall be initiated until final construction plans have been approved by TDEC and a water service agreement with CPWS is fully executed.

Once you have received this Water Availability Letter, next steps in the process to obtain water service from CPWS are as follows:

- Present the attached fireflow analysis figure for coordination and approval of development from the Columbia Fire Marshall.
- Prior to expiration of this water letter, remit to CPWS the new water service fees for Phase 1 of the development as follows:

| | |
|---|---|
| New Water Service Fee: $1,500 + $370 per SFU (129 SFUs) | $49,230.00 |

- Provide site base CAD files in DWG format, including roads, lot lines, existing and proposed contours, and other existing and proposed utilities, for use in development of water construction drawings. *This should include survey for the corridor of any required offsite improvements.*
- CPWS will then develop water construction drawings and submit them to TDEC for approval. Upon approval by TDEC and payment of Phase 1 meter and impact fees by the applicant, applicant may then schedule a pre-construction meeting with CPWS. Pre-construction meeting will not be scheduled until fees are paid in full or surety is provided in lieu of full payment. Final meter and impact fees are subject to change based on final design and meter size determination. Meter fees are subject to change based on market costs at time of purchase. Meters will not be set until meter and impact fees are paid. Meter and impact fees for Phase 1 are as follows:

| | |
|---|---|
| Meter Fee: $540 per 3/4" meter (129 meters) | $69,660.00 |
| Impact Fee: $4,500 per 3/4" meter (129 meters) | $580,500.00 |
| **Total Meter and Impact Fees Due =** | **$650,160.00** |

- After the pre-construction meeting, CPWS will then issue a formal notice to proceed. No construction of CPWS infrastructure may take place prior to the pre-construction meeting.
- Applicant is then required to construct all public water infrastructure per CPWS standard specifications and provide CPWS personnel unregulated access to the site to inspect the construction of the water infrastructure.

If you have any questions, please feel free to contact me at 423-774-0349 or eric.king@inflodesign.com. This letter is valid for one-hundred twenty (120) calendar days from the date of this letter.

Sincerely,



Eric King, P.E.
Inflo Design Group, LLC
on behalf of Columbia Power and Water Systems

cc: Jonathan Hardin, CPWS
File 22-092

## Property and Master Plan Description

Identifying paths for new development, suburban neighborhood development, through *Connect Columbia*

- **Fostered as part of a practice of managed growth that relies on balancing growth, economic development and community development**
  Columbia Bluffs seeks to be a master planned community with diversity of housing options and civic opportunities.

- **Preservation of historic, cultural and environmental assets**
  Columbia Bluffs seeks to build civic areas around the historic/cultural history of the property and utilize proactive measures to protect the natural environmental systems supporting the Duck River.

- **Connectivity**
  Columbia Bluffs seeks to provide a north-south roadway connection between Iron Bridge and Bear Creek Parkway as well as provide stub road opportunities for future development to the east.

- ***Connect Columbia* Top Priorities: allowing a PUD model that will allow flexibility with more assurance of the final outcome**
  Columbia Bluffs seeks to create a master planned neighborhood with commitments on density, architectural character, quality amenities, and protected open space.

- **Suburban Neighborhood goals: future development emphasizing connectivity and housing diversity, pedestrian friendly**
  Columbia Bluffs seeks to development a master plan with all of these goals.

- ***Connect Columbia* Near-Term Priorities: promote master planned housing opportunities for a "full-life cycle" to accommodate retirees and young professionals and to review zoning standards to permit smaller lot and home sizes to encourage such developments.**
  Columbia Bluffs seeks to create a master planned neighborhood with housing opportunities that range from Active Adult age-restricted living, larger lots/homes to support growing families and generational living opportunities, to smaller lots and town homes for young families.


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# PUD Justification

PUD Zoning is only to be used under certain very specific conditions.

- 2.4.4 – *PUD district may be assigned to an area within a parcel of land over 10 gross acres, only if due to unique site conditions or the necessary and intrinsic uses, size, or form a proposed development* ***cannot under any plan, design, or circumstances conform to one or more of the character districts*** *and standards therefor.*

**Environmental Uniqueness.** The uniqueness of the land and its proximity to the Duck River provides a unique opportunity to master plan the community with greater environmental protection.

The Duck River may be the most significant natural feature in Columbia. It's the protection and preservation of this resource for aquatic species diversity, wildlife, and a clean Columbia is paramount. Open spaces should be identified and preserved with these specific goals in mind. Based on the Zoning Ordinance Primary Use Table 4.3.9.A-1, open spaces are defined based on the use type. While some uses on this chart are similar, they do not seem to capture the breadth of environmental resource protections and would therefore fall under "other open space use not listed under any use category" which is limited to use within a PUD only. The use of the PUD-R for this property ensures the City's oversight and the design team's plans for development are thought about on the front end and not left to speculation. The property should be developed using Conservation Design Concepts where low impact development is proposed and where conservation is the top priority within sensitive land and around environmental features in order to protect them. These conservation areas include floodplains, steep slopes, natural drainage areas, and areas of established tree canopy along the Duck River.

The Zoning Ordinance does not require a Conservation Plan, nor a development strategy to protect a resource as significant as the Duck River. Section 6.2 Preservation of Natural Features states: Development shall preserve the natural features of the site, such as wetlands, unique wildlife habitats, Historic Structures, major trees and scenic views both from and into the site. This regulation is too vague and not specific enough for the subject property.


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# Environmental Protection Strategy

1. **Strategy for Resource Protection utilizing a PUD Planning and Design Approach**

    a. Establish a Limits of Disturbance along the Duck River and its tributaries based upon slopes, natural drainage ways, floodplain areas, and mature tree canopy.
    b. Design new development around open space areas to highlight them as community amenities with pedestrian systems that will connect the entire conservation design open space throughout the community.
    c. Pedestrian circulation and trails are highly encouraged along the river, along stream corridors, and through scenic areas.
    d. The quantity of Open Space preservation should greatly exceed any established base zone district.
    e. New home lots should generally be smaller, clustered areas away from the protected banks of the Duck River.
    f. Document on-site natural resources through a State approved Hydrologist and concurrence reports with local, state, and federal agencies.
    g. Remove debris removal along creek banks to prevent impact to Bear Creek (shoes, clothing, random bottles, containers, fencing, wood)
    h. Use Best Management Practices for Stormwater Pollution Prevention Plans during construction.
    i. Use only one crossing point (< less than approx. 50’ - 60’ feet that spans the creek with no structures within Bear Creek (similar to several crossings visible from US (Highway 412).

2. **Strategy for Protection through Construction**

    Implementation of the Plan requires protective measures. PUD phasing and areas of disturbance should be documented and considered through the PUD process. Protection practices shall include:

    A. Storm water erosion control applications I.E.
        i. Stormwater Detention Areas,
        ii. natural riparian buffers
        iii. silt fencing
        iv. sediment ponds
        v. Check dams


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vi. Ongoing stormwater monitoring of Environmental Controls of water runoff areas and tributaries

B. Compliance with CGP, ARAP and NPDES permitting to address the protections that provide additional oversight to the project.

Throughout the duration of the project, these types of practices within the action areas will ensure environmental compliance with local, state and federal requirements.

**3. Strategy for Protection when construction is completed.**

Once development is completed permanent storm water detention areas and water out fall locations will be cleaned and stabilized in accordance with the local, state, and federal guidelines.

## PUD Standards and the Columbia Bluffs Plans

The Columbia Bluffs Master Plan will address and satisfy the standards for PUD Development as defined in 3.7.1 PUD-R District Standards: **PUD-Residential**: *Specifically, this District is intended for predominantly Residential areas on sites where there are sufficient existing infrastructure, services, and utilities available for a proposed Development. Development in this District:*

***a. Is walkable and provides a diverse mixture of housing choices and Building Types,***
***b. Is necessary to implement and is consistent with the Comprehensive Plan,***
***c. Cannot under any circumstances, plan, or design conform to one or more of the other Districts and standards therefor due to its necessary and intrinsic Uses or size or form,***
***d. Provides an innovative plan and design,***
***e. Is harmonious with and respects the land use, character, and natural or man-made features of both the subject property and Adjacent property,***
***f. Promotes quality and environmentally sensitive planning and design by taking advantage of special site characteristics, locations and land uses,***
***g. Provides Civic Space,***
***h. Is the best use of the site consistent with the goals of protecting and enhancing the natural environment. There are specific Development standards provided for this District, which may be supplemented by additional standards approved as part of the applicable Final Master PUD Development Plan.***

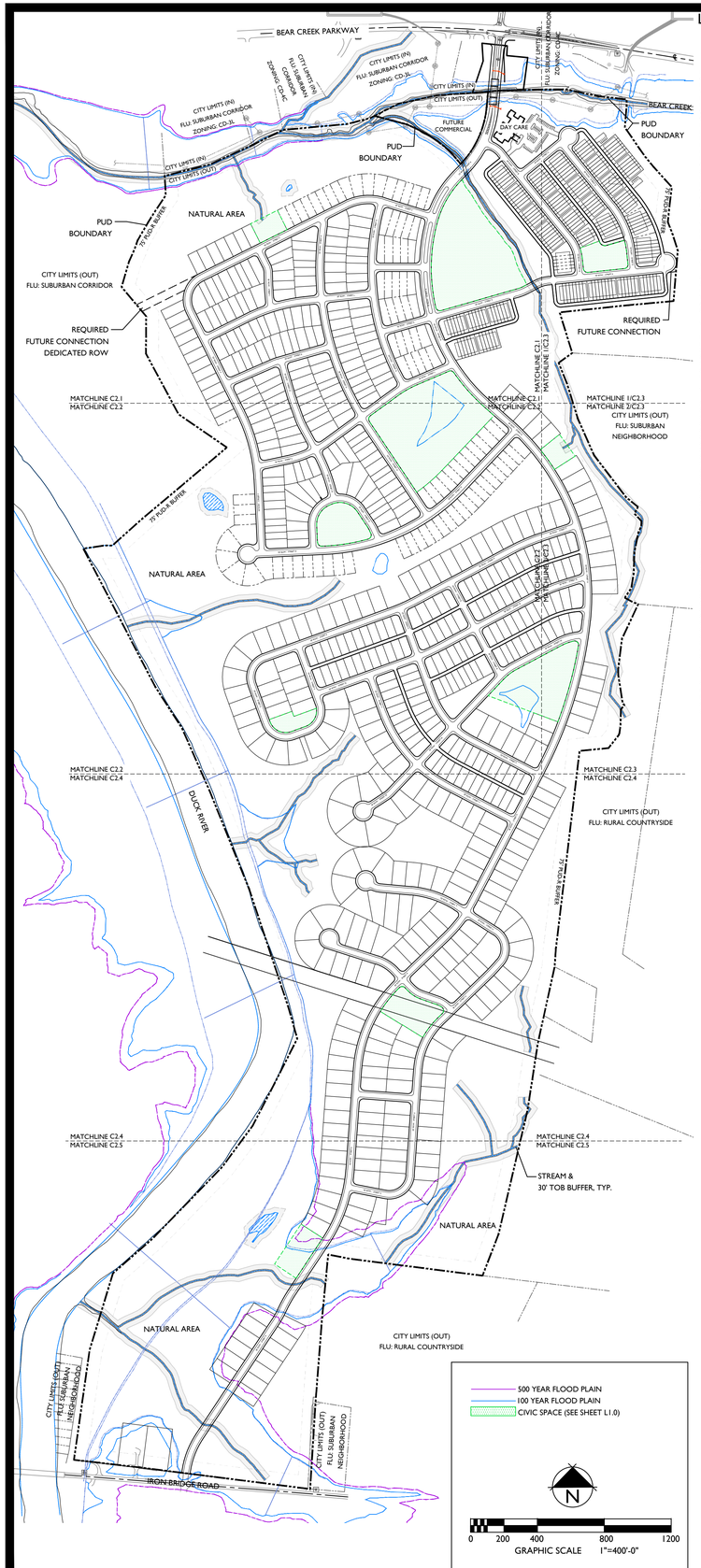
**PUD-R Justification**
Date: October 16, 2023
Project: Columbia Bluffs Preliminary PUD-R Master Development Plan

## Modifications of Standards

The following modifications of standards will be requested by the developer to reduce the development footprint and increase the open space held in preservation. The reduction in ROW width, setbacks, and variations in garage locations will provide for a unique, clustered neighborhood experience.

1. Reduction in ROW width from 70' to 50' provides approximately 19 acres of additional land placed into open space. (+/-41,730 LF of roadway).
2. Reduction in side setbacks from 10' to 7.5' on front loaded homes and townhomes provides approximately 6.6 acres of additional land placed into open space. (113,400 sf townhomes + 175,500 sf front load x 2 side yards x 2.5' reduction).
3. Reduction in side setbacks from 10' to 5' on detached alley loaded homes and active adult homes provides approximately 9.7 acres of additional land placed into open space. (397 homes x 120' depth x 2 side yards x 5' reduction = 422,400 SF)
4. Allow garage in 2nd layer on courtyard style homes (garage doors not facing frontage in second layer)
5. Allow double garage doors with a maximum width of 16' wide, single door with windows
6. Allow primary residential driveways to be 12' instead of 10' across the 1st layer and active adult driveways to be 18' across the 1st layer


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# LEGAL DESCRIPTION OF PROPERTY:

**LEGAL DESCRIPTION FOR ANNEXATION OF 409.92 ACRES TO PUD**
**FOR PART OF MAP 90, PARCEL 12.01**
**DEED BOOK R2051, PAGE 792**
**BIG BEAR BLUFFS, LLC**

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY BEAR CREEK PIKE, ROCK 'N' ROLL JESUS, LLC, AS OF RECORD IN DEED BOOK R2727, PAGE 1242 OF THE REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN); AMIT J. PATEL AND WIFE, MINAXBEN G. PATEL AS OF RECORD IN DEED BOOK R2411, PAGE 1348, ROMCTN; HK BIG BEAR BLUFFS, LLC (R BOOK R2678, PAGE 961, ROMCTN; ON THE EAST BY JEFFERY L. HEAD AND ROSE HEAD, WIFE & HUSBAND AS OF RECORD IN DEED BOOK R2230, PAGE 388, ROMCTN, STEVEN CHARLES FOSTER AND REBECCA JANE FOSTER, HUSBAND & WIFE AS OF RECORD IN DEED BOOK R2497, PAGE 1334, ROMCTN, BARRY C. BLACKBURN, TRUSTEE FOR BARRY C. BLACKBURN REVOCABLE TRUST AS OF RECORD IN DEED BOOK R2301, PAGE 1492, ROMCTN, BRENT W. THORNTON AND WIFE TERRI L. THORNTON AS OF RECORD IN DEED BOOK R0396, PAGE 766, ROMCTN, CALVIN DEAN JOHNSON FORMERLY CARL JOHNSON AND WIFE, BARBARA D. JOHNSON AS OF RECORD IN DEED BOOK 375, PAGE 543, ROMCTN, AND CALVIN DEAN JOHNSON AND WIFE SHERYL GAY JOHNSON AS OF RECORD IN DEED BOOK R747, PAGE 602, ROMCTN; ON THE SOUTH BY IRON BRIDGE ROAD; AND ON THE WEST BY JIMMY MATHEWS AS OF RECORD IN DEED BOOK R2411, PAGE 80, DAVID LUNN HARRIS ETUX AS OF RECORD IN DEED BOOK R2115, PAGE 1148, ROMCTN, DUCK RIVER, AND MARK A. SEAGO AND WIFE TINA SEAGO AS OF RECORD DEED BOOK R2369, PAGE 973 ROMCTN; AND CONTINUED TO THE NORTH BY MIKE BIKES AS OF RECORD IN DEED BOOK R1884, PAGE 1082, DWAYNE SAM GOODMAN AS OF RECORD IN DEED BOOK R2732, PAGE 1288, AND IS MORE PARTICULARLY DESCRIBED AS FOLLOWS

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT AN 1 INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.95 EAST 1,872,344.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 05°01'16" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 21°32'47" E, FOR A DISTANCE OF 51.20 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK N ROLL JESUS;
THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFFS, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 85°53'31" E, 307.86 FEET TO THE TRUE POINT OF BEGINNING;

THENCE, CONTINUING WITH BEAR CREEK, THE FOLLOWING CALLS:

N 85°53'31" E, FOR A DISTANCE OF 85.49 FEET TO A POINT;
N 89°39'27" E, FOR A DISTANCE OF 118.80 FEET TO A POINT;
S 89°57'56" E, FOR A DISTANCE OF 168.93 FEET TO A POINT;
S 81°59'35" E, FOR A DISTANCE OF 77.46 FEET TO A POINT;
S 78°01'43" E, FOR A DISTANCE OF 120.71 FEET TO A POINT;
S 83°35'45" E, FOR A DISTANCE OF 172.70 FEET TO A POINT ALONG THE WEST BOUNDARY OF JEFFERY L. HEAD;

THENCE, WITH THE WEST BOUNDARY OF HEAD, THE FOLLOWING CALLS:

S 0°56'50" W, FOR A DISTANCE OF 40.52 FEET TO AN IRON PIN;
S 04°40'44" W, FOR A DISTANCE OF 127.32 FEET TO A 1-1/2" PIPE FOUND;
S 34°29'27" E, FOR A DISTANCE OF 153.87 FEET TO A T-POST;
S 35°04'16" E, FOR A DISTANCE OF 55.17 FEET TO A T-POST;
S 39°22'56" E, FOR A DISTANCE OF 64.02 FEET TO A T-POST;
S 42°05'33" E, FOR A DISTANCE OF 106.39 FEET TO A T-POST;
S 42°31'20" E, FOR A DISTANCE OF 55.23 FEET TO AN 1-1/2" PIPE FOUND;
S 7°06'58" W, FOR A DISTANCE OF 101.11 FEET TO A 3" METAL POST;
S 5°45'07" W, FOR A DISTANCE OF 110.19 FEET TO AN 1-1/2" PIPE FOUND;
S 21°14'47" E, FOR A DISTANCE OF 78.14 FEET TO A T-POST;
S 17°34'01" E, FOR A DISTANCE OF 102.59 FEET TO A 24" CEDAR;
S 4°57'22" W, FOR A DISTANCE OF 172.54 FEET TO A T-POST;
S 4°32'31" W, FOR A DISTANCE OF 130.65 FEET TO 36" OAK;
S 84°46'29" W, FOR A DISTANCE OF 270.35 FEET TO 20" MAPLE;
S 84°01'38" W, FOR A DISTANCE OF 414.11 FEET TO A FENCE POST;
S 17°15'39" E, FOR A DISTANCE OF 254.68 FEET TO A 6" ROTTED HACKBERRY FENCE POST TO THE SOUTHWEST CORNER OF HEAD;

THENCE, WITH THE WEST BOUNDARY OF FOSTER, THE FOLLOWING CALLS:

S 54°11'5" W, FOR A DISTANCE OF 100.29 FEET TO 6" ROTTED HACKBERRY FENCE POST;
S 21°03'18" E, FOR A DISTANCE OF 130.86 FEET TO A CEDAR FENCE POST;
S 17°11'57" E, FOR A DISTANCE OF 221.38 FEET TO A 12" ELM;
S 23°46'07" E, FOR A DISTANCE OF 240.66 FEET TO A T-POST;
S 37°24'05" E, FOR A DISTANCE OF 315.73 FEET TO 14" ELM;
S 50°37'42" E, FOR A DISTANCE OF 91.73 FEET TO 60" TWIN OAK;
S 28°59'39" W, FOR A DISTANCE OF 35.62 FEET TO 60" OAK;
S 40°35'26" W, FOR A DISTANCE OF 9.08 FEET TO A T-POST;
S 42°52'20" E, FOR A DISTANCE OF 62.79 FEET TO A POINT;
S 1°50'17" W, FOR A DISTANCE OF 30.25 FEET TO A POINT;
S 23°53'47" W, FOR A DISTANCE OF 42.59 FEET TO 14" HACKBERRY;
S 11°25'58" W, FOR A DISTANCE OF 117.75 FEET TO A T-POST;
S 2°03'52" W, FOR A DISTANCE OF 130.94 FEET TO ROTTED HACKBERRY;
S 9°12'29" W, FOR A DISTANCE OF 87.18 FEET A POINT;
S 33°58'56" W, FOR A DISTANCE OF 69.04 FEET TO A 30" HACKBERRY;
S 61°19'48" E, FOR A DISTANCE OF 54.74 FEET TO A 24" HACKBERRY;
S 70°11'17" E, FOR A DISTANCE OF 34.53 FEET TO 12" CEDAR POST AT THE SOUTHWEST CORNER OF FOSTER;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN, THE FOLLOWING CALLS:

S 25°13'18" W, FOR A DISTANCE OF 225.44 FEET TO A 36" HACKBERRY;
S 7°09'46" W, FOR A DISTANCE OF 177.84 FEET TO A 8" DOGWOOD;
S 0°16'28" W, FOR A DISTANCE OF 41.40 FEET TO A 24" HACKBERRY FLAGGED;
S 8°53'22" E, FOR A DISTANCE OF 173.37 FEET TO A T-POST;
S 50°40'30" E, FOR A DISTANCE OF 13.02 FEET TO 6" FENCE POST;
S 39°18'12" W, FOR A DISTANCE OF 34.16 FEET TO A POINT;
S 1°12'16" W, FOR A DISTANCE OF 95.58 FEET TO A 12" OSAGE;
S 7°58'27" W, FOR A DISTANCE OF 43.94 FEET TO A 6" ROTTED TREE;
S 15°41'30" W, FOR A DISTANCE OF 13.75 FEET TO A A 6" TREE USED AS FENCE POST;
S 38°17'00" W, FOR A DISTANCE OF 100.34 FEET TO A 14" ROTTEN CEDAR;
S 84°35'04" W, FOR A DISTANCE OF 173.30 FEET TO FENCE CORNER PK FOUND;
S 6°40'35" W, FOR A DISTANCE OF 1187.64 FEET TO A POINT;
S 4°03'46" W, FOR A DISTANCE OF 112.89 FEET TO A 26" CEDAR;
S 12°22'22" W, FOR A DISTANCE OF 465.96 FEET TO A 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN AND CONTINUING TO THORNTON, THE FOLLOWING CALLS:

S 8°47'46" W, FOR A DISTANCE OF 411.13 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY THORNTON, THE FOLLOWING CALLS:

S 13°08'41" W, FOR A DISTANCE OF 759.59 FEET TO 1" PIPE FOUND;
S 21°10'50" W, FOR A DISTANCE OF 265.00 FEET TO 1" PIPE FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

N 82°44'49" W, FOR A DISTANCE OF 600.97 FEET TO 1" PIPE FOUND;
N 78°43'22" W, FOR A DISTANCE OF 130.34 FEET TO 1" PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

S 5°33'34" W, FOR A DISTANCE OF 375.75 FEET TO 1" PIPE FOUND;
S 4°27'28" W, FOR A DISTANCE OF 508.55 FEET TO A POINT;
S 5°35'19" W, FOR A DISTANCE OF 523.31 FEET TO 5/8" IRON PIN FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF IRON BRIDGE ROAD RIGHT-OF-WAY, THE FOLLOWING CALLS:

N 82°45'55" W, FOR A DISTANCE OF 501.29 FEET TO AN 5/8" IRON PIN FOUND;
N 82°46'22" W, FOR A DISTANCE OF 525.64 FEET TO RAILROAD SPIKE PK FOUND;
N 83°23'15" W, FOR A DISTANCE OF 396.04 FEET TO 5/8" IRON PIN FOUND AT SOUTHEAST CORNER OF MATTHEWS;

THENCE, WITH THE EAST BOUNDARY OF MATHEWS, HARRIS AND DUCK RIVER, THE FOLLOWING CALLS:

N 8°06'23" E, FOR A DISTANCE OF 864.54 FEET TO 1/2" IRON PIN FOUND;
N 1°16'09" E, FOR A DISTANCE OF 478.23 FEET TO A POINT;
N 48°48'57" E, FOR A DISTANCE OF 312.04 FEET TO A POINT;
N 44°09'58" E, FOR A DISTANCE OF 600.70 FEET TO A POINT;
N 36°27'00" E, FOR A DISTANCE OF 305.02 FEET TO A POINT;
N 27°21'22" E, FOR A DISTANCE OF 284.82 FEET TO A POINT;
N 26°51'08" E, FOR A DISTANCE OF 301.40 FEET TO 1" PIPE FOUND;

N 15°43'20" W, FOR A DISTANCE OF 197.42 FEET TO A POINT;
N 18°27'24" W, FOR A DISTANCE OF 744.16 FEET TO A POINT;
N 21°56'04" W, FOR A DISTANCE OF 031.16 FEET TO A POINT;
N 23°44'52" W, FOR A DISTANCE OF 409.10 FEET TO A POINT;
N 32°46'41" W, FOR A DISTANCE OF 286.98 FEET TO A POINT;
N 27°28'08" W, FOR A DISTANCE OF 932.36 FEET TO A POINT;

THENCE, DIRECTING RIGHT, AWAY FROM DUCK RIVER TO THE SOUTH AND EAST BOUNDARY OF SEAGO, THE FOLLOWING CALLS:

N 85°09'29" E, FOR A DISTANCE OF 22.00 FEET TO A POINT;
N 81°22'35" E, FOR A DISTANCE OF 109.60 FEET TO A POINT;
S 87°29'25" E, FOR A DISTANCE OF 42.46 FEET TO 26" OAK;
N 46°08'47" E, FOR A DISTANCE OF 244.67 FEET TO A POINT;
N 46°56'39" E, FOR A DISTANCE OF 291.18 FEET TO 10" HACKBERRY AND 8" CEDAR;
N 49°46'28" E, FOR A DISTANCE OF 367.28 FEET TO 1" PIPE FOUND;
N 55°27'24" W, FOR A DISTANCE OF 350.42 FEET TO A POINT;
N 28°16'29" W, FOR A DISTANCE OF 411.36 FEET TO A 1" PIPE FOUND;
N 71°17'50" E, FOR A DISTANCE OF 220.64 FEET TO AN IRON PIN FOUND;
N 39°36'42" W, FOR A DISTANCE OF 228.86 FEET TO AN IRON PIN FOUND;
N 16°17'40" E, FOR A DISTANCE OF 158.31 FEET TO A POINT;
N 24°10'55" E, FOR A DISTANCE OF 52.03 FEET TO A POINT;
N 27°26'46" E, FOR A DISTANCE OF 28.14 FEET TO 1" PIPE IRON PIPE;
N 19°40'08" E, FOR A DISTANCE OF 57.72 FEET TO A 12" CEDAR;
N 30°13'56" E, FOR A DISTANCE OF 123.71 FEET TO A POINT;
N 32°10'27" E, FOR A DISTANCE OF 87.89 FEET TO A POINT;
N 33°44'57" E, FOR A DISTANCE OF 105.82 FEET TO 1" PIPE FOUND;
N 3°11'17" W, FOR A DISTANCE OF 116.30 FEET TO A POINT AT THE NORTHEAST CORNER OF SEAGO AND THE CENTER OF BEAR CREEK;

THENCE, ALONG BEAR CREEK AND SOUTHERN BOUNDARY OF MIKES BIKES, THE FOLLOWING CALLS:

N 75°48'45" E, FOR A DISTANCE OF 280.14 FEET TO A POINT;
N 85°23'51" E, FOR A DISTANCE OF 281.90 FEET TO A POINT AT THE SOUTHEAST CORNER OF BIKES;

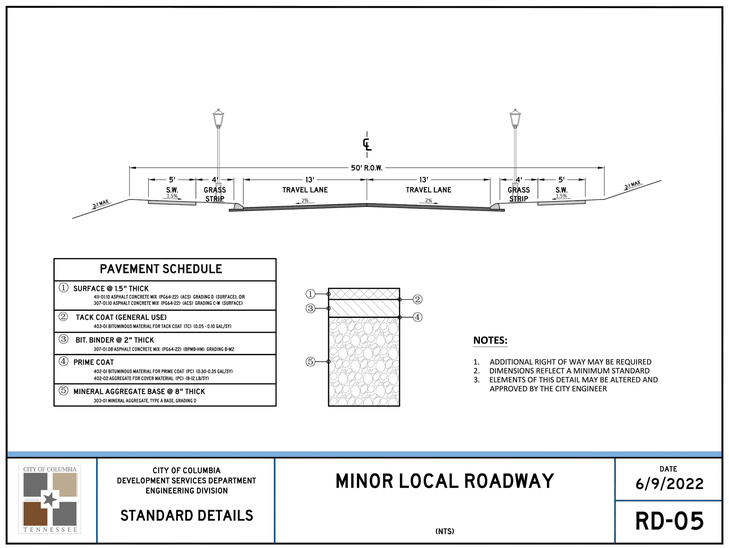
THENCE, ALONG SOUTH BOUNDARY OF GOODMAN, N 63°42'14" E, 199.86 FEET TO A POINT;

THENCE, CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:

N 84°40'48" E, FOR A DISTANCE OF 385.89 FEET TO A POINT;
N 75°36'41" E, FOR A DISTANCE OF 141.99 FEET TO A POINT;
N 83°11'05" E, FOR A DISTANCE OF 28.87 FEET TO A POINT AT AN INTERSECTION OF MCKAY BRANCH
CONTINUING ALONG MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES. THE FOLLOWING CALLS:
S 7°51'27" E, FOR A DISTANCE OF 201.29 FEET TO A POINT;
S 85°15'03" E, FOR A DISTANCE OF 74.45 FEET TO A POINT;
S 61°08'47" E, FOR A DISTANCE OF 61.78 FEET TO A POINT;
S 58°09'42" E, FOR A DISTANCE OF 42.46 FEET TO A POINT;
S 51°12'54" E, FOR A DISTANCE OF 88.37 FEET TO A POINT;
S 45°49'08" E, FOR A DISTANCE OF 65.41 FEET TO A POINT;
S 39°48'13" E, FOR A DISTANCE OF 73.31 FEET TO A POINT;

THENCE, LEAVING MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:

NORTHEASTERLY ALONG A CURVE THROUGH A CENTRAL ANGLE OF 38°33'55", AN ARC DISTANCE OF 380.30 FEET TO A POINT OF TANGENCY, SAID CURVE IS CONCAVE NORTHWESTERLY AND HAS A RADIUS OF 565.50 FEET, CHORD BEARING N 24°33'52" E WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT OF TANGENCY;
N 05°15'54" E, 84.04 FEET TO THE POINT OF BEGINNING CONTAINING 409.92 ACRES (17,855,971 SQ.FT.) AND BEING A PORTION OF THE PROPERTY SHOWN ON TAX MAP 90 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFFS, LLC BY DEED OF RECORD IN BOOK R2837, PAGE 287 IN THE REGISTER'S OFFICE OF MAURY COUNTY, TENNESSEE.




REQUESTED STREET SECTION

# PROJECT DESCRIPTION AND SITE DATA:

REQUEST TO ANNEX AND REZONE THE COLUMBIA BLUFFS PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN.

THE PUD-R PLAN PROPOSES AN ENVIRONMENTALLY SENSITIVE MASTER PLAN FOR A DIVERSE RESIDENTIAL DEVELOPMENT. APPROXIMATELY ONE-THIRD OF THE PROPOSED DEVELOPMENT IS RESERVED FOR ACTIVE ADULT/AGE RESTRICTED SINGLE-FAMILY HOMES. ADDITIONALLY, TOWN HOMES AND A VARIETY OF DETACHED SINGLE-FAMILY HOMES ARE PROPOSED.

IN ADDITION TO THE RESIDENTIAL COMPONENT, THE PUD-R PLANS PROPOSES A DAY CARE FACILITY AND A VARIETY OF NEIGHBORHOOD AMENITIES.

TOTAL SITE AREA: 409.92 ACRES
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

TOTAL DWELLING UNITS: 860 HOMES
OVERALL SITE DENSITY: 2.1 DUA

| RESIDENTIAL BREAKDOWN | | NON RESIDENTIAL |
|---|---|---|
| ACTIVE ADULT HOMES: | 293 | DAYCARE 12,000 - 14,000 SF |
| TOWNHOMES: | 189 | |
| ALLEY SINGLE-FAMILY: | 144 | |
| COURTYARD HOMES: | 104 | |
| LARGE LOT HOMES: | 130 | |

EXISTING TREE CANOPY COVERAGE: 262.2 ACS; 64% OF TOTAL SITE
REQUIRED TREE CANOPY RETENTION: 36%; REQUIRED WITH FMDP

TOTAL OPEN SPACE PROVIDED: 199.8 AC; 48.7% OF GROSS SITE AREA
OPEN SPACE BREAKDOWN
CIVIC SPACE: 22.2 AC
ENVIRONMENTAL PROTECTION (FLOODWAY, STREAM/BUFFERS, 100 YR FLOOD PLAIN): 75.0 AC
ALL OTHER OPEN SPACE: 102.6 AC

CIVIC SPACE REQUIRED: 5% MINIMUM; 20.5 AC
CIVIC SPACE PROVIDED: 5.4%; 22.2 AC (SEE SHEET L1.0)

PARKING: SEE LOT DIAGRAMS (C2.6) FOR PROPOSED RESIDENTIAL PARKING;
AND SHEETS L1.0-L1.6 FOR CIVIC SPACE PARKING
RESIDENTIAL: 2 PARKING SPACES PER UNIT
DAYCARE: 1 PER STAFF + 0.5 PER CHILD
CIVIC SPACE: 1 PER 5,000 SF

# ANNEXATION AND REZONING REQUEST:

REQUEST TO ANNEX +/-409.92 ACRES AND REZONE TO PUD-R
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

CONNECT COLUMBIA FINDINGS:
*Annexation should provide for a continuation of orderly, planned development of the City. Lot sizes and development scale should be compatible with surrounding development. If proposed development abuts land that is undeveloped or has low density/intensity, the density and intensity of the proposed development should taper towards the periphery to provide compatibility of the development pattern. Land annexed into the City should follow the transect and Character Area Matrix to provide the most appropriate land uses and zoning for the newly annexed land.*
Response: The proposed Columbia Bluffs subdivision is 2 miles from the downtown core. Density and lot size transitions from higher density/intensity at the north, along the Bear Creek Parkway corridor to the south, where a more rural character is appropriate adjacent to Iron Bridge Rd and the Yanahli Park. The properties along Bear Creek Parkway have been identified as "area of change." With the development along this corridor, residential development in close proximity to downtown and new commercial development along Tom Hitch Parkway is a logical progression of development pattern.

*Connectivity, directly through street, sidewalks, bikeways, greenways, and trails, and indirectly, through a mixture of housing and business types, should be encouraged throughout Columbia..*
Response: In addition to roadway and sidewalk connections, Columbia Bluffs proposes nature trails through out the property. The development will also provide a roadway connection between Bear Creek Parkway and Iron Bridge Road. A variety of housing types are proposed, including an age restricted Active Adult neighborhood.

*Suburban Neighborhood: Future development should emphasize connectivity and housing diversity.*
Response: Columbia Bluffs proposes a variety of housing styles
*Near-term Priorities: HOUSING MIX/TYPES: Promote mastered planned housing opportunities for a "full-life cycle" community to accommodate retirees and young professionals. Review Zoning standards to permit smaller lot and home sizes to encourage such developments.*

# MODIFICATIONS FROM STANDARD PUD-R ZONING REQUEST:

RESIDENTIAL LOT DIAGRAMS: SEE SHEET C2.6
1. ACTIVE ADULT AND PRIMARY ALLEY LOADED HOMES SIDE-SETBACK REDUCED TO 5'.
2. OTHER PRIMARY RESIDENTIAL SIDE-SETBACK REDUCED TO 7.5'.
3. ACTIVE ADULT, COURTYARD, AND LARGE LOT GARAGE LOCATED IN 2ND LAYER
4. ACTIVE ADULT, COURTYARD, AND LARGE LOT ALLOWED DOUBLE CAR GARAGE DOORS, WITH A MAXIMUM WIDTH OF 16'
5. ACTIVE ADULT DRIVEWAYS TO BE 18' IN FIRST LAYER.
6. COURTYARD AND LARGE LOT DRIVEWAY TO BE 12' IN FIRST LAYER.

THOROUGHFARE STANDARDS:
1. UTILIZATION OF 50' ROW INSTEAD OF 70' ROW.

CIVIC SPACE:
1. ACTIVE ADULT NEIGHBORHOOD TO BE EXCLUDED FROM REQUIRED PLAYGROUND CRITERIA.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# COLUMBIA BLUFFS
## PUD-R PRELIMINARY MASTER DEVELOPMENT PLAN & ANNEXATION REQUEST
400 Bear Creek Parkway, Columbia, Tennessee

GREGORY C. GAMBLE
REGISTERED
TENNESSEE
LANDSCAPE ARCHITECT
10-16-23

Date: October 16, 2023
Revision Date
△
△
△

OVERALL PUD-R PMDP
SHEET
C2.0

# LEGAL DESCRIPTION FOR ANNEXATION OF 409.92 ACRES TO PUD
# FOR PART OF MAP 90, PARCEL 12.01
# DEED BOOK R2051, PAGE 792
# BIG BEAR BLUFFS, LLC

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY BEAR CREEK PIKE, ROCK 'N' ROLL JESUS, LLC, AS OF RECORD IN DEED BOOK R2727, PAGE 1242 OF THE REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN), AMIT J. PATEL AND WIFE, MINAXIBEN G. PATEL AS OF RECORD IN DEED BOOK R2411, PAGE 1348, ROMCTN, HK BIG BEAR BLUFFS, LLC (R BOOK 2878, PAGE 961, ROMCTN, ON THE EAST BY JEFFERY L. HEAD AND ROSE HEAD, WIFE & HUSBAND AS OF RECORD IN DEED BOOK R2230, PAGE 388, ROMCTN, STEVEN CHARLES FOSTER AND REBECCA JANE FOSTER, HUSBAND & WIFE AS OF RECORD IN DEED BOOK R2497, PAGE 1304, ROMCTN, BARRY C. BLACKBURN, TRUSTEE FOR BARRY C. BLACKBURN REVOCABLE TRUST AS OF RECORD IN DEED BOOK R2301, PAGE 1492, ROMCTN, BRENT W. THORNTON AND WIFE TERRI L. THORNTON AS OF RECORD IN DEED BOOK R2096, PAGE 766, ROMCTN, CALVIN DEAN JOHNSON FORMERLY CARL JOHNSON AND WIFE, BARBARA D. JOHNSON AS OF RECORD IN DEED BOOK 375, PAGE 542, ROMCTN, AND CALVIN DEAN JOHNSON AND WIFE SHERYL GAY JOHNSON AS OF RECORD IN DEED BOOK R747, PAGE 602, ROMCTN; ON THE SOUTH BY IRON BRIDGE ROAD; AND ON THE WEST BY JIMMY MATHEWS AS OF RECORD IN DEED BOOK 1311, PAGE 80, DAVID LUNN HARRIS ETUX AS OF RECORD IN DEED BOOK R2173, PAGE 1148, ROMCTN, DUCK RIVER, AND MARK A. SEAGO AND WIFE TINA SEAGO AS OF RECORD DEED BOOK R2369, PAGE 973 ROMCTN; AND CONTINUED TO THE NORTH BY MIKE BIKES AS OF RECORD IN DEED BOOK R1884, PAGE 1082, DWAYNE SAM GOODMAN AS OF RECORD IN DEED BOOK R2732, PAGE 1288, AND IS MORE PARTICULARLY DESCRIBED AS FOLLOWS;

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT AN 1 INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.95 EAST 1,672,944.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 08°01'16" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 21°32'47" E, FOR A DISTANCE OF 51.20 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK N ROLL JESUS;
THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFFS, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 85°53'31" E, 307.86 FEET TO THE TRUE POINT OF BEGINNING;

THENCE, CONTINUING WITH BEAR CREEK, THE FOLLOWING CALLS:

N 85°53'31" E, FOR A DISTANCE OF 85.49 FEET TO A POINT;
N 88°09'20" E, FOR A DISTANCE OF 218.80 FEET TO A POINT;
S 89°57'55" E, FOR A DISTANCE OF 158.93 FEET TO A POINT;
S 78°59'35" E, FOR A DISTANCE OF 77.46 FEET TO A POINT;
S 78°01'13" E, FOR A DISTANCE OF 120.71 FEET TO A POINT;

S 83°35’45” E, FOR A DISTANCE OF 172.70 FEET TO A POINT ALONG THE WEST BOUNDARY OF JEFFERY L. HEAD;

THENCE, WITH THE WEST BOUNDARY OF HEAD, THE FOLLOWING CALLS:

S 0°55'50" W, FOR A DISTANCE OF 40.52 FEET TO AN IRON PIN;
S 04°40'44" W, FOR A DISTANCE OF 127.32 FEET TO A 1-1/2” PIPE FOUND;
S 34°29'27" E, FOR A DISTANCE OF 153.97 FEET TO A T-POST;
S 35°04'16" E, FOR A DISTANCE OF 55.17 FEET TO A T-POST;
S 39°22'56" E, FOR A DISTANCE OF 84.02 FEET TO A T-POST;
S 42°05'33" E, FOR A DISTANCE OF 106.39 FEET TO A T-POST;
S 42°31'20" E, FOR A DISTANCE OF 55.23 FEET TO AN 1-1/2” PIPE FOUND;
S 7°06'55" W, FOR A DISTANCE OF 101.11 FEET TO A 3” METAL POST;
S 5°45'07" W, FOR A DISTANCE OF 110.19 FEET TO AN 1-1/2” PIPE FOUND;
S 21°14'47" E, FOR A DISTANCE OF 78.14 FEET TO A T-POST;
S 17°34'01" E, FOR A DISTANCE OF 102.59 FEET TO A 24” CEDAR;
S 4°57'22" W, FOR A DISTANCE OF 172.54 FEET TO A T-POST;
S 4°32'31" W, FOR A DISTANCE OF 130.65 FEET TO 36” OAK;
S 84°48'25" W, FOR A DISTANCE OF 270.35 FEET TO 30” MAPLE;
S 84°01'38" W, FOR A DISTANCE OF 414.11 FEET TO A FENCE POST;
S 17°15'39" E, FOR A DISTANCE OF 254.68 FEET TO A 6” ROTTED HACKBERRY FENCE POST TO THE SOUTHWEST CORNER OF HEAD;

THENCE, WITH THE WEST BOUNDARY OF FOSTER, THE FOLLOWING CALLS:

S 54°11'15" W, FOR A DISTANCE OF 100.29 FEET TO 6” ROTTED HACKBERRY FENCE POST;
S 21°53'18" E, FOR A DISTANCE OF 130.86 FEET TO A CEDAR FENCE POST;
S 17°11'57" E, FOR A DISTANCE OF 221.38 FEET TO A 12” ELM;
S 23°46'07" E, FOR A DISTANCE OF 240.66 FEET TO A T-POST;
S 37°24'05" E, FOR A DISTANCE OF 315.73 FEET TO 14” ELM;
S 50°37'42" E, FOR A DISTANCE OF 91.73 FEET TO 60” TWIN OAK;
S 26°59'39" W, FOR A DISTANCE OF 35.62 FEET TO 60” OAK;
S 40°35'26" W, FOR A DISTANCE OF 9.08 FEET TO A T-POST;
S 42°52'20" E, FOR A DISTANCE OF 62.79 FEET TO A POINT;
S 1°50'17" W, FOR A DISTANCE OF 30.25 FEET TO A POINT;
S 23°53'47" W, FOR A DISTANCE OF 42.59 FEET TO 14” HACKBERRY;
S 11°25'58" W, FOR A DISTANCE OF 117.73 FEET TO A T-POST;
S 2°03'52" W, FOR A DISTANCE OF 130.34 FEET TO ROTTED HACKBERRY;
S 9°12'29" W, FOR A DISTANCE OF 87.18 FEET A POINT;
S 33°56'56" W, FOR A DISTANCE OF 69.94 FEET TO A 30” HACKBERRY;
S 61°19'48" E, FOR A DISTANCE OF 54.74 FEET TO A 24” HACKBERRY;
S 70°11'17" E, FOR A DISTANCE OF 34.53 FEET TO 12” CEDAR POST AT THE SOUTHWEST CORNER OF FOSTER;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN, THE FOLLOWING CALLS:

S 25°13'18" W, FOR A DISTANCE OF 228.44 FEET TO A 36” HACKBERRY;
S 7°06'46" W, FOR A DISTANCE OF 177.84 FEET TO A 8” DOGWOOD;
S 0°16'28" W, FOR A DISTANCE OF 41.40 FEET TO A 24” HACKBERRY FLAGGED;
S 8°53'22" E, FOR A DISTANCE OF 173.37 FEET TO A T-POST;
S 50°40'30" E, FOR A DISTANCE OF 13.02 FEET TO 6” FENCE POST;

S 39°18'12" W, FOR A DISTANCE OF 34.16 FEET TO A POINT;
S 1°12'18" W, FOR A DISTANCE OF 95.58 FEET TO A 12” OSAGE;
S 7°58'27" W, FOR A DISTANCE OF 43.94 FEET TO A 6” ROTTED TREE;
S 15°41'30" W, FOR A DISTANCE OF 13.75 FEET TO A A 6” TREE USED AS FENCE POST;
S 38°17'00" W, FOR A DISTANCE OF 100.34 FEET TO A 14” ROTTEN CEDAR;
S 84°35'04" W, FOR A DISTANCE OF 173.30 FEET TO FENCE CORNER PK FOUND;
S 6°49'35" W, FOR A DISTANCE OF 1187.64 FEET TO A POINT;
S 4°03'46" W, FOR A DISTANCE OF 112.86 FEET TO A 24” CEDAR;
S 12°22'22" W, FOR A DISTANCE OF 465.96 FEET TO A 1” PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF BLACKBURN AND CONTINUING TO THORNTON, THE FOLLOWING CALLS:

S 8°47'49" W, FOR A DISTANCE OF 411.13 FEET TO 1” PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY THORNTON, THE FOLLOWING CALLS:

S 13°08'41" W, FOR A DISTANCE OF 759.59 FEET TO 1” PIPE FOUND;
S 21°10'50" W, FOR A DISTANCE OF 265.00 FEET TO 1” PIPE FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

N 82°44'49" W, FOR A DISTANCE OF 800.97 FEET TO 1” PIPE FOUND;
N 78°43'22" W, FOR A DISTANCE OF 130.34 FEET TO 1” PIPE FOUND;

THENCE, WITH THE WEST BOUNDARY OF JOHNSON, THE FOLLOWING CALLS:

S 5°32'34" W, FOR A DISTANCE OF 375.75 FEET TO 1” PIPE FOUND;
S 4°27'28" W, FOR A DISTANCE OF 508.55 FEET TO A POINT;
S 3°32'19" W, FOR A DISTANCE OF 523.31 FEET TO 5/8” IRON PIN FOUND AT THE SOUTHWEST CORNER OF THORNTON;

THENCE, WITH THE NORTH BOUNDARY OF IRON BRIDGE ROAD RIGHT-OF-WAY, THE FOLLOWING CALLS:

N 82°45'55" W, FOR A DISTANCE OF 501.29 FEET TO AN 5/8” IRON PIN FOUND;
N 82°46'20" W, FOR A DISTANCE OF 525.64 FEET TO RAILROAD SPIKE PK FOUND;
N 83°23'15" W, FOR A DISTANCE OF 396.04 FEET TO 5/8” IRON PIN FOUND AT SOUTHEAST CORNER OF MATTHEWS;

THENCE, WITH THE EAST BOUNDARY OF MATHEWS, HARRIS AND DUCK RIVER, THE FOLLOWING CALLS:

N 8°06'23" E, FOR A DISTANCE OF 664.54 FEET TO 1/2” IRON PIN FOUND;
N 16°56'08" E, FOR A DISTANCE OF 479.23 FEET TO A POINT;
N 48°48'57" E, FOR A DISTANCE OF 312.04 FEET TO A POINT;
N 44°09'58" E, FOR A DISTANCE OF 600.70 FEET TO A POINT;
N 36°27'00" E, FOR A DISTANCE OF 305.02 FEET TO A POINT;
N 27°21'22" E, FOR A DISTANCE OF 284.62 FEET TO A POINT;
N 26°51'38" E, FOR A DISTANCE OF 301.40 FEET TO 1” PIPE FOUND;

N 15°43'20" W, FOR A DISTANCE OF 197.42 FEET TO A POINT;
N 18°21'24" W, FOR A DISTANCE OF 744.16 FEET TO A POINT;
N 21°56'04" W, FOR A DISTANCE OF 631.16 FEET TO A POINT;
N 23°44'52" W, FOR A DISTANCE OF 409.10 FEET TO A POINT;
N 32°46'41" W, FOR A DISTANCE OF 296.98 FEET TO A POINT;
N 27°28'08" W, FOR A DISTANCE OF 932.36 FEET TO A POINT;

THENCE, DIRECTING RIGHT AWAY FROM DUCK RIVER TO THE SOUTH AND EAST BOUNDARY OF SEAGO, THE FOLLOWING CALLS:

N 85°09'29" E, FOR A DISTANCE OF 22.00 FEET TO A POINT;
N 81°22'35" E, FOR A DISTANCE OF 109.60 FEET TO A POINT;
S 87°28'25" E, FOR A DISTANCE OF 42.46 FEET TO 36” OAK;
N 48°08'47" E, FOR A DISTANCE OF 244.67 FEET TO A POINT;
N 49°58'39" E, FOR A DISTANCE OF 291.18 FEET TO 10” HACKBERRY AND 8” CEDAR;
N 49°46'26" E, FOR A DISTANCE OF 367.28 FEET TO 1” PIPE FOUND;
N 55°27'24" W, FOR A DISTANCE OF 350.42 FEET TO A POINT;
N 28°16'29" W, FOR A DISTANCE OF 411.36 FEET TO A 1” PIPE FOUND;
N 0°17'30" E, FOR A DISTANCE OF 223.84 FEET TO AN IRON PIN FOUND;
N 39°56'42" W, FOR A DISTANCE OF 228.86 FEET TO AN IRON PIN FOUND;
N 16°17'40" E, FOR A DISTANCE OF 158.31 FEET TO A POINT;
N 24°10'55" E, FOR A DISTANCE OF 52.03 FEET TO A POINT;
N 23°26'46" E, FOR A DISTANCE OF 28.14 FEET TO 1” PIPE IRON PIPE;
N 19°40'08" E, FOR A DISTANCE OF 57.72 FEET TO A 12” CEDAR;
N 30°13'58" E, FOR A DISTANCE OF 123.71 FEET TO A POINT;
N 32°10'27" E, FOR A DISTANCE OF 87.69 FEET TO A POINT;
N 33°44'57" E, FOR A DISTANCE OF 105.82 FEET TO 1” PIPE FOUND;
N 3°11'17" W, FOR A DISTANCE OF 116.30 FEET TO A POINT AT THE NORTHEAST CORNER OF SEAGO AND THE CENTER OF BEAR CREEK;

THENCE, ALONG BEAR CREEK AND SOUTHERN BOUNDARY OF MIKES BIKES, THE FOLLOWING CALLS:

N 75°48'45" E, FOR A DISTANCE OF 280.14 FEET TO A POINT;
N 65°23'51" E, FOR A DISTANCE OF 281.90 FEET TO A POINT AT THE SOUTHEAST CORNER OF BIKES;

THENCE, ALONG SOUTH BOUNDARY OF GOODMAN, N 63°42'14" E, 199.86 FEET TO A POINT;

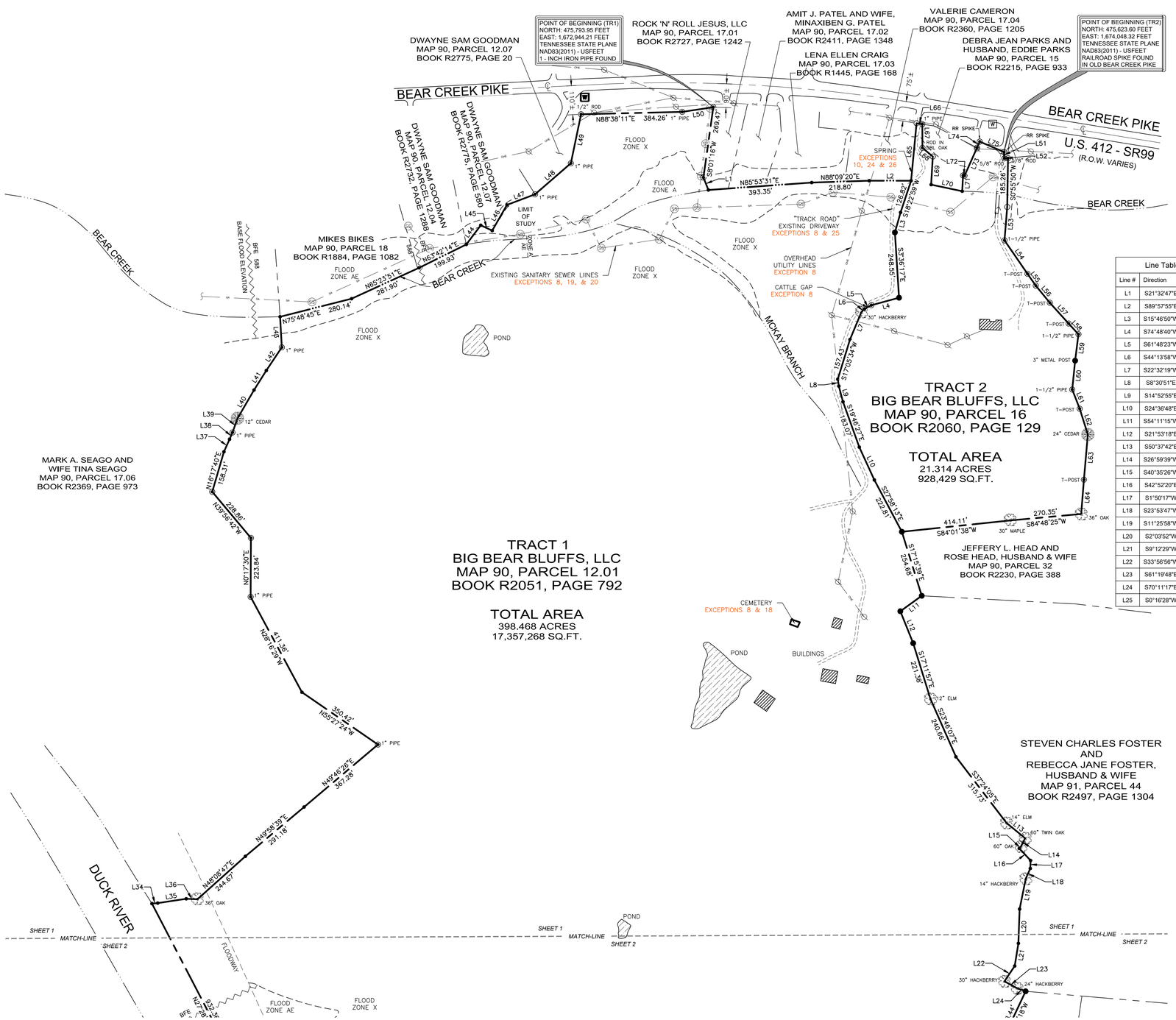
THENCE, CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:

N 84°40'46" E, FOR A DISTANCE OF 385.89 FEET TO A POINT;
N 75°36'41" E, FOR A DISTANCE OF 141.99 FEET TO A POINT;
N 63°11'05" E, FOR A DISTANCE OF 28.87 FEET TO A POINT AT AN INTERSECTION OF MCKAY BRANCH;
CONTINUING ALONG MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:
S 75°17'27" E, FOR A DISTANCE OF 201.23 FEET TO A POINT;
S 65°15'03" E, FOR A DISTANCE OF 74.45 FEET TO A POINT;
S 61°08'47" E, FOR A DISTANCE OF 61.78 FEET TO A POINT;

S 58°09'42" E, FOR A DISTANCE OF 42.46 FEET TO A POINT;
S 53°12'54" E, FOR A DISTANCE OF 86.37 FEET TO A POINT;
S 45°49'08" E, FOR A DISTANCE OF 65.41 FEET TO A POINT;
S 39°46'13" E, FOR A DISTANCE OF 73.31 FEET TO A POINT;

THENCE, LEAVING MCKAY BRANCH AND CREATING A NEW LINE FOR THE ANNEXATION OF 409.92 ACRES, THE FOLLOWING CALLS:

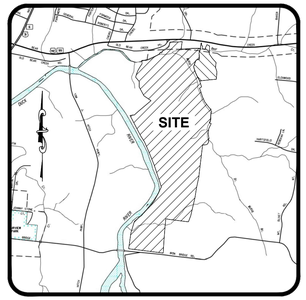
NORTHEASTERLY ALONG A CURVE THROUGH A CENTRAL ANGLE OF 38°33'55", AN ARC DISTANCE OF 380.30 FEET TO A POINT OF TANGENCY, SAID CURVE IS CONCAVE NORTHWESTERLY AND HAS A RADIUS OF 565.00 FEET, CHORD BEARING N 24°32’52” E WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT OF TANGENCY;
N 05°15'54" E, 94.04 FEET TO THE POINT OF BEGINNING CONTAINING 409.92 ACRES (17,855,971 SQ.FT.) AND BEING A PORTION OF THE PROPERTY SHOWN ON TAX MAP 90 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFFS, LLC BY DEED OF RECORD IN BOOK R2827, PAGE 287 IN THE REGISTER’S OFFICE OF MAURY COUNTY, TENNESSEE.




| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L1 | S21°32'47"E | 51.20' |
| L2 | S89°57'55"E | 158.94' |
| L3 | S15°46'50"W | 78.97' |
| L4 | S74°48'40"W | 109.09' |
| L5 | S61°48'23"W | 30.10' |
| L6 | S44°13'58"W | 15.73' |
| L7 | S22°32'19"W | 113.52' |
| L8 | S8°30'51"E | 26.77' |
| L9 | S14°52'55"E | 61.47' |
| L10 | S24°36'48"E | 137.17' |
| L11 | S54°11'15"W | 100.29' |
| L12 | S21°53'18"E | 130.86' |
| L13 | S50°37'42"E | 91.73' |
| L14 | S26°59'39"W | 35.62' |
| L15 | S40°35'26"W | 9.08' |
| L16 | S42°52'20"E | 62.79' |
| L17 | S1°50'17"W | 30.25' |
| L18 | S23°53'47"W | 42.59' |
| L19 | S11°25'58"W | 117.73' |
| L20 | S2°03'52"W | 130.34' |
| L21 | S9°12'29"W | 87.18' |
| L22 | S33°56'56"W | 69.94' |
| L23 | S61°19'48"E | 54.74' |
| L24 | S70°11'17"E | 34.53' |
| L25 | S0°16'28"W | 41.40' |

| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L26 | S50°40'30"E | 13.02' |
| L27 | S39°18'12"W | 34.16' |
| L28 | S1°12'18"W | 95.58' |
| L29 | S7°58'27"W | 43.94' |
| L30 | S15°41'30"W | 13.75' |
| L31 | S38°17'00"W | 100.34' |
| L32 | S4°03'46"W | 112.86' |
| L33 | N78°43'22"W | 130.34' |
| L34 | N85°09'29"E | 22.00' |
| L35 | N81°22'35"E | 109.60' |
| L36 | S87°28'25"E | 42.46' |
| L37 | N24°10'55"E | 52.03' |
| L38 | N23°26'46"E | 28.14' |
| L39 | N19°40'08"E | 57.72' |
| L40 | N30°13'58"E | 123.71' |
| L41 | N32°10'27"E | 87.69' |
| L42 | N33°44'57"E | 105.82' |
| L43 | N3°11'17"W | 116.30' |
| L44 | N37°01'24"E | 91.39' |
| L45 | S64°57'03"E | 47.99' |
| L46 | N29°46'16"E | 112.44' |
| L47 | N69°17'32"E | 114.26' |
| L48 | N49°04'40"E | 179.96' |
| L49 | N11°45'20"E | 190.04' |
| L50 | N81°28'20"E | 119.52' |

| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L51 | S2°49'46"E | 24.13' |
| L52 | N86°58'06"E | 13.97' |
| L53 | S4°40'44"W | 127.32' |
| L54 | S34°29'27"E | 153.97' |
| L55 | S35°04'16"E | 55.17' |
| L56 | S39°22'56"E | 84.02' |
| L57 | S42°05'33"E | 106.39' |
| L58 | S42°31'20"E | 55.23' |
| L59 | S7°06'55"W | 101.11' |
| L60 | S5°45'07"W | 110.19' |
| L61 | S21°14'47"E | 78.14' |
| L62 | S17°34'01"E | 102.59' |
| L63 | S4°57'22"W | 172.54' |
| L64 | S4°32'31"W | 130.65' |
| L65 | N5°25'46"E | 219.38' |
| L66 | S80°44'46"E | 22.14' |
| L67 | S0°18'19"E | 89.89' |
| L68 | S49°53'58"E | 51.40' |
| L69 | S3°25'01"W | 106.80' |
| L70 | S78°01'13"E | 120.71' |
| L71 | N2°59'51"E | 60.05' |
| L72 | S78°10'57"E | 5.80' |
| L73 | N24°00'25"E | 116.87' |
| L74 | N24°07'16"E | 25.12' |
| L75 | S66°43'29"E | 100.36' |




VICINITY MAP
NOT TO SCALE

| NO. | DATE | COMMENT |
|---|---|---|
| | | |

108 Beasley Drive
Franklin, TN
37064
615.794.2275

WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

JOHN C. WILSON II
REGISTERED
LAND SURVEYOR
No. 2069
AGRICULTURE
COMMERCE
7/7/22
TENNESSEE NO. 2069

# ALTA/NSPS LAND TITLE SURVEY

MAP 90, PARCELS 12.01 & 16
BEAR CREEK PIKE / IRON BRIDGE ROAD
MAURY COUNTY, TENNESSEE
FOR: KOLTER GROUP ACQUISITIONS, LLC

**LEGEND**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| IRON PIN FOUND | BENCH MARK | ELECTRIC METER-BOX | EVERGREEN TREE | UNDERGROUND ELEC | UGE |
| IRON PIN SET | WATER METER | ELECTRIC MH | DECIDUOUS TREE | OVERHEAD ELEC | OHE |
| FENCE POST FOUND | WATER VALVE | LIGHT POLE | HANDICAP PARKING | GAS | 4" G |
| FENCE POST SET | FIRE HYDRANT | UTILITY POLE | SIGN | COMMUNICATIONS | COM |
| CONC. MON. FOUND | SANITARY SEWER MH | GUY ANCHOR | TURN LANE MARKING | BOUNDARY | |
| CONC. MON. SET | SANITARY SEWER CO | COMMUNICATION BOX | MAIL BOX | CENTERLINE | |
| PK FOUND | AREA DRAIN | COMMUNICATION MH | CEMETERY | FENCE | X |
| PK SET | CURB INLET | GAS METER | SANITARY SEWER | WATER FEATURE | |
| UNMARKED POINT (BEND/SNAG) | STORM MH | GAS VALVE | WATER 4" W | TREE LINE | |

**CONTROL TABLE**

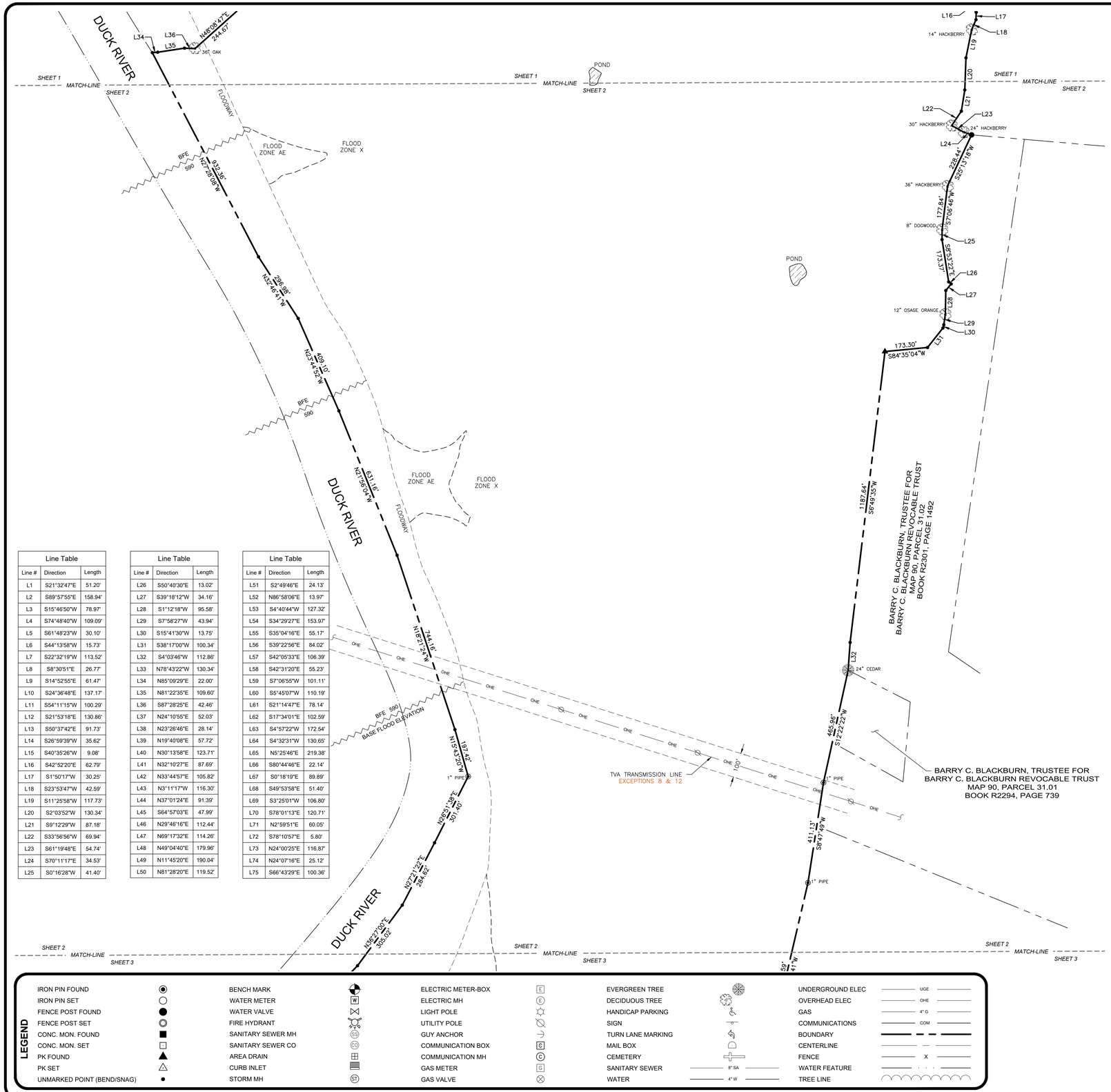
| | | | | |
|---|---|---|---|---|
| 100 | N 474,238.52' | E 1,672,762.90' | EL 675.03' | CAPPED ROD |
| 101 | N 472,572.21' | E 1,672,903.25' | EL 726.28' | CAPPED ROD |
| 102 | N 470,899.48' | E 1,673,280.18' | EL 728.47' | CAPPED ROD |
| 103 | N 468,089.58' | E 1,671,459.06' | EL 573.74' | CAPPED ROD |

PROJECT CONTROL: TENNESSEE STATE PLANE COORDINATES. NAD83(2011), GEOID03 GRID 7 REVISED. NO DATUM ADJUSTMENT.

200 0 100 200 400
GRAPHIC SCALE: 1" = 100'

| | |
|---|---|
| DRAWN BY: | JEC |
| APPVD. BY: | JCW II |
| DATE | 1/7/2022 |
| PROJ. No. | 21-1801 |
| SCALE: | 1" = 200' |

SHEET No.
1 OF 4



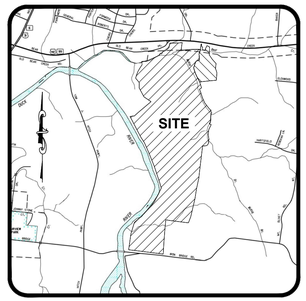

| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L1 | S21°32'47"E | 51.20' |
| L2 | S89°57'55"E | 158.94' |
| L3 | S15°46'50"W | 78.97' |
| L4 | S74°48'40"W | 109.09' |
| L5 | S61°48'23"W | 30.10' |
| L6 | S44°13'58"W | 15.73' |
| L7 | S22°32'19"W | 113.52' |
| L8 | S8°30'51"E | 26.77' |
| L9 | S14°52'55"E | 61.47' |
| L10 | S24°36'48"E | 137.17' |
| L11 | S54°11'15"W | 100.29' |
| L12 | S21°53'18"E | 130.86' |
| L13 | S50°37'42"E | 91.73' |
| L14 | S26°59'39"W | 35.62' |
| L15 | S40°35'26"W | 9.08' |
| L16 | S42°52'20"E | 62.79' |
| L17 | S1°50'17"W | 30.25' |
| L18 | S23°53'47"W | 42.59' |
| L19 | S11°25'58"W | 117.73' |
| L20 | S2°03'52"W | 130.34' |
| L21 | S9°12'29"W | 87.18' |
| L22 | S33°56'56"W | 69.94' |
| L23 | S61°19'48"E | 54.74' |
| L24 | S70°11'17"E | 34.53' |
| L25 | S0°16'28"W | 41.40' |

| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L26 | S50°40'30"E | 13.02' |
| L27 | S39°18'12"W | 34.16' |
| L28 | S1°12'18"W | 95.58' |
| L29 | S7°58'27"W | 43.94' |
| L30 | S15°41'30"W | 13.75' |
| L31 | S38°17'00"W | 100.34' |
| L32 | S4°03'46"W | 112.86' |
| L33 | N78°43'22"W | 130.34' |
| L34 | N85°09'29"E | 22.00' |
| L35 | N81°22'35"E | 109.60' |
| L36 | S87°28'25"E | 42.46' |
| L37 | N24°10'55"E | 52.03' |
| L38 | N23°26'46"E | 28.14' |
| L39 | N19°40'08"E | 57.72' |
| L40 | N30°13'58"E | 123.71' |
| L41 | N32°10'27"E | 87.69' |
| L42 | N33°44'57"E | 105.82' |
| L43 | N3°11'17"W | 116.30' |
| L44 | N37°01'24"E | 91.39' |
| L45 | S64°57'03"E | 47.99' |
| L46 | N29°46'16"E | 112.44' |
| L47 | N69°17'32"E | 114.26' |
| L48 | N49°04'40"E | 179.96' |
| L49 | N11°45'20"E | 190.04' |
| L50 | N81°28'20"E | 119.52' |

| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L51 | S2°49'46"E | 24.13' |
| L52 | N86°58'06"E | 13.97' |
| L53 | S4°40'44"W | 127.32' |
| L54 | S34°29'27"E | 153.97' |
| L55 | S35°04'16"E | 55.17' |
| L56 | S39°22'56"E | 84.02' |
| L57 | S42°05'33"E | 106.39' |
| L58 | S42°31'20"E | 55.23' |
| L59 | S7°06'55"W | 101.11' |
| L60 | S5°45'07"W | 110.19' |
| L61 | S21°14'47"E | 78.14' |
| L62 | S17°34'01"E | 102.59' |
| L63 | S4°57'22"W | 172.54' |
| L64 | S4°32'31"W | 130.65' |
| L65 | N5°25'46"E | 219.38' |
| L66 | S80°44'46"E | 22.14' |
| L67 | S0°18'19"E | 89.89' |
| L68 | S49°53'58"E | 51.40' |
| L69 | S3°25'01"W | 106.80' |
| L70 | S78°01'13"E | 120.71' |
| L71 | N2°59'51"E | 60.05' |
| L72 | S78°10'57"E | 5.80' |
| L73 | N24°00'25"E | 116.87' |
| L74 | N24°07'16"E | 25.12' |
| L75 | S66°43'29"E | 100.36' |

**LEGEND**

| | | | | | |
|---|---|---|---|---|---|
| IRON PIN FOUND | BENCH MARK | ELECTRIC METER-BOX | EVERGREEN TREE | UNDERGROUND ELEC | UGE |
| IRON PIN SET | WATER METER | ELECTRIC MH | DECIDUOUS TREE | OVERHEAD ELEC | OHE |
| FENCE POST FOUND | WATER VALVE | LIGHT POLE | HANDICAP PARKING | GAS | 4"G |
| FENCE POST SET | FIRE HYDRANT | UTILITY POLE | SIGN | COMMUNICATIONS | COM |
| CONC. MON. FOUND | SANITARY SEWER MH | GUY ANCHOR | TURN LANE MARKING | BOUNDARY | |
| CONC. MON. SET | SANITARY SEWER CO | COMMUNICATION BOX | MAIL BOX | CENTERLINE | |
| PK FOUND | AREA DRAIN | COMMUNICATION MH | CEMETERY | FENCE | X |
| PK SET | CURB INLET | GAS METER | SANITARY SEWER | WATER FEATURE | |
| UNMARKED POINT (BEND/SNAG) | STORM MH | GAS VALVE | WATER | TREE LINE | |




**VICINITY MAP**
NOT TO SCALE

## GENERAL NOTES:

1. THE PURPOSE OF THIS SURVEY IS: ALTA/NSPS LAND TITLE (BOUNDARY)
2. THE ADDRESS OF THIS PROPERTY IS: 400 & 420 BEAR CREEK PIKE - COLUMBIA, TN 37401
3. SUBJECT PROPERTY IS PRESENTLY IDENTIFIED AS PARCELS 12.01 & 16, ON MAURY COUNTY TAX MAP 90. SAID PARCEL IS FURTHER IDENTIFIED AS ALL OF THE PROPERTY DESCRIBED IN DEED BOOK R2051, PAGE 792, AND BOOK R2060, PAGE 129, REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE.
4. SUBSURFACE AND ENVIRONMENTAL CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS A PART OF THIS SURVEY.
5. EVERY DOCUMENT OF RECORD REVIEWED AND CONSIDERED AS A PART OF THIS SURVEY IS NOTED HEREON. ONLY THE DOCUMENTS NOTED HEREON WERE SUPPLIED TO THE SURVEYOR. OTHER DOCUMENTS OF RECORD MAY EXIST THAT WOULD AFFECT THIS PARCEL.
6. THE WORD "CERTIFY" IS AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THE FACTS OF THE SURVEY AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE, EXPRESSED OR IMPLIED. DECLARATION IS MADE TO THE SPECIFICALLY NAMED PARTIES AND IS NOT TRANSFERABLE TO ADDITIONAL PERSONS, INSTITUTIONS OR SUBSEQUENT OWNERS OF THE SUBJECT PROPERTY.
7. THIS SURVEY WAS CONDUCTED WITH THE BENEFIT OF A TITLE REPORT ISSUED BY FIDELITY NATIONAL TITLE INSURANCE COMPANY, COMMITMENT NO. 14203-21, DATED NOVEMBER 12, 2021 AT 8:00AM AND IS SUBJECT TO ITS FINDINGS. THERE MAY BE OTHER IMPROVEMENTS OR ENCUMBRANCES THAT AFFECT THE PROPERTY SINCE THE ISSUANCE OF THE REPORT.
8. BEARINGS SHOWN HEREON ARE BASED ON THE TENNESSEE STATE PLANE COORDINATE SYSTEM (NAD83). ELEVATIONS SHOWN HEREON ARE BASED ON NAVD88.
9. ALL CORNERS SHOWN ON THE FACE OF THE SURVEY ARE MARKED EITHER FOUND OR SET. ANY MISSING CORNERS ARE MARKED WITH AN IRON ROD AND CAP BEARING THIS SURVEYORS COMPANY NAME.
10. UTILITIES SHOWN HEREON WERE COMPILED FROM VISIBLE STRUCTURES AT THE SITE, INFORMATION FROM PLANS, AND PHYSICAL MARKINGS AND COMBINED TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE. THIS SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THIS SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. VERIFICATION OF EXISTENCE, LOCATIONS, AND DEPTH SHOULD BE MADE BEFORE CONDUCTING ANY EXCAVATION IN THE VICINITY OF THE UTILITY.
11. BY SCALED MAP LOCATION AND GRAPHIC PLOTTING ONLY, PORTIONS OF THIS PROPERTY ARE LYING WITHIN ZONE "AE" AS DESIGNATED ON CURRENT FEDERAL EMERGENCY MANAGEMENT AGENCY MAP NOS. 47119C0170E, 47119C0190E, 47119C0285E, 47119C0305E, WITH EFFECTIVE DATES OF APRIL 16, 2007, WHICH MAKES UP A PART OF THE NATIONAL FLOOD INSURANCE PROGRAM. BASE FLOOD ELEVATIONS FOR THIS PROPERTY ARE 590 ALONG THE DUCK RIVER AND 588 ALONG BEAR CREEK. ZONE "AE" IS AN AREA WHERE BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED. ZONE "X" IS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
12. I HEREBY CERTIFY THAT THIS IS A CATEGORY IV SURVEY AND WAS CONDUCTED IN ACCORDANCE WITH RULE 0820-03.11 (GLOBAL POSITION SYSTEMS SURVEYS) ACCORDING TO THE CURRENT TENNESSEE MINIMUM STANDARDS OF PRACTICE AS PROMULGATED BY THE TENNESSEE STATE BOARD OF EXAMINERS FOR LAND SURVEYORS. THIS SURVEY WAS CONDUCTED WITH DUAL-FREQUENCY RTK GPS EQUIPMENT BASED ON THE TDOT C.O.R.S NETWORK.
    a. POSITIONAL ACCURACY: 0.08'
    b. DATE OF SURVEY: 01/04/2022
    c. HORIZONTAL ZONE/DATUM: TN-4100/NAD83(2011) - TENNESSEE STATE PLANE COORDINATES.
    d. OCCUPATIONS FOR CONTROL POINTS ARE 3 MINUTES EACH, SIDE SHOTS ARE 3 SECONDS.
    e. VERTICAL DATUM: NAVD88 (GEOID03, GRID 7 REVISED)
    f. NO COMBINED GRID FACTORS WERE USED.
13. THERE WAS NO EVIDENCE OF RECENT EARTH MOVING AT THE TIME OF SURVEY.
14. THERE ARE NO KNOWN CHANGES TO THE STREET ROW AT THE TIME OF SURVEY.
15. THERE WAS NO EVIDENCE OF DELINEATED WETLANDS AT THE TIME OF SURVEY, HOWEVER, SHOWN ON THE SURVEY ARE CLASSIFIED FRESHWATER PONDS AND STREAMS. FURTHER DETAILS CAN BE FOUND ON WETLAND MAPPER WEBSITE. https://www.fws.gov/wetlands/data/mapper.html
16. EXCEPT AS NOTED, THERE WAS NO EVIDENCE OF ENCROACHMENTS AT THE TIME OF SURVEY.
17. THE LOCATIONS OF STRUCTURES ARE APPROXIMATE FROM SATELLITE IMAGERY.

## CONTROL TABLE

| | | | | |
|---|---|---|---|---|
| 100 | N 474,238.52' | E 1,672,762.90' | EL 675.03' | CAPPED ROD |
| 101 | N 472,572.21' | E 1,672,903.25' | EL 726.28' | CAPPED ROD |
| 102 | N 470,899.48' | E 1,673,280.18' | EL 728.47' | CAPPED ROD |
| 103 | N 468,089.58' | E 1,671,459.06' | EL 573.74' | CAPPED ROD |

PROJECT CONTROL: TENNESSEE STATE PLANE COORDINATES. NAD83(2011), GEOID03 GRID 7 REVISED. NO DATUM ADJUSTMENT.

200 0 100 200 400
GRAPHIC SCALE: 1" = 200'

| NO. | DATE | COMMENT |
|---|---|---|
| | | |

108 Beasley Drive
Franklin, TN
37064
615.794.2275

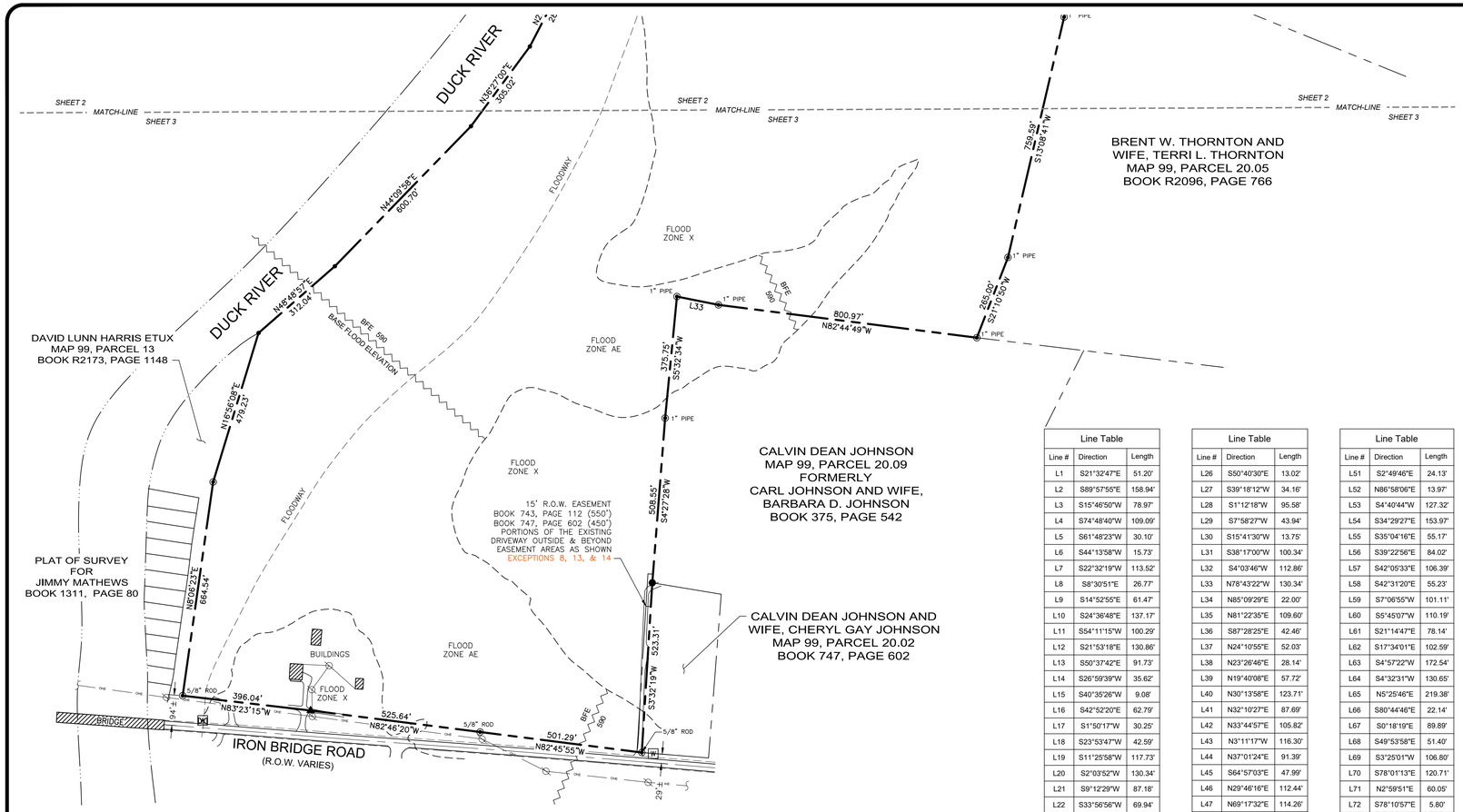
WILSON & ASSOCIATES, P.C.
Engineering/Surveying/Environmental

# ALTA/NSPS LAND TITLE SURVEY

MAP 90, PARCELS 12.01 & 16
BEAR CREEK PIKE / IRON BRIDGE ROAD
MAURY COUNTY, TENNESSEE
FOR: KOLTER GROUP ACQUISITIONS, LLC

| | |
|---|---|
| DRAWN BY: | JEC |
| APPVD. BY: | JCW II |
| DATE | 1/7/2022 |
| PROJ. No. | 21-1801 |
| SCALE: | 1" = 200' |

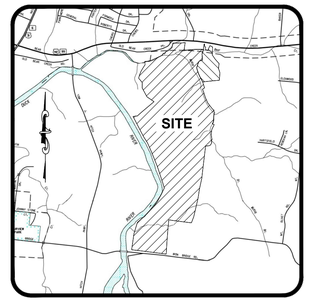
SHEET No.
2 OF 4




| Line Table | | |
|---|---|---|
| Line # | Direction | Length |
| L1 | S21°32'47"E | 51.20' |
| L2 | S89°57'55"E | 158.94' |
| L3 | S15°46'50"W | 78.97' |
| L4 | S74°48'40"W | 109.09' |
| L5 | S61°48'23"W | 30.10' |
| L6 | S44°13'58"W | 15.73' |
| L7 | S22°32'19"W | 113.52' |
| L8 | S8°30'51"E | 26.77' |
| L9 | S14°52'55"E | 61.47' |
| L10 | S24°36'48"E | 137.17' |
| L11 | S54°11'15"W | 100.29' |
| L12 | S21°53'18"E | 130.86' |
| L13 | S50°37'42"E | 91.73' |
| L14 | S26°59'39"W | 35.62' |
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| L16 | S42°52'20"E | 62.79' |
| L17 | S1°50'17"W | 30.25' |
| L18 | S23°53'47"W | 42.59' |
| L19 | S11°25'58"W | 117.73' |
| L20 | S2°03'52"W | 130.34' |
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| Line # | Direction | Length |
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| L28 | S1°12'18"W | 95.58' |
| L29 | S7°58'27"W | 43.94' |
| L30 | S15°41'30"W | 13.75' |
| L31 | S38°17'00"W | 100.34' |
| L32 | S4°03'46"W | 112.86' |
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| L34 | N85°09'29"E | 22.00' |
| L35 | N81°22'35"E | 109.60' |
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| L63 | S4°57'22"W | 172.54' |
| L64 | S4°32'31"W | 130.65' |
| L65 | N5°25'46"E | 219.38' |
| L66 | S80°44'46"E | 22.14' |
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| L74 | N24°07'16"E | 25.12' |
| L75 | S66°43'29"E | 100.36' |




**VICINITY MAP**
NOT TO SCALE

CERTIFICATION OF SURVEY FOR ALTA/NSPS LAND TITLE SURVEYS

TO: (I) KOLTER GROUP ACQUISITIONS, LLC, AND (II) FIDELITY NATIONAL TITLE INSURANCE COMPANYOLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY.

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 8, 11(OBSERVED), 13, 14, 16, 17, 18, AND 19, OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON 01/04/22.

JOEY C. WILSON II, PE, RLS
TN PE NO. 106976 1/7/22
TN RLS NO. 2089

LEGAL DESCRIPTIONS BASED ON THIS SURVEY WILL BE PROVIDED ON SHEET NUMBER 4 AFTER TITLE COMMENTS AND QUESTIONS HAVE BEEN ADDRESSED.

| NO. | DATE | COMMENT |
|---|---|---|
| | | |

108 Beasley Drive
Franklin, TN
37064
615.794.2275

WILSON&ASSOCIATES, P.C.
Engineering/Surveying/Environmental

JOEY C. WILSON II
REGISTERED LAND SURVEYOR
XV
AGRICULTURE
1/7/22
COMMERCE
2089
TENNESSEE NO.

## ALTA/NSPS LAND TITLE SURVEY

MAP 90, PARCELS 12.01 & 16
BEAR CREEK PIKE / IRON BRIDGE ROAD
MAURY COUNTY, TENNESSEE
FOR: KOLTER GROUP ACQUISITIONS, LLC

SCHEDULE B-II EXCEPTIONS:

1. RIGHTS OR CLAIMS OF PARTIES IN POSSESSION NOT SHOWN BY THE PUBLIC RECORDS. NONE OBSERVED DURING SURVEY
2. ANY LIEN, OR RIGHT TO A LIEN, FOR SERVICES, LABOR, OR MATERIAL HERETOFORE OR HEREAFTER FURNISHED, IMPOSED BY LAW AND NOT SHOWN BY THE PUBLIC RECORDS. NOT A SURVEY MATTER
3. TAXES OR SPECIAL ASSESSMENTS WHICH ARE NOT SHOWN AS EXISTING LIENS BY THE PUBLIC RECORDS. NOT A SURVEY MATTER
4. ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCES AFFECTING THE TITLE THAT WOULD BE DISCLOSED BY AN ACCURATE AND COMPLETE LAND SURVEY OF THE LAND. NO ENCROACHMENTS OBSERVED DURING SURVEY EXCEPT AS NOTED
5. EASEMENTS OR CLAIMS OF EASEMENTS NOT SHOWN BY THE PUBLIC RECORDS. DRIVEWAY USE EXTENDS OUTSIDE AND BEYOND EASEMENT AREA AS SHOWN - SEE ALSO ITEMS 13 &14
6. ANY DEFECT, LIEN, ENCUMBRANCE, ADVERSE CLAIM, OR OTHER MATTER THAT APPEARS FOR THE FIRST TIME IN THE PUBLICRECORDS OR IS CREATED, ATTACHES, OR IS DISCLOSED BETWEEN THE COMMITMENT DATE AND THE DATE ON WHICH ALL OF THE SCHEDULE B, PART I--REQUIREMENTS ARE MET. NOT A SURVEY MATTER
7. 2022 AND SUBSEQUENT YEARS MAURY COUNTY, TENNESSEE AND CITY OF COLUMBIA REAL PROPERTY TAXES AND/OR ASSESSMENTS WHICH CONSTITUTE A LIEN UPON SAID REAL PROPERTY UNTIL PAID. IF IMPROVEMENTS ARE COMPLETED AFTER JANUARY 1 OF ANY YEAR, THE LAW REQUIRES SUPPLEMENTAL ASSESSMENT FOR THE YEAR IN WHICH IMPROVEMENTS ARE COMPLETED AS DEFINED BY STATUTE. WE ASSUME NO LIABILITY FOR TAXES ASSESSED BY CORRECTION PURSUANT TO THE PROVISIONS OF SECTION 67-5-603, ET SEQ., TENN. CODE ANN. NOT A SURVEY MATTER
8. SUBJECT TO ANY AND ALL MATTERS APPEARING IN MAP OF RECORD IN PLAT BOOK P16, PAGES 53-54 IN THE MAURY COUNTY, TENNESSEE REGISTER OF DEEDS OFFICE, INCLUDING BUT NOT LIMITED TO RIGHTS OF OTHERS, IF ANY, IN AND TO THE "TRACK ROAD" ALONG THE NORTHERN PORTION OF THE EASTERN BOUNDARY; CEMETERY; TVA TRANSMISSION LINE; "JOHNSON RIGHT OF WAY"; LOCAL SERVICE POWER AND TELEPHONE LINES; DUCK RIVER; BEAR CREEK; OLD BEAR CREEK PIKE AND, SEWER LINE WITH MANHOLES ALONG THE NORTHERN BOUNDARY. (TRACT 1) SHOWN ON SURVEY
9. TITLE TO ANY PORTION OF SAID LAND LYING WITHIN THE BOUNDS OF ANY ROAD OR RIGHT OF WAY. (TRACT 1) RIGHT OF WAY MARGINS SHOWN ON SURVEY BASED ON FOUND MONUMENTS
10. TERMS AND CONDITIONS OF THAT CERTAIN BENEFICIAL EASEMENT IN FAVOR OF N.W. DANNELLEY AND WIFE, RUTH A. DANNELLEY FOR THE PURPOSE OF RIGHT IN AND TO A SPRING OF RECORD IN BOOK 319 AT PAGE 295 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 1). SPRING SHOWN ON SURVEY
11. EASEMENT IN FAVOR OF MAURY COUNTY, TENNESSEE FOR RIGHT OF WAY FOR ROAD PURPOSES (IRON BRIDGE ROAD) OF RECORD IN BOOK 387 AT PAGE 497 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 1). EXISTING IRON BRIDGE ROAD IS SHOWN ON SURVEY
12. EASEMENT IN FAVOR OF TVA FOR THE PURPOSE OF ELECTRIC TRANSMISSION LINES AS REFERENCED IN CURRENT VESTING DEED OF RECORD IN BOOK R2051 AT PAGE 792 IN THE MAURY COUNTY, TENNESSEE REGISTER OF DEEDS OFFICE. (TRACT 1) SHOWN ON SURVEY
13. EASEMENT IN FAVOR OF CALVIN DEAN JOHNSON FOR THE PURPOSE OF RIGHT OF WAY OF RECORD IN BOOK 747 AT PAGE 602 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 1). SHOWN ON SURVEY
14. EASEMENT IN FAVOR OF CARL JOHNSON ETUX BARBARA D. JOHNSON FOR THE PURPOSE OF RIGHT OF WAY OF RECORD IN BOOK 743 AT PAGE 112 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 1). SHOWN ON SURVEY
15. TITLE TO ANY PORTION OF SAID LAND LYING IN THE BED OR BANKS OF THE MCKAY BRANCH CREEK, THE RIGHTS OF UPPER AND LOWER RIPARIAN OWNERS TO THE FREE AND UNOBSTRUCTED FLOW OF THE WATER OF SAID MCKAY BRANCH CREEK, WITHOUT DIMINUTION OR POLLUTION, AND THE CONSEQUENCE OF ANY PAST OR FUTURE CHANGE IN THE LOCATION OF SAID MCKAY BRANCH CREEK. (TRACT 1) NOT A SURVEY MATTER
16. TITLE TO ANY PORTION OF SAID LAND LYING IN THE BED OR BANKS OF THE DUCK RIVER, THE RIGHTS OF UPPER AND LOWER RIPARIAN OWNERS TO THE FREE AND UNOBSTRUCTED FLOW OF THE WATER OF SAID DUCK RIVER, WITHOUT DIMINUTION OR POLLUTION, AND THE CONSEQUENCE OF ANY PAST OR FUTURE CHANGE IN THE LOCATION OF SAID DUCK RIVER. (TRACT 1) NOT A SURVEY MATTER
17. TITLE TO ANY PORTION OF SAID LAND LYING IN THE BED OR BANKS OF THE BEAR CREEK, THE RIGHTS OF UPPER AND LOWER RIPARIAN OWNERS TO THE FREE AND UNOBSTRUCTED FLOW OF THE WATER OF SAID BEAR CREEK, WITHOUT DIMINUTION OR POLLUTION, AND THE CONSEQUENCE OF ANY PAST OR FUTURE CHANGE IN THE LOCATION OF SAID BEAR CREEK. (TRACT 1) NOT A SURVEY MATTER
18. RIGHTS OF OTHERS IN AND TO THE CEMETERY LOCATED ON SUBJECT PROPERTY AND THE RIGHTS OF INGRESS AND EGRESS THERETO. (TRACT 1). CEMETERY SHOWN ON SURVEY
19. EASEMENT IN FAVOR OF CITY OF COLUMBIA, TN FOR THE PURPOSE OF RIGHT OF WAY FOR SEWER/UTILITY EASEMENT OF RECORD IN BOOK R1801 AT PAGE 828 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 1). EXISTING SEWER LINES SHOWN ON SURVEY
20. EASEMENT IN FAVOR OF CITY OF COLUMBIA, TN FOR THE PURPOSE OF RIGHT OF WAY FOR SEWER/UTILITY EASEMENT OF RECORD IN BOOK R1801 AT PAGE 831 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 1). EXISTING SEWER LINES SHOWN ON SURVEY
21. SUBJECT TO ALL MATTERS SHOWN ON UNRECORDED SURVEY OF S. K. ADKINS DATED JULY 14, 2008. (TRACT 1) DOCUMENT WAS NOT PROVIDED
22. SPECIAL PROPERTY TAX ASSESSMENT (I.E. ROLL-BACK TAX), IF APPLICABLE, PURSUANT TO T.C.A. SECTION 67-5-1008 (D) ("THE AGRICULTURAL, FOREST, AND OPEN SPACE LAND ACT OF 1976"), AS MOST RECENTLY AMENDED. GREENBELT APPLICATION OF RECORD IN BOOK G5 AT PAGE 218 IN THE MAURY COUNTY, TENNESSEE REGISTER OF DEEDS OFFICE. (TRACT 1). NOT A SURVEY MATTER
23. ANY INACCURACY IN THE AREA, SQUARE FOOTAGE, OR ACREAGE OF LAND DESCRIBED IN PROPERTY DESCRIPTION OR ATTACHED PLAT, IF ANY. THE COMPANY DOES NOT INSURE THE AREA, SQUARE FOOTAGE, OR ACREAGE OF THE LAND. (TRACT 1) AREAS NOTED ARE CORRECT
24. EASEMENT FOR THE PURPOSE OF INGRESS/EGRESS RIGHT OF WAY OVER THE LANDS OF THOMPSON AND RIGHTS TO OBTAIN WATER FROM SPRING NOTED IN DEED OF RECORD IN BOOK 537 AT PAGE 671 IN THE MAURY COUNTY REGISTER OF DEEDS OFFICE. (TRACT 2) SPRING SHOWN ON SURVEY
25. EASEMENTS IN FAVOR OF JAMES A. HARDISON AND WIFE, MARJORIE J. HARDISON FOR THE PURPOSE OF INGRESS/EGRESS OF RECORD IN BOOK 513 AT PAGE 220 AND BOOK 483 AT PAGE 527 IN THE MAURY COUNTY, TENNESSEE REGISTER OF DEEDS OFFICE. (TRACT 2)
26. EASEMENT IN FAVOR OF J. W. THOMPSON OR "ANYONE ELSE" FOR THE PURPOSE OF OBTAINING SPRING WATER OF RECORD IN BOOK 441 AT PAGE 504 IN THE MAURY COUNTY, TENNESSEE REGISTER OF DEEDS OFFICE. (TRACT 2) SPRING SHOWN ON SURVEY
27. TITLE TO THAT PORTION OF THE PROPERTY WITHIN THE BOUNDS OF OLD BEAR CREEK PIKE. (TRACT 2) RIGHT OF WAY MARGINS SHOWN ON SURVEY BASED ON FOUND MONUMENTS - RAILROAD SPIKES FOUND IN THE REMNANTS OF PAVEMENT - MAY BE SUBJECT TO RIGHT OF WAY - LEGAL QUESTION REGARDING ABANDONMENT - MINIMAL AREA IN QUESTION
28. TITLE TO ANY PORTION OF SAID LAND LYING IN THE BED OR BANKS OF THE BEAR CREEK, THE RIGHTS OF UPPER AND LOWER RIPARIAN OWNERS TO THE FREE AND UNOBSTRUCTED FLOW OF THE WATER OF SAID BEAR CREEK, WITHOUT DIMINUTION OR POLLUTION, AND THE CONSEQUENCE OF ANY PAST OR FUTURE CHANGE IN THE LOCATION OF SAID BEAR CREEK. (TRACT2) NOT A SURVEY MATTER
29. ANY INACCURACY IN THE AREA, SQUARE FOOTAGE, OR ACREAGE OF LAND DESCRIBED IN PROPERTY DESCRIPTION OR ATTACHED PLAT, IF ANY. THE COMPANY DOES NOT INSURE THE AREA, SQUARE FOOTAGE, OR ACREAGE OF THE LAND. (TRACT 2) AREAS NOTED ARE CORRECT
30. SPECIAL PROPERTY TAX ASSESSMENT (I.E. ROLL-BACK TAX), IF APPLICABLE, PURSUANT TO T.C.A. SECTION 67-5-1008 (D) ("THE AGRICULTURAL, FOREST, AND OPEN SPACE LAND ACT OF 1976"), AS MOST RECENTLY AMENDED. GREENBELT APPLICATION OF RECORD IN BOOK G5 AT PAGE 275 IN THE MAURY COUNTY, TENNESSEE REGISTER OF DEEDS OFFICE. (TRACT 2) NOT A SURVEY MATTER
31. TITLE TO ANY PORTION OF SAID LAND LYING WITHIN THE BOUNDS OF ANY ROAD OR RIGHT OF WAY. (TRACT 2) RIGHT OF WAY MARGINS SHOWN ON SURVEY BASED ON FOUND MONUMENTS

**LEGEND**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| IRON PIN FOUND | BENCH MARK | ELECTRIC METER-BOX (E) | EVERGREEN TREE | UNDERGROUND ELEC | UGE |
| IRON PIN SET | WATER METER (W) | ELECTRIC MH (E) | DECIDUOUS TREE | OVERHEAD ELEC | OHE |
| FENCE POST FOUND | WATER VALVE | LIGHT POLE | HANDICAP PARKING | GAS | 4" G |
| FENCE POST SET | FIRE HYDRANT | UTILITY POLE | SIGN | COMMUNICATIONS | COM |
| CONC. MON. FOUND | SANITARY SEWER MH | GUY ANCHOR | TURN LANE MARKING | BOUNDARY | |
| CONC. MON. SET | SANITARY SEWER CO | COMMUNICATION BOX (C) | MAIL BOX | CENTERLINE | |
| PK FOUND | AREA DRAIN | COMMUNICATION MH (C) | CEMETERY | FENCE | X |
| PK SET | CURB INLET | GAS METER (G) | SANITARY SEWER | 8" SA | WATER FEATURE |
| UNMARKED POINT (BEND/SNAG) | STORM MH | GAS VALVE | WATER | 4" W | TREE LINE |

**CONTROL TABLE**

| | | | | |
|---|---|---|---|---|
| 100 | N 474,238.52' | E 1,672,762.90' | EL 675.03' | CAPPED ROD |
| 101 | N 472,572.21' | E 1,672,903.25' | EL 726.28' | CAPPED ROD |
| 102 | N 470,899.48' | E 1,673,280.18' | EL 728.47' | CAPPED ROD |
| 103 | N 468,089.58' | E 1,671,459.06' | EL 573.74' | CAPPED ROD |

PROJECT CONTROL: TENNESSEE STATE PLANE COORDINATES. NAD83(2011), GEOID03 GRID 7 REVISED. NO DATUM ADJUSTMENT.

200 0 100 200 400
GRAPHIC SCALE: 1" = 200'

| | |
|---|---|
| DRAWN BY: | JEC |
| APPVD. BY: | JCW II |
| DATE | 1/7/2022 |
| PROJ. No. | 21-1801 |
| SCALE: | 1" = 200' |

SHEET No.
3 OF 4

CITY OF COLUMBIA TENNESSEE

DEVELOPMENT SERVICES
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# Preliminary Plat, Site Development Plan, and PUD Checklist

Development: Columbia Bluffs PUD-R Preliminary Master Development Plan

*This checklist shall be completed, and included with the submittal documents. If the submittal does not contain a completed checklist, it shall be deemed incomplete. All below listed items shall be included in the submittal documents and plans, as well as any further information required by the City of Columbia to evaluate compliance and to perform a full and complete review. See Zoning Ordinance Article 8 and Subdivision Regulations.*

**General**

- ☑ Name of development
- ☑ Contact info for the owner and licensed design professional(s) preparing plan: name, address, email, phone
- ☑ Plan sealed by a Design Professional licensed in the State of Tennessee.
- ☑ North Arrow, legend, and site vicinity map
- ☑ Graphic Scale: between 1 in. = 10 ft. and 1 in. =100 ft.
- ☑ Survey stamped by a State of Tennessee Licensed Professional Land Surveyor, with all project boundaries including bearings and angles to the nearest hundredth, utilities, and existing streets and rights-of-way.
- ☑ Note referencing Tennessee State Plane Coordinate System, NAD 83 Datum
- ☑ All property boundaries, existing easements, and encumbrances
- ☑ Parcel identification, owner, and deed and plat references of adjoining properties
- ☑ Proposed phasing and timetable for all phases of development
- ☑ Traffic Impact Study, as required.
- ☑ The substance of all existing and proposed covenants, easements, or other restrictions.

**Lots and Land-Use**

- ☑ The size of total property to be developed in square feet and acres
- ☑ Lot numbers of all proposed lots, with dimensions, locations, and square footage
- ☑ A tabulation of the land area to be devoted to various uses and activities and overall densities.
- ☑ Typical lot layout depicting proposed setbacks, yards, and easements, where applicable

**Structures**

- ☑ Location and approximate dimensions of all existing and proposed structures.
- ☑ Location of all earth retaining structures, with approximate top and bottom of wall elevations.
- ☑ Existing and intended use of all buildings and structures on site, including the number of dwelling units and density, where applicable
- ☐ Location, type, and size of proposed signs FMDP
- ☑ Approximate height, bulk, and the utilization of structures including activities and the number of living units.

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**DEVELOPMENT SERVICES**
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**Grading, Drainage, and Storm**

- ☑ Existing conditions and contours at vertical intervals of not more than two (2) feet
- ☑ General proposed contours at vertical intervals of not more than two (2) feet
- ☑ FEMA Special Flood Hazard Area (SFHA), 100-year Floodplain (F-P), and Floodway (F-W) boundaries with elevations and the exact location of the nearest benchmark. Indicate the Flood Insurance Rate Map (FIRM) panel number, its effective date, and flood insurance zones
- ☑ Location and dimension of aquatic buffer zones
- ☑ General layout of the proposed storm drainage system including surface and subsurface drainage systems, areas for detention, and water quality devices.
- ☑ Identification of all critical lots

**Streets, Parking, and Pedestrian Elements**

- ☑ Proposed street and alley rights-of-way, typical sections, widths, classification, names, and proposed ownership and maintenance responsibility
- ☑ Proposed connections to existing and proposed streets (including classification) located outside the development
- ☑ Proposed improvements as identified in the Traffic Impact Study, as required
- ☑ Existing and proposed sidewalks, trails, and other pedestrian elements
- ☑ Existing and proposed on-street and off-street parking and loading areas
- ☑ Summary of all provided and required parking

**Landscaping, Open Space, and Amenities**

- ☑ Natural features on site including, but not limited to, wetlands, streams, ponds, springs, sinkholes, wells, rock outcroppings, excessive slopes, and forested areas
- ☑ Landscaped areas and buffers with details on proposed plantings, existing vegetation, and other features. FMDP
- ☑ The location and size of all common open space, parkland dedications, and dedications and reservations of land for public uses.
- ☑ Any amenity features and structures for private or public benefit.
- ☑ Location, dimension, and materials of fences and walls
- ☑ Tree Canopy retention FMDP

**Utilities**

- ☑ General layout and location of existing and proposed utilities and utility features including, but not limited to potable water, fire hydrants, sanitary sewer, storm sewer, and power and communication facilities.
- ☑ Acknowledgement from water, sewer, and power utility providers that the proposed development may be adequately served with existing infrastructure, or if improvements are required to adequately serve the development, a general statement of the improvements.

CITY OF
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TENNESSEE

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**PUD Specific Items**

- ☑ Legal Description of Property
- ☑ Owner's Affidavit
- ☑ List of all variances requested
- ☑ The nature of the landholder's interest in the land proposed to be developed and a written statement of concurrence from all parties having a beneficial interest in the affected property.
- ☑ Location and approximate dimensions of all existing and proposed structures including approximate height, bulk, and the utilization of structures including activities and the number of living units. Include architectural renderings of all proposed structures with materials listed.
- ☑ The substance of covenants, grants of easements or other restrictions to be imposed upon the use of the land, buildings and structures including proposed easements for public utilities on the property or documentation of off-site easements.
- ☐ Exterior lighting FMDP

*If the application is deemed incomplete by the Zoning Administrator, a written request shall be made within ten days after the original submittal, for further information. In such case the application shall be held in abeyance until deemed complete for final review. No plan shall be formally presented for Planning Commission action until such plan is found complete, compliant with City standards, and ready for review.*

**Checklist Completed By:**

| KELI FRYMIRE | [signature] | 10/16/2023 |
|---|---|---|
| Print Name | Signature | Date |

Rev. 6/7/2022

CITY OF COLUMBIA TENNESSEE

DEVELOPMENT SERVICES
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
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# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

## SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | 400 Bear Creek Pike | | |
| | TAX MAP: 90 | GROUP: | PARCEL: 12.01 |
| SUMMARY OF NATURE OF REQUEST AND WORK | Annexation request and PUD-R rezoning request for a little over 400 acres between Bear Creek and Iron Bridge Road. PUD-R neighborhood to provide a variety of homes, including Active Adult/age restricted area, town homes, and large single family home lots. | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | 8/30/2023 | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ☒ Annexation<br>☐ Rezoning<br>☐ Preliminary Plat<br>☐ Final Plat<br>☒ PUD Preliminary Master Plan<br>☐ PUD Final Site Plan<br>☐ Multi-Family Site Plan<br>☐ Other:<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>☐ Written Legal Description copy<br>☐ Requested Zone Listed<br>☐ Compliance with Comprehensive Plan<br>☐ Annexation Permission Form<br>☐ Plans and/or Plats conforming to City standards with check list completed<br>☐ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>☐ Project Name (include Sections & Phases)<br>Columbia Bluffs PUD-R Preliminary Master Plan<br>☐ Total Number of Lots<br>866 residential lots<br>☐ Total acreage<br>+/-409.52 acres |



Rev. 4/14/2022

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

**All communications go to the Applicant's email that is provided.**

| | | | |
|---|---|---|---|
| NAME | Greg Gamble - Gamble Design | PHONE | 615-975-5765 |
| ADDRESS | 3020 Stansberry Lane, Suite 201, Franklin | EMAIL | info@gdc-tn.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | HK Big Bear Bluffs, LLC | PHONE | 813-615-1244 |
| ADDRESS | 14025 Riveredge Dr. Ste 175<br>Tampa FL 33637 | EMAIL | jgibbs@kolter.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

Greg Gamble
APPLICANT NAME

APPLICANT SIGNATURE

10/16/2023
DATE

HK Big Bear Bluffs LLC
James P. Harvey
PROPERTY OWNER NAME

PROPERTY OWNER SIGNATURE

10/10/2023
DATE

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |

**From:** Keli Frymire
**To:** Paul Keltner; Austin Brass; Kevin McCarthy
**Cc:** Joshua Gibbs; Ty; Greg Gamble; Brad Snyder; Tyler Gray
**Subject:** [Caution External Email] - Columbia Bluffs - Planning Commission Deferral Request
**Date:** Monday, February 12, 2024 4:43:14 PM
**Attachments:** image001.png

---

Good afternoon all,
I spoke with Kevin today on the phone and am sending this email as a follow up to that conversation.

We request to defer the Columbia Bluffs PUD-R and Columbia Bluffs CD-4 annexation and rezoning projects from the February 14, 2024 Planning Commission agenda to the March 13, 2024 agenda. We would like to ensure that we have the appropriate time to work through the late sewer comments and remove any uncertainty surrounding this issue. Additionally, Kevin and I discussed the Land Use policy amendment for the CD-4 parcel and will need to also use this time to update this request to include the land use policy change.

Thank you again for working with us on these projects.

Keli Frymire | PLA
Mailing: 3020 Stansberry Lane, Suite 201; Franklin, TN 37069
Physical: Freeport, FL
keli@gdc-tn.com
Mobile: (706) 566-6480
www.gdc-tn.com

# Bear Creek Commercial Site

| | | | |
|---|---|---|---|
| Project #: | 23-0421 | Location: | Tax Map 90 Parcel 12.01 |
| Applicant: | Greg Gamble | Case Type(s): | Rezoning |
| Staff Planner: | Kevin C. McCarthy, AICP | Proposed Use: | Professional Office |

## PROJECT SUMMARY

The applicant requests annexation with a plan of services and rezoning of 3.27-acres situated between Bear Creek and McKay's Branch. The property is part of a larger existing parcel, a small portion of which is located within Columbia's corporate limits. This request pertains to a relatively small portion of the property which is located outside the city but within its Urban Growth Boundary. Along with annexation into the city, the applicant requests rezoning to CD-4 (General Urban Character District).

- The request is inconsistent with Connect Columbia, the city's comprehensive plan. Consequently, the request does not satisfy the criteria for rezoning at 8.5.19.H.4.a. and the Planning Commission must recommend denial of the rezoning request.
- If the future land use map for the subject property were amended from Suburban Neighborhoods (fka Suburban Neighborhood) to City Center Urban Village (fka Urban Neighborhood), the requested zoning would be consistent with the comprehensive plan.
- The concept plan demonstrates that it is possible to develop the site in conformity with the standards of the requested character district.
- Subsequent development and division of the property will require review and approval by the Planning Commission or the Zoning Administrator.
- The Planning Commission is a **recommending body** for rezoning requests.
- Templates are provided at the end of the report to assist the Planning Commission in crafting properly formatted motions.

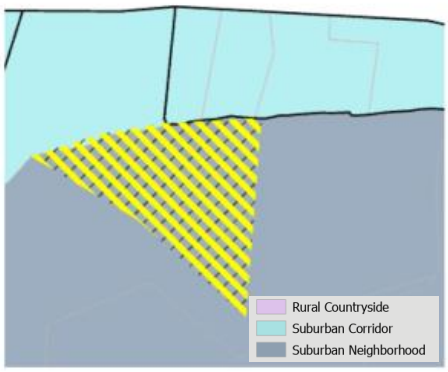
DRAFT

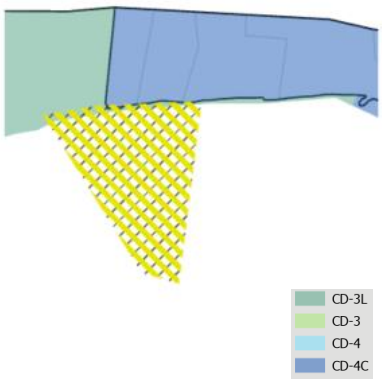
## SITE INFORMATION

| CURRENT ZONING | EXISTING USE | EXISTING IMP. | LAND AREA |
|---|---|---|---|
| Unincorporated | Vacant | Various Structures | +/- 409.92 |



| FUTURE LAND USE MAP | ZONING MAP |
|---|---|



| SITE CONTEXT/ADJACENT PROPERTIES | | | |
|---|---|---|---|
| | Future Land Use | Zoning | Current Use |
| Subject Property | Suburban Neighborhood | Unincorporated | Vacant |
| North | Suburban Corridor | CD-3L/CD-4C | Commercial |
| South | Suburban Neighborhood | Unincorporated | Vacant |
| East | Suburban Neighborhood | Unincorporated | Vacant |
| West | Suburban Neighborhood | Unincorporated | Vacant |

## CONSISTENCY WITH CONNECT COLUMBIA

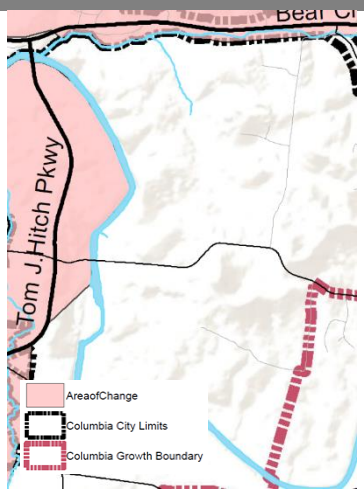
**Suburban Neighborhood:** The requested rezoning is not consistent with the future land use map. The future land use of the subject site is Suburban Neighborhood. The Character Area is characterized by a residential development and neighborhoods, with limited, intermixed and compatible civic uses (Connect Columbia, p. 22). The Future Land Use Plan indicates that "the general development pattern is defined by a single use activity on individual lots" (Connect Columbia, p. 22). Green space is largely incorporated on individual lots; neighborhood and community parks should be located within neighborhoods to enhance the quality of life. Development should emphasize connectivity and housing diversity (Connect Columbia, p. 23). The Character Area Matrix from page twenty-two of the Future Land Use Plan (excerpted below) is a guide to approving requests for zoning map amendments and Planned Unit Developments. The future land use classification is implemented by the CD-3L and CD-3 character districts, as well as PUDs.

DRAFT

| CHARACTER AREA MATRIX | | | | |
|---|---|---|---|---|
| | **Development Pattern** | **Zoning Category and Uses** | **Infrastructure** | **Design Standard** |
| **SUBURBAN NEIGHBORHOOD** | **Is the property in an Area of Change?**<br><br>**No:**<br>The development pattern is established. Changes to overall character of the area should rarely occur.<br><br>**Yes:**<br>The development pattern is evolving. Changes to the area are likely as development occurs. New development should respect both the natural environment and blend with existing, surrounding neighborhood assets. | **Residential Uses Zoning Category:**<br>Low Density Residential District and Medium Residential.<br><br>**Public and Civic Uses Zoning Category:**<br>Religious Facilities, Government Facilities (low impact), and Educational Facilities. | **Not in an Area of Change:**<br>Limited new services, with mostly in-fill enhancements to existing infrastructure.<br><br>**Within an Area of Change:**<br>Extensions to transportation, water, sewer, and other services should be expected. New service or extensive redevelopment of existing services should be vetted and reviewed by Planning Commission and City Council as a primary element of approval. | Scale: New dwellings and structures should be compatible with the established character of the area.<br><br>Architecture: New developments should include a mix of architectural styles. Residential garages, if front-facing, should be recessed from the front façade of the structure. Civic use should respect the residential character, while providing architectural interest. |

## AREA OF CHANGE

The subject site **is not located** in an Area of Change (Connect Columbia Map 3). In 2017 the Planning Commission determined that the development pattern was established. Changes to overall character of the area should rarely occur. The designation does not necessarily mean that any particular development proposal is inconsistent with Connect Columbia. It does mean that the Planning Commission may pause to ensure the context of the area surrounding the subject property is considered fully in the review process. (Connect Columbia p. 14).



## CONFORMITY WITH ZONING ORDINANCE

As required by **§ 8.5.19.F.3** of the Zoning Ordinance, the applicant provided a concept plan (i.e. "Sketch Development Plan"). The purpose of the concept plan is to demonstrate that it is possible to develop the site in conformity with the standards of the requested character district. This request for rezoning simply establishes entitlements under the zoning ordinance, not a vested right to develop the site as depicted in the concept plan.

**Lots, Building Sites & Bulk Standards**

- **The concept demonstrates that it is possible to develop the site in conformity with the bulk and design standard of the Ordinance at Table 4.3.1-D.**
    - The plan depicts a small retail building site with associated parking.
    - As drawn, the plan would not conform to the standards for frontage buildout and parking placement. However, with a minor modification of the building placement, it could conform to the CD-4 bulk and site standards listed in **Table 4.3.1-D** of the Zoning Ordinance.
    - If the rezoning is successful and the site develops, Planning staff will perform zoning compliance review to determine conformity with the standards of the Ordinance.
    - Any proposed redevelopment of the site must conform to the standards of the Zoning Ordinance and applicable overlays.
- **The current request establishes the applicable standards for future reviews. The concept plan is not a plan of development and approval of the rezoning request does not establish a vested right.**

**Plan Consistency**

- **The Zoning Ordinance requires plan consistence for all rezonings.**
    - **§ 8.5.19.H.4.a** requires the Planning Commission to determine that all proposed rezonings are consistent and not in conflict with the Comprehensive Plan or other applicable approved local plans for the area when making a recommendation to City Council.
    - Furthermore, **§ 8.5.19.K.6.a** requires the City Council to determine the Rezoning is in agreement with the Comprehensive Plan and any applicable local area plans prior to approval.

- The future land use of the subject site under the 2018 version of Connect Columbia is suburban neighborhood. The 2018 version of the plan indicates that appropriate uses for Suburban Neighborhood include medium density residential and civic uses. The requested CD-4 zoning is a mixed use district which permits commercial uses, as depicted in the applicant's site plan.
- The 2024 version of Connect Columbia, adopted on February 8, 2024, places the subject property in the Suburban Neighborhoods future land use classification. The future land use classification is implemented by CD-3 and CD-3L.
- Articles 3 and 4 of the Zoning Ordinance describes the CD-4 character districts as appropriate for the Urban Neighborhood character area and makes clear that it is a mixed-use district. Pending Zoning text amendments update this language to indicate that the CD-4 character district implements the City Center Urban Village future land use classification.
- The requested zoning is not consistent with the comprehensive plan.

DRAFT

## REVIEW PROCESS

The Development Review Committee evaluated the proposed rezoning at its December 2023 meeting, as directed by section **8.3.7** of the Zoning Ordinance. Technical comments are provided in the agenda package.

Section **8.5.19** of the Zoning Ordinance directs the Planning Commission to review and make a recommendation on all proposed changes to the Official Zoning Map. The Planning Commission is the recommending body for rezonings under **§ 8.3.3.B.3** of the Zoning Ordinance.

Section **8.5.19.H.4** of the Zoning Ordinance establishes the review criteria for approval of all changes to the Official Zoning Map:

a. *The Rezoning is consistent and not in conflict with the Comprehensive Plan or other applicable approved local plans for the area;*
b. *It has been determined that the legal purposes for which zoning exists, as set forth in Section 1.5 [, are not contravened];* [1]
c. *It has been determined that there will be no adverse effect upon Adjoining property owners unless such effect can be justified by the overwhelming public good or welfare;*
d. *It has been determined that no one property owner or small group of property owners will benefit materially from the change to the detriment of the general public;*
e. *It has been determined that conditions affecting the area have changed to a sufficient to warrant the Zoning Map Amendment or that the existing zoning of the property was the result of a mistake;*
f. *It has been determined that adequate school, road, parks, wastewater treatment, water supply, and stormwater drainage facilities are available*

[1] Ordinance 4400 contains this incomplete sentence. The previous ordinance contained a nearly identical list of criteria at § 3.18.7.B. The corresponding criterion in Ordinance 3638 read "the legal purposes for which zoning exists are not contravened."

## SUMMARY OF DEVELOPMENT REVIEW COMMITTEE COMMENTS

The DRC reviewed this proposal at its December 2023 and January 2024 meetings. A full list of comments, and the applicant's responses, is provided in the agenda packet. Some key comments are noted below.

- **Planning** informed the applicant that the request is inconsistent with the comprehensive plan and requested that the applicant amend the application to request a future land use map amendment.
- Planning also requested that the applicant provide a narrative response explaining why the applicant believes the five criteria for Planning Commission recommendations listed at 8.5.20.F of the Zoning Ordinance (p. 450) support the proposed change to the Future Land Use Map.
- **Planning** directed the applicant to provide a narrative response to criterion at **§ 8.5.19.H.4(e)** explaining why the applicant believes conditions affecting the area have changed sufficiently to warrant the Zoning Map Amendment.
- Planning also advised that staff prefers to see this request combined with a related and concurrent request for Planned Unit Development approval of the larger portion of the same parcel. The subject site will be inaccessible if the other development is not completed.
- Planning also advised the applicant to consider the feasibility of providing the required parking for the intended use of the property.
- Utility providers indicated willingness and capacity to serve. Some included standard caveats about the impact of supply chain disruption on the ability to establish services. Water availability letters must be renewed every 120 days.

DRAFT

## COMMENTARY FROM PROFESSIONAL PLANNING STAFF

**The requested CD-4 zoning is not consistent with Connect Columbia; the Planning Commission must recommend denial.** As discussed above, the subject site's future land use classification is Urban Neighborhood. Section **8.5.19.H.4.a** of the Zoning Ordinance requires the Planning Commission to determine that all proposed rezonings are consistent and not in conflict with the Comprehensive Plan. Section **8.5.19.K.6.a** requires the City Council to determine the Rezoning is in agreement with the Comprehensive Plan prior to approval. The requested CD-4 zoning is a medium density mixed use district which is not consistent with the Suburban Nieghborhoods future land use classification.

## SAMPLE MOTIONS

**Approve:**

Move to find, based on the information presented by the applicant and the analysis provided by city staff, that the criteria listed in sections **8.5.19.H** of the City of Columbia Zoning Ordinance have been satisfied and recommend approval of the proposed annexation with a plan of services and rezoning *[, subject to technical comments and other conditions presented by planning staff*].

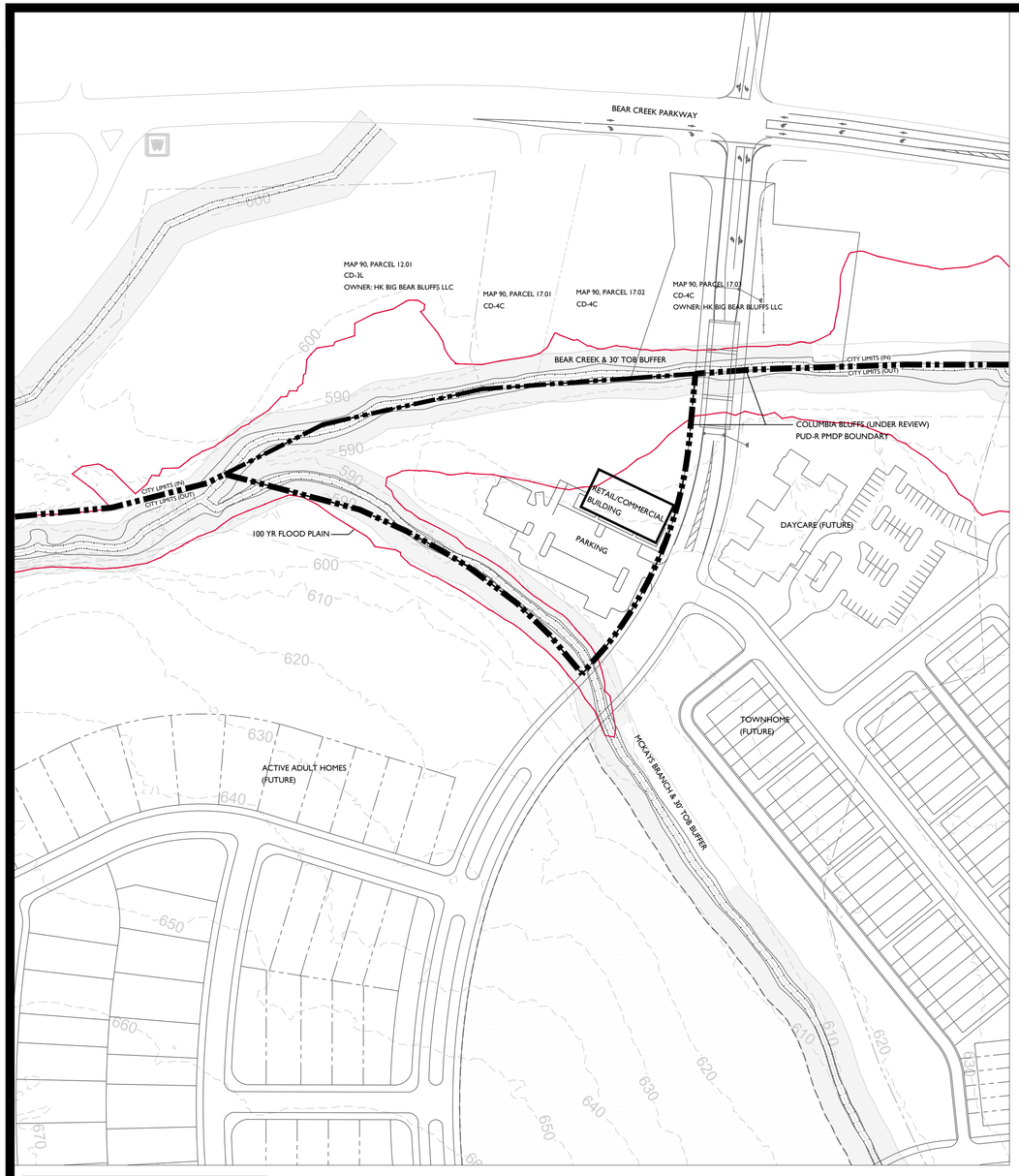
**Deny:**

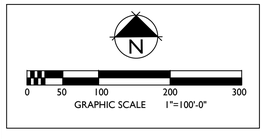
Move to recommend denial of the requested annexation with a plan of services and rezoning having found, based on the information presented by the applicant and the analysis provided by city staff, that the criteria listed in section **8.5.19.H** of the City of Columbia Zoning Ordinance are not satisfied [*list specific reasons for denial*].

**Defer:**

Move to find that there is insufficient information to decide, defer the matter to the next regularly scheduled meeting of the Planning Commission, and request that the [*applicant/staff*] provide: [*list additional information*] for review at a future meeting.

DRAFT




## CONCEPTUAL DEVELOPMENT PLAN CD-4 DESIGN CRITERIA:

GROSS SITE AREA: +/-3.36 AC

7,200 SF NON-RESIDENTIAL BUILDING (60'X120')

TOTAL IMPERVIOUS SURFACE RATIO: 80% MAX
MAXIMUM BUILDING LENGTH: 120'

SETBACKS:
FRONT: 6' - 20'
SIDE: 6' MIN.
REAR: 3' MIN.

PARKING PER ZONING ORDINANCE STANDARD
PARKING PROVIDED: SURFACE IN 3RD LAYER
+/- 54 PARKING SPACES SHOWN ON PLAN (1 PER 133 SF)

## LEGAL DESCRIPTION OF PROPERTY:

**LEGAL DESCRIPTION**
**FOR ANNEXATION REQUEST – 3.36 ACRES**
**A PORTION OF MAP 90, PARCEL 12.01**
**DEED BOOK R2827, PAGE 587**
**HK BIG BEAR BLUFFS, LLC**

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242), AMIT J. PATEL AND WIFE, MINAXIBEN G. PATEL (BK R2411, PAGE 1348), HK BIG BEAR BLUFFS, LLC (R2870, PG 961), AND WEST, SOUTH, AND EAST BY REMAINING PORTIONS OF BIG BEAR BLUFFS, LLC (2827, PG 587) REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN), AND IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT AN 1 INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.95 EAST 1,672,944.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 08°01'15" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 21°32'47" E, FOR A DISTANCE OF 51.20 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK N ROLL JESUS AND THE TRUE POINT OF BEGINNING;

THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFFS, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 85°53'31" E, 307.86 FEET TO A POINT;

THENCE, CREATING A NEW LINE WITH THIS ANNEXATION OF PROPERTY, THE FOLLOWING 2 CALLS:

S 05°15'54" W, 94.01 FEET TO THE BEGINNING OF A CURVE CONCAVE WESTERLY, SAID CURVE HAS A RADIUS OF 565.00 FEET;

SOUTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 38°33'55", AN ARC DISTANCE OF 380.30 FEET, CHORD BEARING S 24°32'52" W WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT ALONG THE CENTER OF MCKAY BRANCH;

THENCE, ALONG MCKAY BRANCH, THE FOLLOWING 7 CALLS:

N 39°46'13" W, 73.31 FEET TO A POINT;

N 45°49'08" W, 65.41 FEET TO A POINT;

N 53°12'54" W, 86.37 FEET TO A POINT;

N 58°09'42" W, 42.46 FEET TO A POINT;

N 61°08'47" W, 61.78 FEET TO A POINT;

N 65°15'03" W, 74.45 FEET TO A POINT;

N 75°17'27" W, 201.23 FEET TO A POINT WHERE MCKAY BRANCH CREEK INTERSECTS WITH BEAR CREEK;

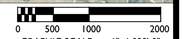
THENCE, ALONG BEAR CREEK, THE FOLLOWING 2 CALLS:

N 63°11'05" E, 159.96 FEET TO A POINT;

N 77°31'07" E, 234.79 FEET TO THE POINT OF BEGINNING CONTAINING 3.36 ACRES (146,345.13 SQ FT.) AND BEING A PORTION OF THE PROPERTY SHOWN ON TAX MAP 90 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFFS, LLC BY DEED OF RECORD IN BOOK R2827, PAGE 287 IN THE REGISTER'S OFFICE OF MAURY COUNTY, TENNESSEE.




LOCATION MAP




## PROJECT INFORMATION:

PARCEL: PORTION OF MAP 90 PARCEL 12.01
ADDRESS: PORTION OF 400 BEAR CREEK PARKWAY

PROPOSED USE: NEIGHBORHOOD SERVING COMMERCIAL CONFORMING TO THE APPROVED CD-4 USES.

## CONTACT:

APPLICANT/LANDSCAPE ARCHITECT:
GREG GAMBLE OR KELI FRYMIRE
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37069
615-975-5765
greg.gamble@gdc-tn.com
keli@gdc-tn.com

DEVELOPER:
KOLTER LAND
JIM HARVEY OR
JOSHUA GIBBS
615-582-3253
jgibbs@kolter.com

OWNER:
HK BIG BEAR BLUFFS LLC
JIM HARVEY

## ANNEXATION AND REZONING REQUEST:

REQUEST TO ANNEX +/-3.36 ACRES AND REZONE TO CD-4
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

CONNECT COLUMBIA FINDINGS:
*Annexation should provide for a continuation of orderly, planned development of the City. Lot sizes and development scale should be compatible with surrounding development. If proposed development abuts land that is undeveloped or has low density/intensity, the density and intensity of the proposed development should taper towards the periphery to provide compatibility of the development pattern. Land annexed into the City should follow the transect and Character Area Matrix to provide the most appropriate land uses and zoning for the newly annexed land.*
Response: The proposed commercial parcel would be adjacent to CD-4C zoned properties on Bear Creek Parkway and would serve to provide neighborhood commercial and personal service options for the residents of the proposed Columbia Bluffs development. The parcels along Bear Creek Parkway are within an area of change. With the development along this corridor, residential development in close proximity to downtown and new commercial development along Tom Hitch Parkway is a logical progression of development pattern.

*Suburban Neighborhood: Future development should emphasize connectivity and housing diversity. Additionally, new development should create a pedestrian-friendly environment by adding sidewalks and/or creating other pedestrian-friendly multiuse trail/bike routes linking current and future neighborhoods and major destinations such as libraries, neighborhood centers, health facilities, commercial clusters, parks, schools, or other such uses.*
Response: The small commercial parcel will be a destination for nearby residents and is proposed along a new/proposed road into the Columbia Bluffs development. Sidewalk connections will link this commercial area to this residential development.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# PORTION OF 400 BEAR CREEK PARKWAY ANNEXATION, REZONING REQUEST & CONCEPTUAL DEVELOPMENT PLAN

Columbia, Tennessee

GREGORY C. GAMBLE — TENNESSEE REGISTERED LANDSCAPE ARCHITECT — No. 1302

Date: OCTOBER 16, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

CONCEPTUAL DEVELOPMENT PLAN

SHEET
L1.0

January 23, 2024

Paul Keltner, Director
Development Services
City of Columbia, TN

RE: Project# 23-0421; Re-Submittal 400 Bear Creek Parkway – Annexation Request and CD4 Rezoning

Dear Mr. Keltner,
The accompanying documents and comment responses below are for the resubmittal of the above referenced project. It is our understanding that this project will be on the February CMPC agenda.

Below, please find written responses to the Technical Review comments provided on December 12, 2023.

Included in the submittal are the following:

1. Comment responses to Development Review Committee (below)

## Staff Comments:

### Planning

1. The requested character district (CD-4) is inconsistent with the comprehensive plan future land use map. Please add a request for a comprehensive plan amendment to Urban Neighborhood.
   ***Response: The applicant is not seeking a comprehensive plan amendment and is not seeking to change the land use policy in this area to Urban Neighborhood. The existing future land use policy is Suburban Neighborhood, with adjacency to Suburban Corridor. The applicant has heard feedback that would support small, neighborhood serving commercial uses in this location and feels like this land use policy and zoning district would be more appropriate.***
2. The lead staff person for this case is City Planner Kevin McCarthy, AICP; he will prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process or technical comments.
   ***Response: Noted.***

greg.gamble@gdc-tn.com
615.975.5765 cell
3020 Stansberry Lane, Suite 201
Franklin, TN 370

3. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, please simply not that the information has been acknowledged.
   ***Response: noted.***
4. Please provide a narrative response to criterion 8.5.19.H.4(e) explaining why the applicant believes conditions affecting the area have changed sufficiently to warrant the Zoning Map Amendment.
   ***Response: With approval of the Columbia Bluffs development, this small commercial parcel would add a pedestrian friendly commercial opportunity to the local residents. This commercial parcel would also be on the multi-use trail route that serves as a link between Bear Creek Parkway and Iron Bridge Road.***
5. Please provide a narrative response explaining why the applicant believes the five criteria for Planning Commission Recommendations listed at 8.5.20.F of the Zoning Ordinance (p. 450) support the proposed change to the Future Land Use Map.
   ***Response: The applicant is not seeking a change to the Future Land Use Map.***
6. Please provide a more detailed concept plan indicating that the site can be developed in conformity with the standards of the CD-4 character district.
   ***Response: The previous/current concept plan depicts a small commercial building with associated parking and stormwater. Access to the parcel would currently only be available from the proposed Columbia Bluffs Boulevard.***
7. Please explain how the site will be accessed if the adjacent Planned Unit Development Preliminary Master Plan is not approved. Does the utilization of this site under the standards of the CD-4 character district depend on a change of entitlements and approved plan of development for another property?
   ***Response: The applicant does not anticipate pursuing this application if the larger Columbia Bluffs PUD-R Preliminary Master Development Plan is not approved.***
8. Advisory: A current water availability letter is required throughout the entitlement process. The current letter will expire on February 17, 2023. Presuming a timely resubmittal to technical comments and a favorable recommendation from the planning Commission in February, the item will proceed to City Council agenda for first consideration in March. Consequently, following consideration by the Planning Commission, a new water availability letter will be required to proceed to the City Council agenda. The lead times for new letters can be long. Please communicate with IDG and CPWS accordingly.
   ***Response: Noted.***
9. Advisory: Planning staff will place signs on the property and send certified letters to adjacent property owners at least 10 days prior to the Planning Commission meeting. Please be prepared to address any concerns regarding compatibility with the established pattern of the surrounding area.
   ***Response: noted.***
10. Advisory: Planning staff recommends timing resubmittals so that this item proceeds to Planning Commission on the same agenda as the Planned Unit Development Preliminary Master Plan proposed for the adjacent site.
    ***Response: Noted. The items are intended to track on the same agenda.***

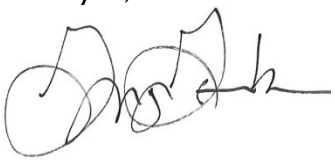
DEVELOPMENT PLANNING
DESIGN
MANAGEMENT

greg.gamble@gdc-tn.com
615.975.5765 cell
3020 Stansberry Lane, Suite 201
Franklin, TN 370

11. Columbia Power System has an existing power line near your proposed development. We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction.
    ***Response: Noted***
12. Unfortunately, due to current supply chain challenges, no timeframe can be guaranteed regarding the availability of meters or transformers appropriate. for your development.
    ***Response: noted.***
13. Please see attached Plan of Services for 3-acre portion for commercial use and City of Columbia Dumpster Guidelines & Accessibility Requirements.
    ***Response: Noted.***
14. All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided. Note: Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.
    ***Response: noted***
15. "A water availability letter was issued on November 19, 2023, it remains valid for 120 days. The availability of capacity to serve is based on a determination by the Fire Marshal of fire flow requirements and the information submitted on the Water Service Availability Request application. Any off-site improvements detailed in the availability letter are the responsibility of the developer/owner. All public water system improvements are subject to the preparation and approval of detailed construction plans prepared in accordance with CPWS and Tennessee Department of Environment and Conservation requirements."
    ***Response: noted***
16. ATT intends to serve.
    ***Response: Noted.***
17. [CPWS BB] Plan to serve.
    ***Response: Noted.***

If there are any questions or additional information needed, please feel free to reach out to me, or Keli Frymire (keli@gdc-tn.com) in my office.

Thank you,



**Gamble Design Collaborative**
Greg Gamble

# PLAN OF SERVICES

FOR ANNEXATION

*400 BEAR CREEK PIKE* PROPERTY

+/-3.36 ACRES,

*BEING*

TAX MAP 90 PARCEL 12.01

**23-0421**

## A. Water

The project is within Columbia Power and Water's service area. "A water availability letter was issued on October 13, 2023, it remains valid for 120 days. The letter will need to be updated prior to the applicable meeting of the Planning Commission. The availability of capacity to serve will be based on a determination by the Fire Marshal of fire flow requirements and the information submitted on the Water Service Availability Request application. Any off-site improvements detailed in the availability letter are the responsibility of the developer/owner. All public water system improvements are subject to the preparation and approval of detailed construction plans prepared in accordance with CPWS and Tennessee Department of Environment and Conservation requirements."

## B. Sewer

All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided. Note: Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.

## C. Police

The jurisdiction of the Columbia Police Department will be extended to the areas annexed immediately upon the effective date of annexation.

## D. Fire and Rescue

1. The City of Columbia Fire & Rescue provides an array of services to the citizens and visitors of the City of Columbia. These services include but may not be limited to non-emergency services such as fire prevention and codes enforcement, pre-incident planning, public education programs, smoke alarm check/replacement, emergency management preparedness, and emergency services such as fire suppression, heavy rescue, emergency medical first response, and hazardous materials response. The City of Columbia Fire Department currently holds an Insurance Service Organization (ISO) class 1 rating.

   Columbia Fire & Rescue strives to provide all services in a timely, courteous, and professional manner. Due to the nature of emergency services, we strive to arrive at the incident scene as quickly as possible but without posing additional dangers to the residents/visitors we meet while responding to your location.

**Infrastructure:**

The infrastructure put in place is like the foundation of your development. If the infrastructure is designed and constructed with the present needs and future plans in mind, your development will be prepared for the future.

**Water:**

Columbia Fire & Rescue requires that there be sufficient water provided through the municipal water system to meet the needed fire flow requirements for your facility. These flows are calculated by the Fire Marshal. These flows are based on many factors dealing with your buildings' construction type, fire load in the building, square footages, and etc. If you install fire sprinkler systems in your facilities, Columbia Fire & Rescue can drastically reduce fire flow requirements.

**Roadway and Bridges**: Columbia Fire & Rescue serves the residents and visitors of our jurisdiction by utilizing highly trained firefighters and modern fire apparatus. A minimum response to a structure fire in your development will be four fire apparatus. One of the fire apparatus that will respond to your development will be a ladder truck with a gross vehicle weight rating of approximately 80,000 pounds. Roadways and bridges must be designed and constructed not only with light vehicle traffic in mind but with the emergency service vehicles that will be servicing your development.

**Damage Free Property Access:** Columbia Fire & Rescue requires all gates automatic or manual that will be or may be locked to be equipped with Knox Rapid Entry system. You can research this product at www.knoxbox.com or

your gate vendor will be familiar with the product. Our department would also be happy to work with you to find what Knox Rapid Entry product is best suited for your application.

**Damage Free Home/Facility Access**: Currently, Columbia Fire & Rescue does not require residential occupancies to be equipped with the Knox Rapid Entry system. However, this product is a very wise investment for your future development. The Knox Rapid Entry System products allow homes to be secured but also allow the Columbia Fire & Rescue Department access to your property and/or homes without any delay or property damage. The system has an armored key lock safe recess mounted to the exterior of the homes with the key to the residence inside. Firefighters access the residence key during an emergency to gain entry into the home without causing any property damage. Again, our department would be happy to provide you with information and education on this program and its many positive attributes.

**Emergency Response to Your Location:** The proposed annex will be located on the property at 400 Bear Creek Pike in Columbia, Tennessee. This location is approximately 1.4 miles from Columbia Fire Station #3 located at 705 Tom Sharp Road, 3.3 miles from Fire Station #1 located at 1000 South Garden in downtown Columbia, and 7.4 miles from Fire Station #5 located at 2633 Nashville Hwy. These distances are used to calculate an estimated response time to your development for the different levels of emergency response that may be needed at your facilities.

**Medical Emergency Response:** Columbia Fire & Rescue normally responds a minimum of one fire apparatus from Station #3 to service your location for a medical emergency. From the time you dial 911 until the fire department will arrive at your location will be within 3.5 minutes. Should your property experience a mass casualty incident where additional fire apparatus/firefighters would need to respond, then Fire Station #1 could send an additional unit and arrive on-scene 4.5 minutes of your 911 call.

**Fire Incident Response:** Columbia Fire & Rescue recommends a multi-faceted fire suppression approach. First, future homes should be constructed to meet or exceed all applicable fire and life safety codes. Secondly, even if not required by building, fire, or life safety codes, we encourage the installation and use of fire sprinkles in future homes. Columbia Fire & Rescue's normal fire incident response to a single family residential development is three fire apparatus with a minimum 15 firefighters and 1 Chief Officer. Response times will be similar to the times estimated in the emergency medical response section. Your first fire apparatus should be on-scene within approximately 3.5 minutes, the second fire apparatus should be on-scene within 4.5 minutes, and the third/fourth apparatus should be on-scene within 4.5 minutes. Due to OSHA standards that require at least four firefighters to arrive on-scene prior to initiating an interior fire attack

and Columbia Fire & Rescue's minimum staffing policy, it could take the 4.5 minutes to get the minimum number of firefighters to the scene to begin an interior fire attack.

In summary, the members of the Columbia Fire & Rescue consider it an honor to serve the residents and visitors in our community each and every day. When an emergency occurs, time is our worst enemy. Columbia firefighters train to reduce every second while not posing any additional undue risk to firefighters and/or the public when responding to or working at an emergency incident. The times estimated in the referenced examples are a combination of averages and estimations. Our department has very little data to support incident responses to your location. The time estimations are based on the fire companies being at their regular station, time it takes for Maury 911 to process a 911 call, the time it takes for Columbia firefighters to board the apparatus and leave the station, and the travel time from the station to your location is an estimate based on road miles, probable traffic conditions, and road conditions. You can see by the examples referenced above that it will take time for Columbia Fire & Rescue to receive your call for help and then respond to your location. The roadways have considerable driveway/cross street connections, hills, curves, and reduced speed zones that contribute to a long response time for fire apparatus to arrive.

## E. Development Services

1. The planning and zoning jurisdiction of the City will extend to the annexed areas immediately upon the effective date of the annexation.

2. The property shall be zoned CD-4 (General Urban Character District) ) upon the effective date of the annexation.

3. The code administration jurisdiction of the City will extend to the annexed areas immediately upon the effective date of the annexation.

4. Upon the effective date of annexation, all development will be required to abide by the Columbia Zoning Ordinance.

## F. Streets

1. Upon acceptance by City Council and all warranties have expired; all streets and drainage systems will be maintained by Public Works. Service will include street sweeping, catch basin cleaning, street repair and snow removal drainage maintenance, and sidewalk repair.

2. Upon acceptance by City Council, all approved street signs will be maintained by Public Works.

## G. Parks and Recreation

Residents of the annexed areas may use all existing recreational facilities, parks, etc., on the effective date of annexation. The same standards and policies now used in the present City will be followed in expanding the recreational program and facilities in the enlarged City.

## H. Refuse Collection

Single family homes will receive City of Columbia trashcan service. For 189 townhomes, we recommend five or six 8-yard dumpsters with 3x/week collection if utilizing City of Columbia sanitation services. Private sanitation services, including dumpsters, compactors, individual receptacles or valet service, may be utilized. Individual trash receptacles will not be provided by the City of Columbia to townhome residents.

Single Family homes will receive the following City of Columbia sanitation services: Residential customers will be issued one 96-gallon garbage receptacle with the option to purchase up to two additional garbage receptacles. The Sanitation Department will provide weekly curbside garbage collection. Bi-weekly curbside recycling will be offered on a subscription basis. Brush collection will be provided on a bi-weekly basis. Residents are allotted three free bulk item pickups per year.

Townhomes will receive the following services: The Sanitation Department will provide dumpster collection. For the 189 units, we recommend five (5) or six (6) 8-yard dumpsters serviced 3 times a week. Brush collection will be provided on a bi-weekly basis. Residents are allotted three free bulk item pickups per year. Private sanitation services, including dumpsters, compactors, individual receptacles or valet service, a are an option for townhomes. Individual receptacles will not be provided by the City of Columbia to multi-family apartment or townhomes.

## I. Power

Columbia Power System has an existing power line near the proposed development. We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction.

## J. Schools

This property falls under the jurisdiction of Maury County Public School System.

The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.

DEVELOPMENT REVEW COMMITTEE MEETING
Tuesday, January 9, 2024

**ITEM NO.**
23-0421

**DESCRIPTION:** Annexation request and CD4 Rezoning Request for a parcel of about 3.36 acres between Bear Creek and McKays Branch, adjacent to the proposed Columbia Bluffs PUD-R property.

**RECOMMENDATION:** For final recommendation please see staff report.

**COMMENTS:**

**Planning**

1. The requested character district (CD-4) is inconsistent with the comprehensive plan future land use map. Please add a request for a comprehensive plan amendment to Urban Neighborhood.
2. The lead staff person for this case is City Planner Kevin McCarthy, AICP; he will prepare the staff report for this item. Please contact kmccarthy@columbiatn.com with question about the development review process or technical comments.
3. At resubmittal, please provide a response letter addressing each comment along with any revised plans. If the nature of the comment does not warrant a response, please simply not that the information has been acknowledged.
4. Advisory: Planning staff will place signs on the property and send certified letters to adjacent property owners on or before December 28th. Please be prepared to address any concerns regarding compatibility with the established pattern of the surrounding area.
5. Advisory: Planning staff recommends timing resubmittals so that this item proceeds to Planning Commission on the same agenda as the Planned Unit Development Preliminary Master Plan proposed for the adjacent site.
6. Please provide a narrative response to criterion 8.5.19.H.4(e) explaining why the applicant believes conditions affecting the area have changed sufficiently to warrant the Zoning Map Amendment.
7. Please provide a narrative response explaining why the applicant believes the five criteria for Planning Commission Recommendations listed at 8.5.20.F of the Zoning Ordinance (p. 450) support the proposed change to the Future Land Use Map.
8. Advisory: A current water availability letter is required throughout the entitlement process. The current letter will expire on February 17, 2023. Presuming a timely resubmittal to technical comments and a favorable recommendation from the planning

Commission in January, the item will proceed to City Council agenda for first consideration in February. If the City Council reviews the request favorably upon initial consideration, the public hearing for this item will occur on March 14th. Consequently, following consideration by the Planning Commission, a new water availability letter will be required to proceed to the City Council agenda. The lead times for new letters can be long. Please communicate with IDG and CPWS accordingly.

9. Please provide a more detailed concept plan indicating that the site can be developed in conformity with the standards of the CD-4 character district.
10. Please explain how the site will be accessed if the adjacent Planned Unit Development Preliminary Master Plan is not approved. Does the utilization of this site under the standards of the CD-4 character district depend on a change of entitlements and approved plan of development for another property?

## Building

1. No comments.

## Police

2. No comments provided.

## Columbia Power

3. Columbia Power System has an existing power line near your proposed development.
   We are willing to serve this new development subject to all Columbia Power System policies and procedures in effect at actual time service is rendered provided an approved final plat and complete electrical load information is furnished as soon as possible prior to start of actual construction.
   • Unfortunately, due to current supply chain challenges, no timeframe can be guaranteed regarding the availability of meters or transformers appropriate. for your development.

## Public Works

4. Please see attached Plan of Services for 3 acre portion for commercial use and City of Columbia Dumpster Guidelines & Accessibility Requirements.

## ATT

5. ATT TO SERVE

## Maury County E911

6. No comment on Annexation.

## Wastewater

7. All sewer improvements including but not limited to off-site improvements, on-site improvements, and pump station and equipment installation shall be completed and functioning to the satisfaction of the Director of the Wastewater Department prior to the filing of any Final Plat with the City of Columbia Municipal Planning Commission, unless specific approval is granted by the Director and a surety of sufficient amount is provided. Note: Pump stations will require a building permit and all other required permits from additional entities. All inspections must be completed and certificates of completion granted before Council Agenda Deadline. Please contact the Wastewater Department for standard design details and equipment.

## Maury County Schools

8. Howell Elementary, Cox Middle School, Central High School
   See Attached Capacity Numbers
   The development combined with current neighborhoods and additional approved developments in these zones may require either new construction or realignment of school zones to accommodate new students.
   of school zones to accommodate new students.

## Duck River Electric Membership Corp

9. No comment.

## Fire

10. No comments

## Columbia Water

11. "A water availability letter was issued on October 13, 2023, it remains valid for 120 days. The letter will need to be updated prior to the applicable meeting of the Planning Commission. The availability of capacity to serve is based on a determination by the Fire Marshal of fire flow requirements and the information submitted on the Water Service Availability Request application. Any off-site improvements detailed in the availability letter are the responsibility of the developer/owner. All public water system improvements are subject to the preparation and approval of detailed construction plans prepared in accordance with CPWS and Tennessee Department of Environment and Conservation requirements."

## Atmos Energy

12. Natural Gas available along Bear Creek Pike

## Engineering

13. No Comment on rezoning. Bridge over Bear Creek must be constructed before any development can occur on this property.

## Maury County Highway Dept.

14. No comments.

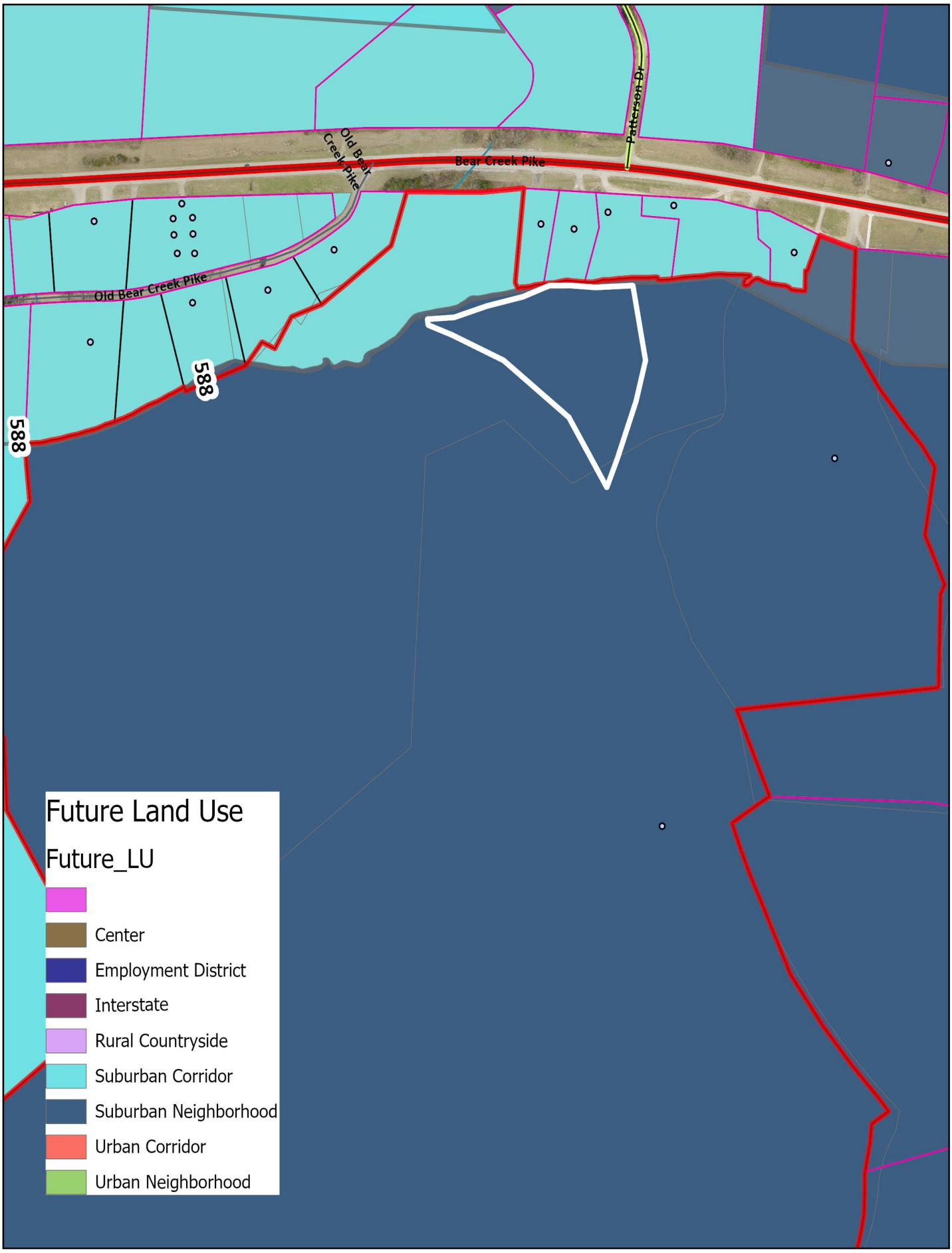
**ATTACHMENTS: Concept Plan**

**NOTE:** All submittals shall be compliant with City standards prior to Planning Commission review. Items that are not adhering to the regulations and/or comments for that request will not be forwarded to the next agenda until such items are amended.

## Current Enrollment / Capacity

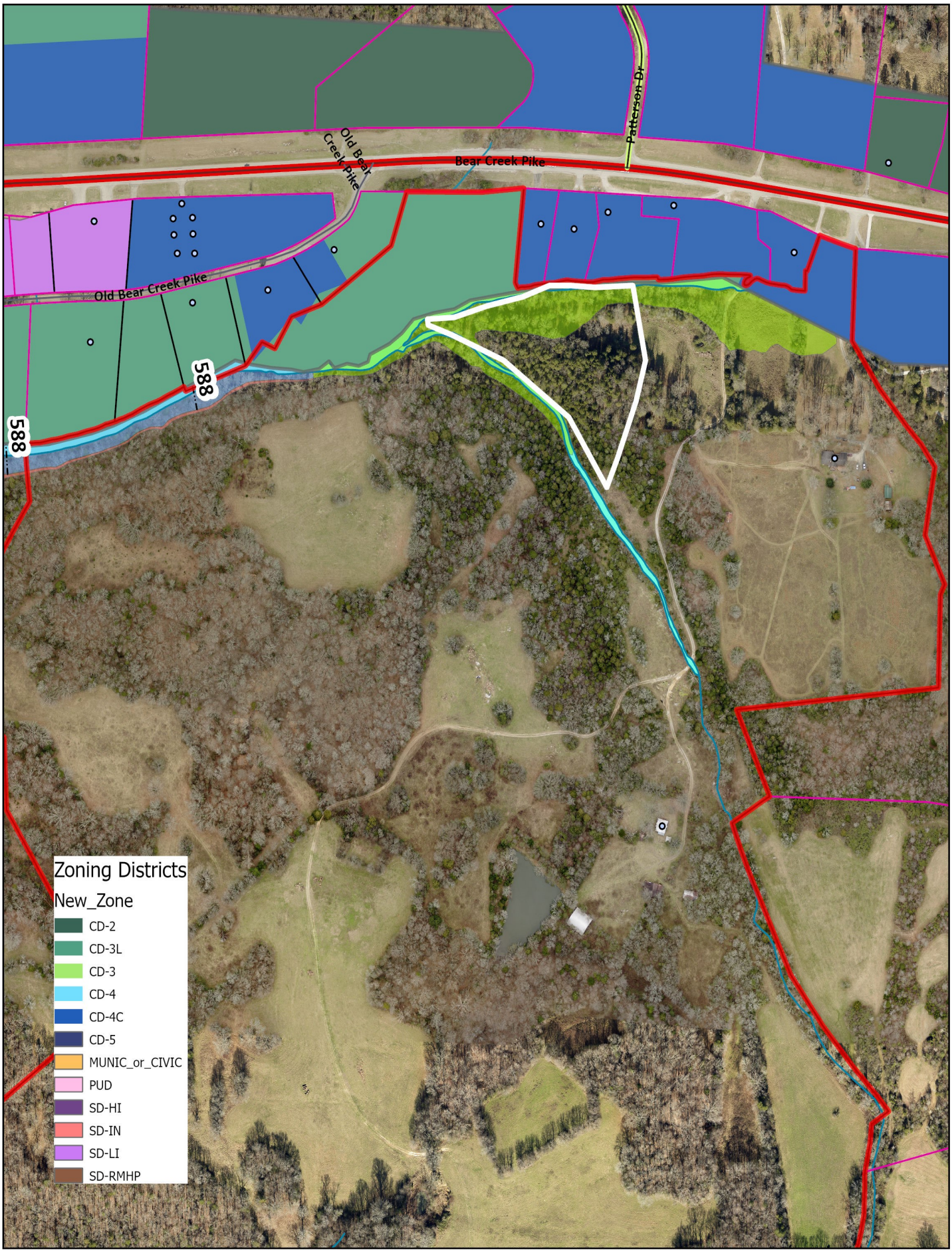
| | Facility Name | Date Constructed | Sq. Ft. | Acreage | Capacity |
|---|---|---|---|---|---|
| **Elementary** | Baker | 1960 | 43,920 | 12 | 340 |
| | Battle Creek | 2019 | 90,000 | 30 | 700 |
| | Brown | 1968 | 56,720 | 20 | 405 |
| | Highland | 1986 | 47,800 | 4.5 | 380 |
| | Howell | 1999 | 81,600 | 17.5 | 700 |
| | Mt. Pleasant | 1978 | 80,021 | 22 | 630 |
| | Riverside | 1984 | 71,150 | 14 | 500 |
| | Spring Hill | 1984 | 69,000 | 10 | 540 |
| | Woodard | 1990 | 76,200 | 17 | 600 |
| | Wright | 2005 | 97,765 | 18 | 740 |
| | | | | | ***5535*** |
| | | | | | |
| **Middle** | Battle Creek | 2019 | 125,000 | 45 | 900 |
| | Cox | 1997 | 137,200 | 25 | 900 |
| | Mt. Pleasant | 2001 | 113,938 | 29.2 | 550 |
| | Spring Hill | 2010 | 158,106 | 39.49 | 950 |
| | Whitthorne | 1979 | 175,600 | 17 | 1050 |
| | | | | | ***4350*** |
| | | | | | |
| **High** | Central | 2016 | 296,740 | 55 | 1700 |
| | Mt. Pleasant | 1969 | 110,759 | 31 | 600 |
| | Spring Hill | 1993 | 181,800 | 57 | 1200 |
| | | | | | ***3500*** |
| | | | | | |
| **Unit** | Culleoka | 1969 | 205,800 | 34 | 1020 |
| | Hampshire | 1978 | 83,410 | 13.12 | 500 |
| | Santa Fe | 1964 | 94,225 | 24 | 650 |
| | | | | | ***2170*** |
| | | | | | |
| **Other** | Central Office | 1960 | 15,400 | 1.5 | |
| | College Hill | 1958 | 42,211 | 2.26 | |
| | Maintenance | 1987 | 9,400 | 4.7 | |
| | McDowell | | 46,165 | 7 | |
| | | | | | |
| | | | **2,509,930** | **550.27** | **15555** |

| Current Enrollment | Capacity Used |
|---|---|
| 328 | 96.5% |
| 632 | 90.3% |
| 358 | 88.4% |
| 304 | 80.0% |
| 592 | 84.6% |
| 580 | 92.1% |
| 406 | 81.2% |
| 445 | 82.4% |
| 559 | 93.2% |
| 601 | 81.2% |
| ***4805*** | ***86.8%*** |
| | |
| 731 | 81.2% |
| 656 | 72.9% |
| 424 | 77.1% |
| 527 | 55.5% |
| 971 | 92.5% |
| ***3309*** | ***76.1%*** |
| | |
| 1396 | 82.1% |
| 379 | 63.2% |
| 1223 | 101.9% |
| ***2998*** | ***85.7%*** |
| | |
| 875 | 85.8% |
| 408 | 81.6% |
| 509 | 78.3% |
| ***1792*** | ***82.6%*** |
| | |
| | |
| 166 | |
| | |
| | |
| | |
| **13070** | |



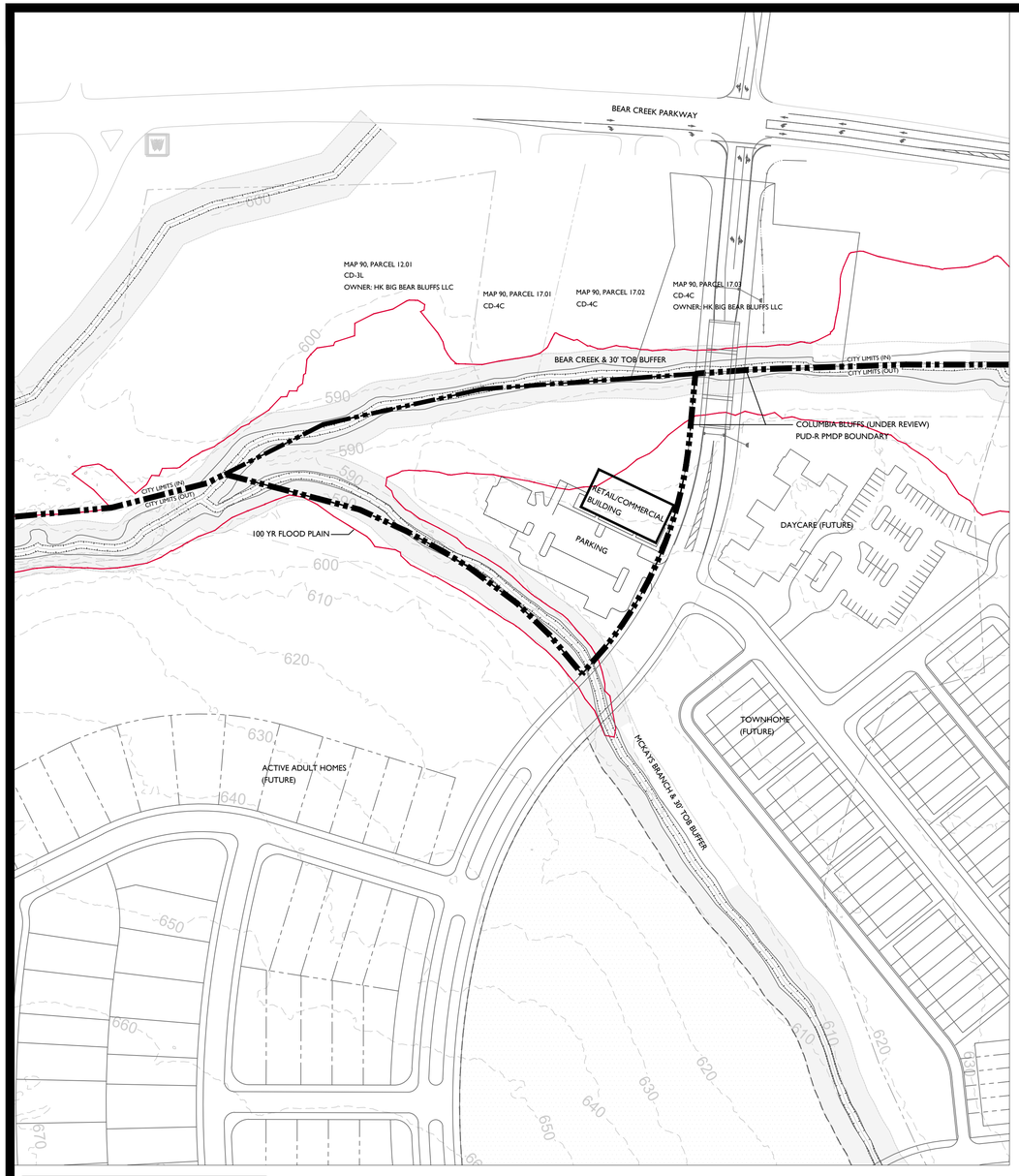

23-0421
Tax Map 90 Parcel 12.01,
3.36 acre portion
Bear Creek Pike

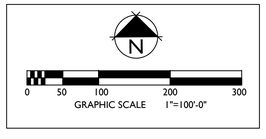
CITY OF COLUMBIA TENNESSEE
DEVELOPMENT SERVICES
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541




23-0421
Tax Map 90 Parcel 12.01,
3.36 acre portion
Bear Creek Pike

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## CONCEPTUAL DEVELOPMENT PLAN CD-4 DESIGN CRITERIA:

GROSS SITE AREA: +/-3.36 AC

7,200 SF NON-RESIDENTIAL BUILDING (60'X120')

TOTAL IMPERVIOUS SURFACE RATIO: 80% MAX
MAXIMUM BUILDING LENGTH: 120'

SETBACKS:
FRONT: 6' - 20'
SIDE: 6' MIN.
REAR: 3' MIN.

PARKING PER ZONING ORDINANCE STANDARD
PARKING PROVIDED: SURFACE IN 3RD LAYER
+/- 54 PARKING SPACES SHOWN ON PLAN (1 PER 133 SF)

## LEGAL DESCRIPTION OF PROPERTY:

**LEGAL DESCRIPTION**
**FOR ANNEXATION REQUEST – 3.36 ACRES**
**A PORTION OF MAP 90, PARCEL 12.01**
**DEED BOOK R2827, PAGE 587**
**HK BIG BEAR BLUFFS, LLC**

LAND LYING IN THE 4TH CIVIL DISTRICT OF MAURY COUNTY, TENNESSEE, BOUNDED ON THE NORTH BY ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242), AMIT J. PATEL AND WIFE, MINAXIBEN G. PATEL (BK R2411, PAGE 1348), HK BIG BEAR BLUFFS, LLC (R2870, PG 961), AND WEST, SOUTH, AND EAST BY REMAINING PORTIONS OF BIG BEAR BLUFFS, LLC (2827, PG 587) REGISTERS OFFICE OF MAURY COUNTY, TENNESSEE (ROMCTN), AND IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

TO FIND THE TRUE POINT OF BEGINNING, COMMENCE AT AN 1 INCH IRON PIPE FOUND IN THE SOUTHERN ROW OF BEAR CREEK PIKE, SAID POINT ALSO BEING THE NORTHWEST BOUNDARY OF ROCK 'N' ROLL JESUS, LLC (BK R2727, PG 1242) AND HAVING A TENNESSEE STATE PLANE COORDINATE OF NORTH 475,793.95 EAST 1,672,944.21;

THENCE, WITH THE WEST BOUNDARY OF JESUS, THE FOLLOWING CALLS:

S 08°01'15" W, FOR A DISTANCE OF 269.51 FEET, TO AN IRON PIN FOUND;
S 21°32'47" E, FOR A DISTANCE OF 51.20 FEET TO A THE CENTER OF BEAR CREEK BEING THE SOUTHWEST CORNER OF ROCK N ROLL JESUS AND THE TRUE POINT OF BEGINNING;

THENCE, WITH THE SOUTH BOUNDARY OF ROCK 'N' ROLL JESUS, LLC, AMIT J. PATEL & HK BIG BEAR BLUFFS, LLC, AND ALSO BEING THE CENTER OF BEAR CREEK, N 85°53'31" E, 307.86 FEET TO A POINT;

THENCE, CREATING A NEW LINE WITH THIS ANNEXATION OF PROPERTY, THE FOLLOWING 2 CALLS:

S 05°15'54" W, 94.01 FEET TO THE BEGINNING OF A CURVE CONCAVE WESTERLY, SAID CURVE HAS A RADIUS OF 565.00 FEET;

SOUTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 38°33'55", AN ARC DISTANCE OF 380.30 FEET, CHORD BEARING S 24°32'52" W WITH A CHORD DISTANCE OF 373.16 FEET TO A POINT ALONG THE CENTER OF MCKAY BRANCH;

THENCE, ALONG MCKAY BRANCH, THE FOLLOWING 7 CALLS:

N 39°46'13" W, 73.31 FEET TO A POINT;

N 45°49'08" W, 65.41 FEET TO A POINT;

N 53°12'54" W, 86.37 FEET TO A POINT;

N 58°09'42" W, 42.46 FEET TO A POINT;

N 61°08'47" W, 61.78 FEET TO A POINT;

N 65°15'03" W, 74.45 FEET TO A POINT;

N 75°17'27" W, 201.23 FEET TO A POINT WHERE MCKAY BRANCH CREEK INTERSECTS WITH BEAR CREEK;

THENCE, ALONG BEAR CREEK, THE FOLLOWING 2 CALLS:

N 63°11'05" E, 159.96 FEET TO A POINT;

N 77°31'07" E, 234.79 FEET TO THE POINT OF BEGINNING CONTAINING 3.36 ACRES (146,345.13 SQ FT.) AND BEING A PORTION OF THE PROPERTY SHOWN ON TAX MAP 90 PARCEL 12.01 CONVEYED TO BIG BEAR BLUFFS, LLC BY DEED OF RECORD IN BOOK R2827, PAGE 287 IN THE REGISTER'S OFFICE OF MAURY COUNTY, TENNESSEE.




LOCATION MAP

0 500 1000 2000
GRAPHIC SCALE 1"=1,000'-0"

## PROJECT INFORMATION:

PARCEL: PORTION OF MAP 90 PARCEL 12.01
ADDRESS: PORTION OF 400 BEAR CREEK PARKWAY

PROPOSED USE: NEIGHBORHOOD SERVING COMMERCIAL CONFORMING TO THE APPROVED CD-4 USES.

## CONTACT:

APPLICANT/LANDSCAPE ARCHITECT:
GREG GAMBLE OR KELI FRYMIRE
GAMBLE DESIGN COLLABORATIVE
3020 STANSBERRY LANE, SUITE 201
FRANKLIN, TN 37069
615-975-5765
greg.gamble@gdc-tn.com
keli@gdc-tn.com

DEVELOPER:
KOLTER LAND
JIM HARVEY OR
JOSHUA GIBBS
615-582-3253
jgibbs@kolter.com

OWNER:
HK BIG BEAR BLUFFS LLC
JIM HARVEY

## ANNEXATION AND REZONING REQUEST:

REQUEST TO ANNEX +/-3.36 ACRES AND REZONE TO CD-4
FUTURE LAND USE: SUBURBAN NEIGHBORHOOD

CONNECT COLUMBIA FINDINGS:
*Annexation should provide for a continuation of orderly, planned development of the City. Lot sizes and development scale should be compatible with surrounding development. If proposed development abuts land that is undeveloped or has low density/intensity, the density and intensity of the proposed development should taper towards the periphery to provide compatibility of the development pattern. Land annexed into the City should follow the transect and Character Area Matrix to provide the most appropriate land uses and zoning for the newly annexed land.*
Response: The proposed commercial parcel would be adjacent to CD-4C zoned properties on Bear Creek Parkway and would serve to provide neighborhood commercial and personal service options for the residents of the proposed Columbia Bluffs development. The parcels along Bear Creek Parkway are within an area of change. With the development along this corridor, residential development in close proximity to downtown and new commercial development along Tom Hitch Parkway is a logical progression of development pattern.

*Suburban Neighborhood: Future development should emphasize connectivity and housing diversity. Additionally, new development should create a pedestrian-friendly environment by adding sidewalks and/or creating other pedestrian-friendly multiuse trail/bike routes linking current and future neighborhoods and major destinations such as libraries, neighborhood centers, health facilities, commercial clusters, parks, schools, or other such uses.*
Response: The small commercial parcel will be a destination for nearby residents and is proposed along a new/proposed road into the Columbia Bluffs development. Sidewalk connections will link this commercial area to this residential development.

GAMBLE DESIGN COLLABORATIVE
DEVELOPMENT PLANNING AND LANDSCAPE ARCHITECTURE

# PORTION OF 400 BEAR CREEK PARKWAY ANNEXATION, REZONING REQUEST & CONCEPTUAL DEVELOPMENT PLAN

Columbia, Tennessee

GREGORY C. GAMBLE — TENNESSEE — REGISTERED — LANDSCAPE ARCHITECT

Date: OCTOBER 16, 2023

| Revision Date |
|---|
| △ |
| △ |
| △ |

CONCEPTUAL DEVELOPMENT PLAN

SHEET
L1.0

# LEGAL DESCRIPTION
# FOR ANNEXATION REQUEST – 3.36 ACRES
# A PORTION OF MAP 90, PARCEL 12.01
# DEED BOOK R2827, PAGE 587
# HK BIG BEAR BLUFFS, LLC

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CITY OF COLUMBIA
TENNESSEE

DEVELOPMENT SERVICES

I, HK Big Bear Bluffs, LLC_being the sole ownership of the property__ more particularly described as 090 012.01; 090-16.00____ on Plat of Record in Plat Book **R2827** Page **576-586** in the Maury County Register of Deeds office, do hereby, formally, request that the City of Columbia, Tennessee annex such property into such City.

James P. Harvey
Print Name

11/10/2022
Date

Signature

| STAFF USE ONLY | |
|---|---|
| Docket Number: | Requested Agenda: |

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

## SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy **submittals larger than 8½"x11"***

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | 400 Bear Creek Pike | | |
| | TAX MAP: 90 | GROUP: | PARCEL: 12.01 |
| SUMMARY OF NATURE OF REQUEST AND WORK | Annexation request and CD4 Rezoning Request for a parcel of about 3 and a quarter acres between Bear Creek and McKay's Branch adjacent to and accessed from the main entry road of the Columbia Bluffs PUD-R property. | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | 8/30/2023 | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ☒ Annexation<br>☒ Rezoning<br>☐ Preliminary Plat<br>☐ Final Plat<br>☐ PUD Preliminary Master Plan<br>☐ PUD Final Site Plan<br>☐ Multi-Family Site Plan<br>☐ Other:<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>☐ Written Legal Description copy<br>☐ Requested Zone Listed<br>☐ Compliance with Comprehensive Plan<br>☐ Annexation Permission Form<br>☐ Plans and/or Plats conforming to City standards with check list completed<br>☐ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>☐ Project Name (include Sections & Phases)<br>Columbia Bluffs Annexation/Commercial CD4 Rezoning<br>☐ Total Number of Lots<br>1 non-residential lot<br>☐ Total acreage<br>+/-3.27 acres |



Rev. 4/14/2022

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

**All communications go to the Applicant's email that is provided.**

| | | | |
|---|---|---|---|
| NAME | Greg Gamble - Gamble Design | PHONE | 615-975-5765 |
| ADDRESS | 3020 Stansberry Lane, Suite 201, Franklin | EMAIL | info@gdc-tn.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | HK Big Bear Bluffs, LLC | PHONE | 813-615-1244 |
| ADDRESS | 14025 Riveredge Dr. Ste 175<br>Tampa FL 33637 | EMAIL | jgibbs@kolter.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

| | | |
|---|---|---|
| Greg Gamble |  | 10/16/2023 |
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |
| HK Big Bear Bluffs LLC<br>James P. Harvey |  | 10/10/2023 |
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

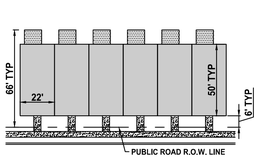
| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |

| LOTS 1-3 PARKING SUMMARY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LOT | OFFICE SF | PARKING SPACE REQ'D (1/200 SF) | RETAIL SF | PARKING SPACE REQ'D (1/500 SF) | RESTAURANT SF | PARKING SPACE REQ'D (1/100 SF) | SECOND FLOOR RESIDENTIAL UNITS | PARKING SPACE REQ'D (1.5 PER UNIT) | STREET PARKING PROVIDED | OFFSTREET PARKING PROVIDED |
| 1 | 5,000 | 25 | | | | | | | 6 | 20 |
| 2 | | | 3,600 | 8 | 2,400 | 24 | 5 | 8 | 9 | 31 |
| 3 | | | 3,600 | 8 | 1,200 | 12 | 4 | 6 | 12 | 20 |
| TOTAL | 5,000 | 25 | 7200 | 16 | 3600 | 36 | 9 | 14 | 27 | 71 |

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE # | LENGTH | RADIUS | DELTA | CHORD DIRECTION | CHORD LENGTH |
| C1 | 121.67' | 125.00' | 55°46'17" | S62°44'08"W | 116.93' |
| C2 | 24.69' | 90.00' | 15°43'11" | S82°45'42"W | 24.61' |
| C3 | 135.29' | 100.00' | 48°26'52" | S59°04'26"W | 131.30' |
| C4 | 62.91' | 90.00' | 40°02'57" | S54°52'33"W | 61.64' |
| C5 | 76.57' | 200.00' | 20°13'00" | S24°44'38"W | 76.29' |
| C6 | 24.66' | 165.00' | 8°33'42" | S18°54'51"W | 24.63' |
| C7 | 83.92' | 235.00' | 20°13'00" | S24°44'38"W | 82.49' |
| C8 | 39.27' | 25.00' | 90°00'00" | S13°39'06"E | 35.36' |
| C9 | 44.36' | 25.00' | 101°39'17" | S74°51'21"W | 38.76' |
| C10 | 142.37' | 125.00' | 65°15'26" | N22°31'18"W | 134.80' |
| C11 | 27.32' | 100.00' | 9°47'03" | N35°15'29"W | 27.29' |

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE # | LENGTH | RADIUS | DELTA | CHORD DIRECTION | CHORD LENGTH |
| C12 | 154.91' | 166.00' | 53°28'23" | N17°23'46"W | 149.35' |
| C13 | 102.51' | 90.00' | 65°15'26" | N22°31'18"W | 97.05' |
| C14 | 1.77' | 206.00' | 0°30'29" | N10°21'46"E | 1.77' |
| C15 | 2.08' | 235.00' | 0°30'29" | N10°21'46"E | 2.08' |
| C16 | 1.48' | 165.00' | 0°30'29" | N10°21'46"E | 1.48' |
| C17 | 205.12' | 125.00' | 94°01'06" | N57°37'27"E | 182.87' |
| C18 | 262.33' | 166.00' | 94°01'06" | N57°37'27"E | 234.67' |
| C19 | 147.88' | 90.00' | 94°01'06" | N57°37'27"E | 131.96' |
| C20 | 39.27' | 25.00' | 90°00'00" | S30°22'00"E | 35.36' |
| C21 | 39.27' | 25.00' | 90°00'00" | S59°38'00"W | 35.36' |

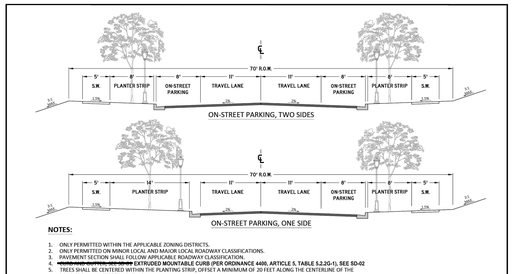



TYPICAL
TOWNHOME LOT LAYOUT

GRAPHIC SCALE

60 0 30 60

( IN FEET )
1 inch = 60 ft.

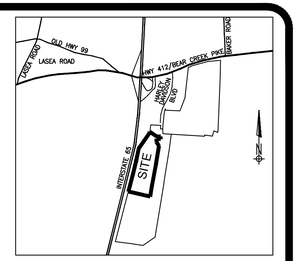



NOTES:

1. ONLY PERMITTED WITHIN THE APPLICABLE ZONING DISTRICTS.
2. ONLY PERMITTED ON MINOR LOCAL AND MAJOR LOCAL ROADWAY CLASSIFICATIONS.
3. PAVEMENT SECTION SHALL FOLLOW APPLICABLE ROADWAY CLASSIFICATION.
4. ~~CONCRETE CURB~~ EXTRUDED MOUNTABLE CURB (PER ORDINANCE 4400, ARTICLE 5, TABLE 5.2.2G-1), SEE SD-02
5. TREES SHALL BE CENTERED WITHIN THE PLANTING STRIP, OFFSET A MINIMUM OF 20 FEET ALONG THE CENTERLINE OF THE ROAD FROM ANY STREET LIGHTING.
6. DECORATIVE LIGHT BASES SHALL BE BETWEEN 18" AND 24" BEHIND THE BACK OF CURB.
7. ADDITIONAL RIGHT OF WAY MAY BE REQUIRED.
8. DIMENSIONS REFLECT A MINIMUM STANDARD.
9. ELEMENTS OF THIS DETAIL MAY BE ALTERED AND APPROVED BY THE CITY ENGINEER.

**PUBLIC ROADWAY DETAIL**
NOT TO SCALE

| CITY OF COLUMBIA DEVELOPMENT SERVICES DEPARTMENT ENGINEERING DIVISION | CHARACTER DISTRICT STREET URBAN NEIGHBORHOOD | DATE 6/9/2022 |
|---|---|---|
| STANDARD DETAILS | (NTS) | DS-03 |




VICINITY MAP
SCALE: 1" = 2000'

## LEGEND

- EXISTING SANITARY SEWER
- SANITARY SEWER — 8"SA
- WATER LINE — W — W
- SANITARY SEWER MANHOLE
- FIRE HYDRANT ASSEMBLY
- WATER VALVE
- STOP SIGN

**PURPOSE OF SUBMITTAL** - TO OBTAIN PRELIMINARY PLAT APPROVAL FOR MIXED USE DEVELOPMENT ON APPROXIMATELY 20.90 ACRES PORTION OF PARCELS 2.00 & 2.01 ON TAX MAP 93 UNDER CD-4 ZONING.

**PROPERTY OWNER:**
CHR LAND, LLC
818 S. MAIN STREET
COLUMBIA, TN 38401
TAX MAP 93, PARCELS 2.00 & 2.01

**APPLICANT:**
TKC ARCHITECTURE AND ENGINEERING LLC
818 S. MAIN STREET
COLUMBIA, TN 38401
615.617.7477
COLE@TKC-AE.COM

**NOTE:**

ALL ROADS SHOWN ARE PUBLIC ROADS.

ALL ROAD NAMES TO BE APPROVED BY E-911.

TOWNHOMES MUST BE CONSTRUCTED IN ACCORDANCE WITH THE 2018 IRC.

THIS PROPERTY IS LOCATED ON F.E.M.A. FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47119C0195E WHICH HAS NOT BEEN PRINTED FOR THIS LOCATION.

| TOWNHOME DENSITY | | |
|---|---|---|
| UNITS | ACRES | UNITS/AC. |
| 98 | 12.65 | 7.75 |

| TOWNHOME PARKING SUMMARY | | |
|---|---|---|
| TYPE UNIT | # UNITS | SURFACE PARKING PROVIDED |
| 22'X50' (NO CAR GARAGE) | 98 | 195 |
| TOTAL PARKING PROVIDED ---------- 195 | | |
| TOTAL PARKING REQUIRED ---------- 98 X 1.5 = 147 | | |

| TOWNHOME OPEN SPACE SUMMARY |
|---|
| PRIVATE YARD SPACE PROVIDED: 100 SF / UNIT = 100 X 98 = 9,800 SF = 0.22 ACRES |

# Preliminary Plat
# Mixed Use Development

**COLUMBIA, TENNESSEE**
**MAURY COUNTY**
**NOVEMBER 17, 2023**

COLE O. NEWTON
LICENSED PROFESSIONAL ENGINEER
STATE OF TENNESSEE
11/15/2023

NOT FOR CONSTRUCTION
DRAWING FOR PRELIMINARY REVIEW ONLY

TKC
ARCHITECTURE
INTERIORS
CIVIL SITE

818 S. MAIN STREET, COLUMBIA, TN 38401 | 615.617.7477 | WWW.TKC-AE.COM



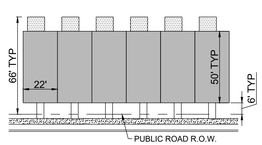

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE # | LENGTH | RADIUS | DELTA | CHORD DIRECTION | CHORD LENGTH |
| C1 | 121.67' | 125.00' | 55°46'11" | S62°44'08"W | 116.93' |
| C2 | 24.69' | 90.00' | 15°43'11" | S82°43'42"W | 24.61' |
| C3 | 135.29' | 160.00' | 48°26'32" | S59°04'26"W | 131.30' |
| C4 | 62.91' | 90.00' | 40°03'03" | S54°32'33"W | 61.64' |
| C5 | 70.57' | 200.00' | 20°13'09" | S24°44'36"W | 70.20' |
| C6 | 24.66' | 165.00' | 8°33'42" | S18°54'51"W | 24.63' |
| C7 | 82.92' | 235.00' | 20°13'09" | S24°44'36"W | 82.48' |
| C8 | 39.27' | 25.00' | 90°00'00" | S10°09'09"E | 35.36' |
| C9 | 44.36' | 25.00' | 101°39'11" | S74°01'21"W | 38.76' |
| C10 | 142.37' | 125.00' | 65°15'26" | N22°31'18"W | 134.80' |
| C11 | 27.32' | 160.00' | 9°47'03" | N50°15'29"W | 27.29' |

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE # | LENGTH | RADIUS | DELTA | CHORD DIRECTION | CHORD LENGTH |
| C12 | 154.91' | 166.00' | 53°28'22" | N71°37'46"W | 149.83' |
| C13 | 102.51' | 95.00' | 65°19'26" | N22°31'18"W | 97.05' |
| C14 | 1.77' | 206.00' | 0°30'25" | N15°21'46"E | 1.77' |
| C15 | 2.08' | 235.00' | 0°30'25" | N15°21'46"E | 2.08' |
| C16 | 1.46' | 165.00' | 0°30'25" | N15°21'46"E | 1.46' |
| C17 | 205.12' | 125.00' | 94°01'06" | N57°37'27"E | 182.87' |
| C18 | 262.53' | 160.00' | 94°01'06" | N57°37'27"E | 234.67' |
| C19 | 147.68' | 90.00' | 94°01'06" | N57°37'27"E | 131.66' |
| C20 | 39.27' | 25.00' | 90°00'00" | S30°22'39"E | 35.36' |
| C21 | 39.27' | 25.00' | 90°00'00" | S59°38'06"W | 35.36' |




## LOCATION MAP
SCALE: 1" = 2000'

| LOTS 1-3 PARKING SUMMARY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LOT | OFFICE SF | PARKING SPACE REQ'D (1/200 SF) | RETAIL SF | PARKING SPACE REQ'D (1/500 SF) | RESTAURANT SF | PARKING SPACE REQ'D (1/100 SF) | SECOND FLOOR RESIDENTIAL UNITS | PARKING SPACE REQ'D (1.5 PER UNIT) | STREET PARKING PROVIDED | OFFSTREET PARKING PROVIDED |
| 1 | 5,000 | 25 | | | | | | | 6 | 20 |
| 2 | | | 3,600 | 8 | 2,400 | 24 | 5 | 8 | 9 | 31 |
| 3 | | | 3,600 | 8 | 1,200 | 12 | 4 | 6 | 12 | 20 |
| TOTAL | 5,000 | 25 | 7200 | 16 | 3600 | 36 | 9 | 14 | 27 | 71 |




**TYPICAL TOWNHOME LOT LAYOUT**

| TOWNHOME DENSITY | | |
|---|---|---|
| UNITS | ACRES | UNITS/AC. |
| 98 | 12.65 | 7.75 |

| TOWNHOME PARKING SUMMARY | | |
|---|---|---|
| TYPE UNIT | # UNITS | SURFACE PARKING PROVIDED |
| 22'X50' (NO CAR GARAGE) | 98 | 195 |
| TOTAL PARKING PROVIDED ——— 195 | | |
| TOTAL PARKING REQUIRED ——— 98 X 1.5 = 147 | | |

| TOWNHOME OPEN SPACE SUMMARY |
|---|
| PRIVATE YARD SPACE PROVIDED: 100 SF / UNIT = 100 X 98 = 9,800 SF = 0.22 ACRES |

NOTES:
1. THIS IS A PRELIMINARY SITE PLAN. A FINAL SITE PLAN WILL BE SUBMITTED UPON PRELIMINARY PLAT APPROVAL.
2. THIS PLAN FOLLOWS THE DESIGN AND FACADE STANDARDS OF TABLE 4.3.1-D (P.78-85) AND TABLE 4.3.8.B (P. 212) OF THE CITY ZONING ORDINANCE 4400. CONFORMITY WILL BE CONFIRMED AT BUILDING PERMIT.
3. LIGHTING AT FRONTAGE LINES WILL NOT EXCEED 1.0 FOOT CANDLE. ON-SITE OUTDOOR LIGHTING WILL CONFORM TO THE STANDARDS OF 4.3.17.B (P. 297) OF THE ZONING ORDINANCE 4400. CONFORMITY WILL BE CONFIRMED AT BUILDING PERMIT.

**PROPERTY OWNER:**
**CHR LAND, LLC**
**818 S. MAIN STREET**
**COLUMBIA, TN 38401**
**615.812.2147**
**TAX MAP 93, PARCELS 2.00 & 2.01**

**APPLICANT:**
**TKC ARCHITECTURE AND ENGINEERING LLC**
**818 S. MAIN STREET**
**COLUMBIA TN 38401**
**615.617.7477**
**COLE@TKC-AE.COM**

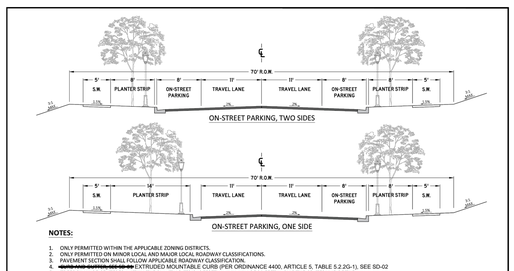
**THIS PROPERTY IS LOCATED ON F.E.M.A. FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47119C0195E WHICH HAS NOT BEEN PRINTED FOR THIS LOCATION.**

UTILITY NOTES:
- WATER SERVICES TO BE PROVIDED BY COLUMBIA POWER AND WATER SYSTEMS (CPWS)
- WASTEWATER SERVICE TO BE PROVIDED BY CITY OF COLUMBIA
- ELECTRICAL SERVICE TO BE PROVIDED BY DUCK RIVER ELECTRIC MEMBERSHIP CORPORATION
  - •• FINAL UTILITY DESIGN WILL BE DONE DURING THE FINAL SITE PLAN PHASE

STORMWATER NOTES:
- STORMWATER FOR THE SITE WILL BE MANAGED THROUGH REGIONAL DETENTION IN THE PROPOSED POND JUST NORTH AND SOUTH OF THE SITE

FIRE PROTECTION NOTES:
- FIRE TRUCK ACCESS IS PROVIDED.

LANDSCAPE NOTES:
- LANDSCAPE TO BE PROVIDED WITH THE FINAL SITE PLAN SUBMITTAL.
  - •• THE FINAL DESIGN WITH SPECIES TYPE AND SPACING PER THE ZONING CODE WILL BE DONE WITH FINAL SITE DESIGN.




**NOTES:**
1. ONLY PERMITTED WITHIN THE APPLICABLE ZONING DISTRICTS.
2. ONLY PERMITTED ON MINOR LOCAL AND MAJOR LOCAL ROADWAY CLASSIFICATIONS.
3. PAVEMENT SECTION SHALL FOLLOW APPLICABLE ROADWAY CLASSIFICATION.
4. ~~CURB SHALL BE CAST IN PLACE~~ EXTRUDED MOUNTABLE CURB (PER ORDINANCE 4400, ARTICLE 5, TABLE 5.2.2G-1), SEE SD-02
5. TREES SHALL BE CENTERED WITHIN THE PLANTING STRIP, OFFSET A MINIMUM OF 20 FEET ALONG THE CENTERLINE OF THE ROAD FROM ANY STREET LIGHTING.
6. DECORATIVE LIGHT BASES SHALL BE BETWEEN 18" AND 24" BEHIND THE BACK OF CURB.
7. ADDITIONAL RIGHT OF WAY MAY BE REQUIRED.
8. DIMENSIONS REFLECT A MINIMUM STANDARD.
9. ELEMENTS OF THIS DETAIL MAY BE ALTERED AND APPROVED BY THE CITY ENGINEER.

**PUBLIC ROADWAY DETAIL**
NOT TO SCALE

| CITY OF COLUMBIA DEVELOPMENT SERVICES DEPARTMENT ENGINEERING DIVISION | CHARACTER DISTRICT STREET URBAN NEIGHBORHOOD | DATE 6/9/2022 |
|---|---|---|
| STANDARD DETAILS | (NTS) | DS-03 |

TKC
ARCHITECTURE
INTERIORS
CIVIL SITE
818 S. MAIN STREET, COLUMBIA, TN 38401 | 615.617.7477 | WWW.TKC-AE.COM

CONSULTANTS:

PROJECT TITLE:
# MIXED USE DEVELOPEMENT
HARLEY DAVIDSON BOULEVARD
COLUMBIA, TN

COLE O. NEWTON
REGISTERED ENGINEER
AGRICULTURE
ENGINEER
COMMERCE
115
STATE OF TENNESSEE
11/17/2023

NOT FOR CONSTRUCTION
DRAWING FOR PRELIMINARY REVIEW ONLY

| Revision | | |
|---|---|---|
| No. | Date | Description |
| | | |

THIS DRAWING IS THE PROPERTY OF TKC ARCHITECTURE & ENGINEERING (TKC A&E). ANY UNAUTHORIZED REPRODUCTION OR USAGE WITHOUT THE PRIOR WRITTEN CONSENT OF TKC A&E IS PROHIBITED.

SHEET TITLE:
## SITE DEVELOPMENT PLAN

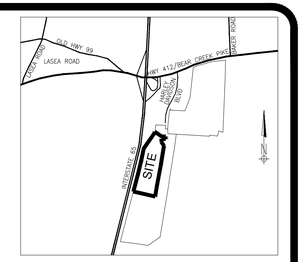
-
DATE: 11/17/2023
DRAWN BY: TS
PROJECT NO.: 2336

SHEET NO.:
# 10F1

GRAPHIC SCALE

60 0 30 60

( IN FEET )
1 inch = 60 ft.




VICINITY MAP
SCALE: 1" = 2000'

BEAR CREEK GLEN TOWNHOMES DEVELOPMENT

HARLEY DAVIDSON BLVD

TOWNHOMES AT PUMPKIN CREEK DEVELOPMENT

27.15 SQ. FT. R.O.W. DEDICATION

EVINOLE ROAD (FUTURE PUBLIC ROAD)

PUBLIC R.O.W. 4.94 ACRES

ROBBINS LANE (FUTURE PUBLIC ROAD)

LOT 3 0.83 ACRES

STORMWATER DETENTION / AREA 1

1-STORY OFFICE BUILDING 58' X 95'

2-STORY RETAIL / RESIDENTIAL 60' X 85'

2-STORY RETAIL / RESIDENTIAL 60' X 105'

MAIL KIOSK

LOT 1 1.10 ACRES

LOT 2 1.38 ACRES

EXISTING HARLEY-DAVIDSON OF COLUMBIA

COLUMBIA LEON CO., INC. TAX MAP 93, PARCEL 1.00 ZONED A-2 (MAURY COUNTY)

PROPOSED WALKING TRAIL

TOWNHOME LOT 12.65 ACRES

PROPOSED GRAVITY SANITARY SEWER

EXISTING 20' AT&T EASEMENT

PROPOSED DUMPSTER AREA (TYP)

INTERSTATE 65

- EXISTING TREE CANOPY COVER 17.54 ACRES

- TREE CANOPY RETAINED 2.70 ACRES (15% OF EXISTING)

NOTE: CANOPY TREES ARE NOT TO BE DISTURBED AND THE DETAIL OF THE AREA WILL BE INCLUDED IN THE INDIVIDUAL LANDSCAPE AND DEVELOPMENT PLAN FOR THE PROJECT.

SITE DATA

SITE AREA: 20.90 ACRES

EXISTING ZONING: CD-4

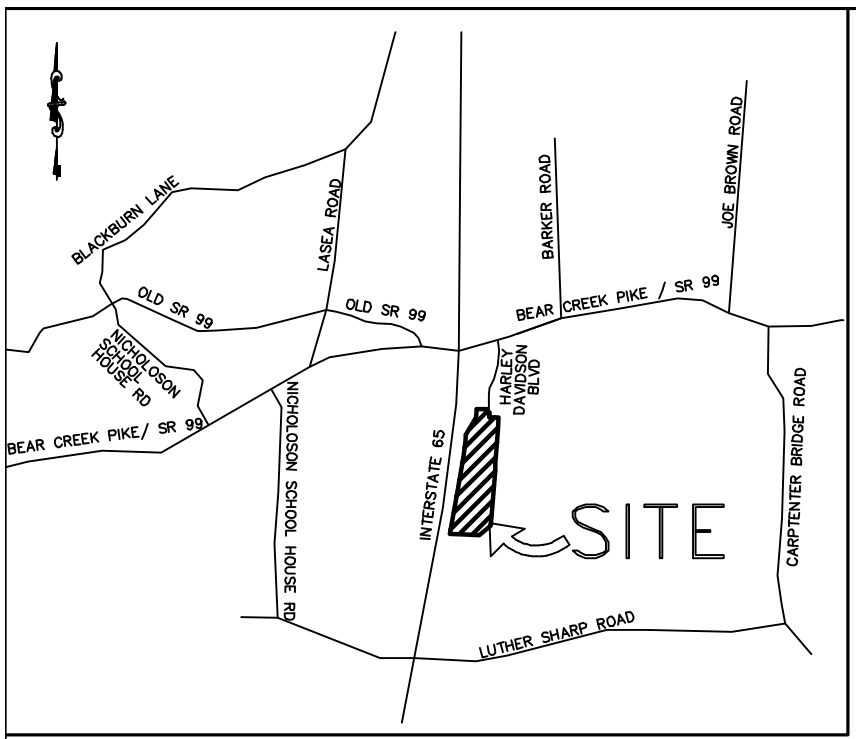
PROPERTY OWNER:
CHR LAND, LLC
818 S. MAIN STREET
COLUMBIA, TN 38401
TAX MAP 93, PARCELS 2.00 & 2.01

THIS PROPERTY IS LOCATED ON F.E.M.A. FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47119C0195E WHICH HAS NOT BEEN PRINTED FOR THIS LOCATION.

# Tree Preservation Plan
# Mixed Use Development

**COLUMBIA, TENNESSEE**
**MAURY COUNTY**
**NOVEMBER 17, 2023**

# EXHIBIT "A"




VICINITY MAP
NOT TO SCALE

## STANDARD LEGEND

- IRF = IRON ROD W/CAP STAMPED "H.H. SURVEY" (FOUND)
- IRS = IRON ROD W/CAP STAMPED "H.H. SURVEY" (SET)
- ——x——x——x—— = FENCE LINE
- P.O.B. = POINT OF BEGINNING

MARKETING GROUP 1, LLC
TAX MAP 93, PARCEL 1.01
BK R2008, PG 875
(R.O.M.C., TN)

HARLEY DAVIDSON BLVD

CHR LAND, LLC
TAX MAP 93A, GRP A,
PARCEL 27.00
BK R2704, PG 868
BEAR CREEK GLEN
PHASE 1
PB 23, PG 144
(R.O.M.C., TN)

P.O.B.

S87°11'22"E 280.53'

20' WIDE ACCESS EASEMENT FOR EXISTING BILLBOARD ON PARCEL 1.00

N07°11'35"E 219.52'

L1 C1 L2 L3 C2 L4 L5

COLUMBIA NEON CO., INC
TAX MAP 93, PARCEL 1.00
BK 643, PG 757
(R.O.M.C., TN)

1/2" IRON ROD FOUND

1/2" IRON ROD FOUND WITH CAP ESPEY HUSTON & ASSOC.

N34°51'00"E 538.69'

335.10' S07°06'29"W

Δ =3°26'59"
R=12,084.38'
L=727.62'
CHD BRG=N12°44'13"E
CHD=727.51'

853.02' S09°17'35"W

DMLG INVESTMENTS, GP
TAX MAP 93, PARCEL 3.00
BK R2805, PAGE 779
(R.O.M.C., TN)

CONC. R-O-W MON. (FOUND)

INTERSTATE I-65

906.27' N14°38'00"E

1/2" IRON ROD FOUND

199.82' S07°34'49"W

1/2" IRON ROD FOUND

LPG, LLC
TAX MAP 93, PARCEL 2.00
AND PARCEL 2.01
BOOK R2952, PAGE 973
(R.O.M.C., TN)

AREA=67.30 AC.±

CONC. R-O-W MON. (FOUND)

1473.68' S09°21'37"W

1051.73' N14°36'26"E

MARTIN L. GROOM, ETUX
TAX MAP 93, PARCEL 13.04
BK 1336, PAGE 174
(R.O.M.C., TN)

1/2" IRON ROD FOUND

409.75' S55°26'49"W

IRF

431.41' N82°29'07"W

348.48' N81°31'56"W

1/2" IRON ROD W/CAP FOUND – ILLEGIBLE

NAIL FOUND (IN BASE OF TREE)

TSFCS

LAMINZA DERRYBERRY
TAX MAP 93, PARCEL 14.00
BK R2092, PAGE 341
(R.O.M.C., TN)

0' 150' 300' 600'

SCALE: 1" = 300'

BOUNDARY ANNOTATION

| CURVE | DELTA ANGLE | RADIUS | ARC LENGTH |
|---|---|---|---|
| C1 | 7°56'05" | 530.01' | 73.40' |
| C2 | 11°21'07" | 180.00' | 35.66' |

| CURVE | CHORD BEARING | CHORD LENGTH |
|---|---|---|
| C1 | S02°08'16"W | 73.34' |
| C2 | S03°50'47"W | 35.60' |

| LINE | BEARING | DISTANCE |
|---|---|---|
| L1 | S06°06'17"W | 29.24' |
| L2 | N88°10'14"E | 60.00' |
| L3 | S01°51'26"E | 99.31' |
| L4 | S86°34'05"E | 238.09' |
| L5 | S08°40'50"W | 50.28' |

DRAWN BY: MAF

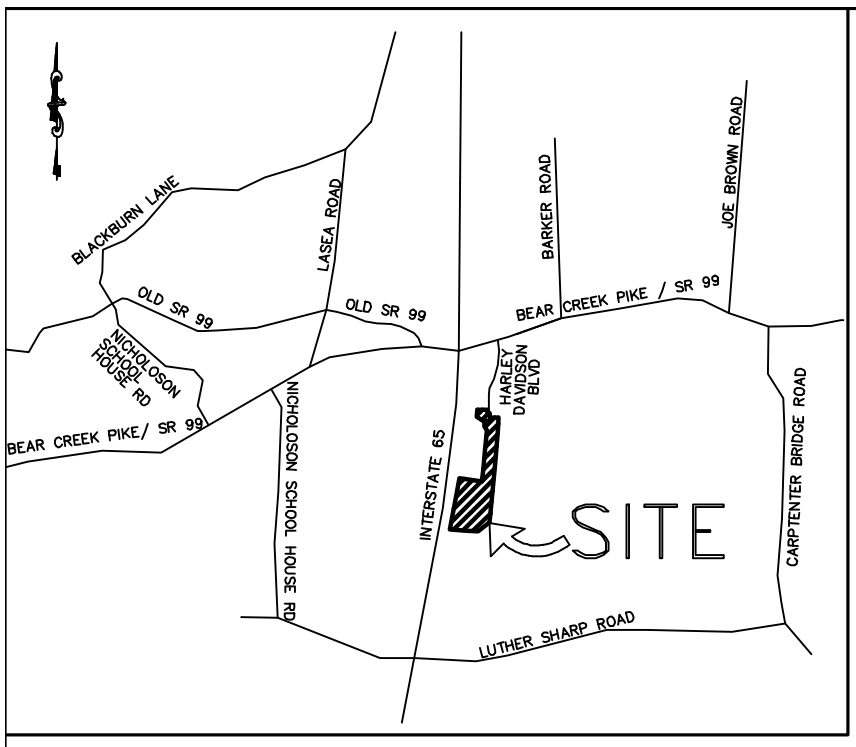
*EXHIBIT "A"* — *67.30 ACRE TRACT*

OWNER: LPG, LLC
PROPERTY ADDRESS: INTERSTATE I-65, COLUMBIA, MAURY COUNTY, TN
TAX MAP 93, PARCEL 2.00 AND PARCEL 2.01
RECORD: BOOK R2952, PAGE 973, R.O.M.C., TN


*H&H LAND SURVEYING, INC.*
*612 A FITZHUGH BLVD. SMYRNA, TENNESSEE 37167*
*PHONE: (615) 831-0756 handhland@bellsouth.net*


JOB: 2020-0317 | AREA: 2,931,534 SQ.FT. OR 67.30 AC.± | DRAWING SCALE: 1"=300' | DATE: NOVEMBER 9, 2023

# EXHIBIT "A"




VICINITY MAP
NOT TO SCALE

## STANDARD LEGEND

- IRF = IRON ROD W/CAP STAMPED "H.H. SURVEY" (FOUND)
- IRS = IRON ROD W/CAP STAMPED "H.H. SURVEY" (SET)
- ——x——x——x—— = FENCE LINE
- P.O.B. = POINT OF BEGINNING

BOUNDARY ANNOTATION

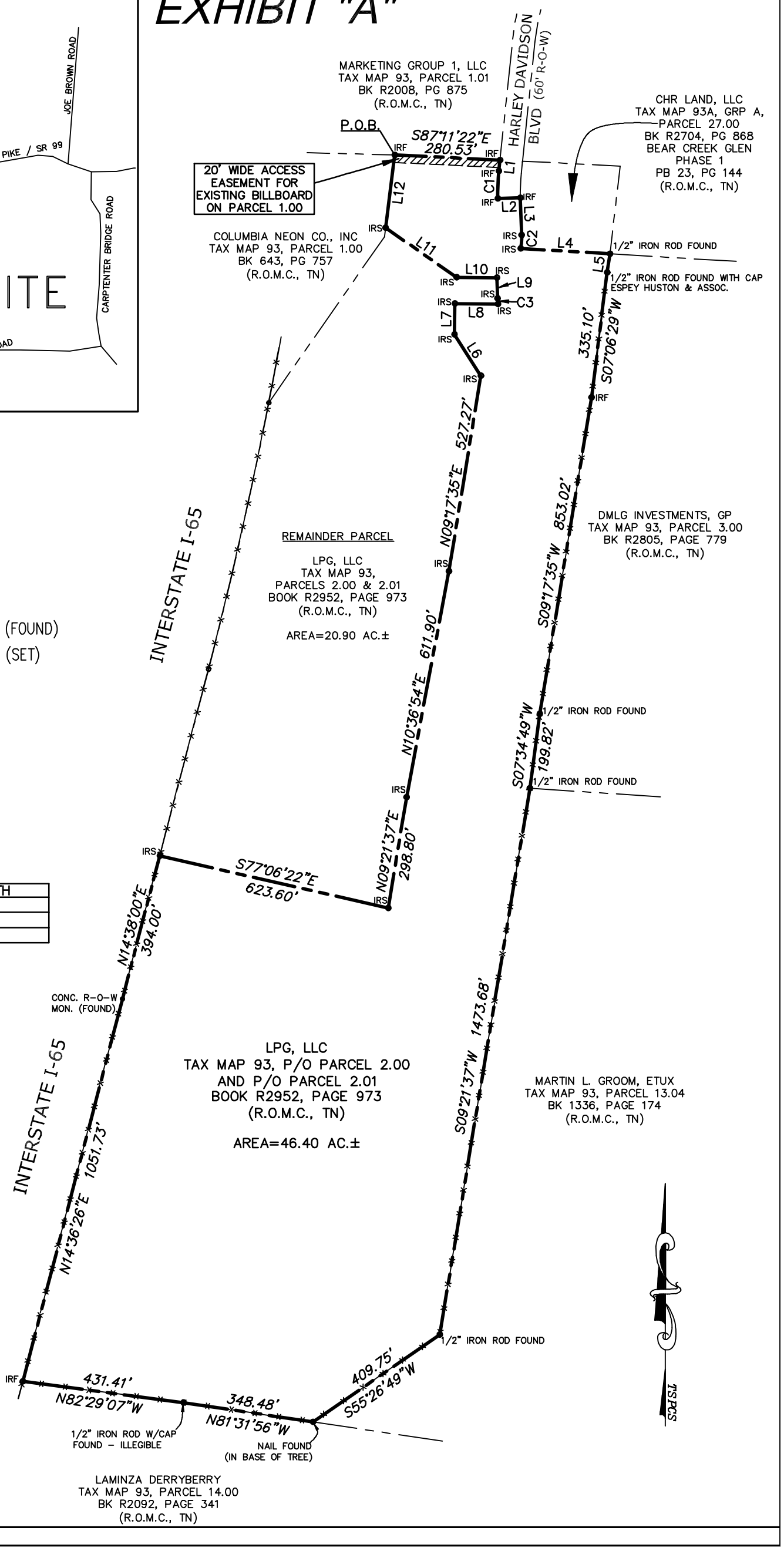
| CURVE | DELTA ANGLE | RADIUS | ARC LENGTH |
|---|---|---|---|
| C1 | 7°56'05" | 530.01' | 73.40' |
| C2 | 11°21'07" | 180.00' | 35.66' |
| C3 | 5°24'51" | 157.50' | 14.88' |

| CURVE | CHORD BEARING | CHORD LENGTH |
|---|---|---|
| C1 | S02°08'16"W | 73.34' |
| C2 | S03°50'47"W | 35.60' |
| C3 | N04°08'37"W | 14.88' |

| LINE | BEARING | DISTANCE |
|---|---|---|
| L1 | S06°06'17"W | 29.24' |
| L2 | N88°10'14"E | 60.00' |
| L3 | S01°51'26"E | 99.31' |
| L4 | S86°34'05"E | 238.09' |
| L5 | S08°40'50"W | 50.28' |
| L6 | N32°31'42"W | 130.51' |
| L7 | N00°37'17"E | 82.07' |
| L8 | S89°22'43"E | 114.59' |
| L9 | N01°26'11"W | 55.21' |
| L10 | N89°22'43"W | 107.39' |
| L11 | N55°09'00"W | 230.49' |
| L12 | N07°11'35"E | 195.47' |




SCALE: 1" = 300'




DRAWN BY: MAF

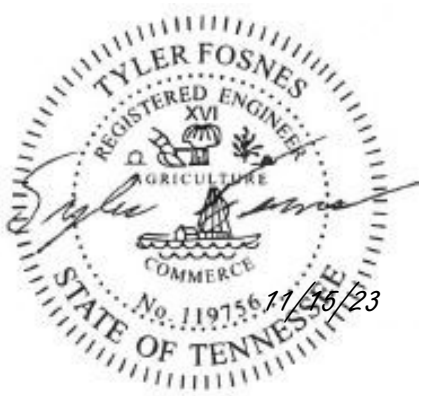
## EXHIBIT "A" — 46.40 ACRE TRACT

OWNER: LPG, LLC
PROPERTY ADDRESS: INTERSTATE I-65, COLUMBIA, MAURY COUNTY, TN
TAX MAP 93, P/O PARCEL 2.00 AND P/O PARCEL 2.01
RECORD: BOOK R2952, PAGE 973, R.O.M.C., TN


**H&H LAND SURVEYING, INC.**
612 A FITZHUGH BLVD. SMYRNA, TENNESSEE 37167
PHONE: (615) 831-0756 handhland@bellsouth.net


JOB: 2020-0317 | AREA: 2,021,331 SQ.FT. OR 46.40 AC.± | DRAWING SCALE: 1"=300' | DATE: NOVEMBER 13, 2023

# MEMORANDUM




| | |
|---|---|
| **TO:** | City of Columbia |
| **FROM:** | Tyler Fosnes, PE, KCI Technologies, Inc. |
| **DATE:** | November 15, 2023 |
| **SUBJECT:** | I-65 and Bear Creek Pike – Trip Generation Comparison and Capacity Analysis Memo |

The I-65 and Bear Creek Pike development is located along Bear Creek Pike (SR 99) in Columbia, Tennessee. In January 2022, KCI Technologies, Inc. conducted an updated a traffic impact study for the proposed development. Phase 2 included 189 single-family residential units and 125 multi-family residential units.

In April 2023, the development team proposed changes to Phase 2 of the approved development plan to include 300 multi-family residential units and 5,500 square feet of office space. A Trip Generation Comparison Memo was prepared and submitted to the City of Columbia to detail the effects of these changes.

The development team is now proposing additional updates to Phase 2 to include 408 multi-family residential units (398 townhomes and 10 apartment units), 5,510 square feet of office space, 7,600 square feet of retail space, and 3,800 square feet of restaurant space. The current site plan is attached at the end of the memo. This memo provides a trip generation comparison and updated capacity analysis associated with the changes between the approved development plan and the proposed development plan.

## Trip Generation Comparison

The approved and proposed trip generation for the project site were calculated in order to determine the impact of the proposed changes to the development. When the traffic impact study was completed for the development in January 2022, ITE's *Trip Generation*, 10th Edition was utilized. Since then, however, ITE has updated the equations used to calculate trip generation in order to better reflect the changes in trip generation over time. In order to accurately compare the approved and proposed land uses, factors for the trip generation were taken from ITE's *Trip Generation*, 11th Edition, for all scenarios. The results of those calculations are presented in Table 1.

**TABLE 1. DEVELOPMENT TRIP GENERATION**

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|---|---|---|---|---|---|
| | | | AM PEAK | | PM PEAK | |
| | | | Enter | Exit | Enter | Exit |
| **JANUARY 2022 APPROVED** | | | | | | |
| Single Family Detached Housing (LUC 210) | 189 units | 1,812 | 35 | 98 | 114 | 67 |
| Multi-Family Housing (Low-Rise) (LUC 220) | 125 units | 877 | 12 | 38 | 47 | 27 |
| **JANUARY 2022 TIS - NEW TRIPS** | | **2,689** | **47** | **136** | **161** | **94** |
| | | | **183** | | **255** | |
| **APRIL 2023 PROPOSED** | | | | | | |
| Multi-Family Housing (Low-Rise) (LUC 220) | 300 units | 1,385 | 28 | 92 | 71 | 46 |
| Office (LUC 710) | 5,500 s.f. | 60 | 7 | 1 | 1 | 7 |
| **APRIL 2023 PROPOSED – NEW TRIPS** | | **1,445** | **35** | **93** | **72** | **53** |
| | | | **128** | | **125** | |
| **NOVEMBER 2023 PROPOSED** | | | | | | |
| Multi-Family Housing (Low-Rise) (LUC 220) | 408 units | 2,691 | 39 | 124 | 123 | 73 |
| Office (LUC 710) | 5,510 s.f. | 60 | 7 | 1 | 1 | 7 |
| Strip Retail Plaza (LUC 822) | 7,600 s.f. | 550 | 11 | 7 | 25 | 25 |
| High-Turnover (Sit-Down) Restaurant (LUC 932) | 3,800 s.f. | 407 | 20 | 16 | 21 | 13 |
| **NOVEMBER 2023 PROPOSED – NEW TRIPS** | | **3,708** | **77** | **148** | **170** | **118** |
| | | | **225** | | **288** | |
| ***DIFFERENCE BETWEEN JANUARY 2022 APPROVED AND NOVEMBER 2023 PROPOSED*** | | ***+1,019*** | ***+30*** | ***+12*** | ***+9*** | ***+24*** |
| | | | ***+42*** | | ***+33*** | |

Source: *Trip Generation*, 11th Edition

As shown in Table 1, the traffic generated by the proposed development scenario is expected to be more than the traffic generated by the approved development scenario from the January 2022 TIS. Trip generation calculations are attached at the end of the memo.

The additional trips generated by the changes in Phase 2 of the proposed development were assigned throughout the roadway network using the same distribution as the January 2022 TIS. The distribution figure from the January 2022 TIS as well as the updated projected peak hour traffic volume figure is attached at the end of the memo.

## Capacity / Level of Service Analyses

To determine the operation of the study intersections with the new proposed site plan, capacity analyses were performed for the AM and PM peak hours. The capacity calculations were performed according to the methods outlined in the *Highway Capacity Manual*, 6th Edition. The capacity analyses result in the determination of a Level of Service (LOS) for an intersection. The LOS is a concept used to describe how well an intersection or roadway operates. LOS A is the best, while LOS F is the worst. LOS D is typically considered as the minimum acceptable LOS for an intersection in an urbanized area. For stop-controlled intersections, a LOS is presented for each critical turning movement. For signalized intersections, a LOS is presented for the overall intersection. Table 2 presents the descriptions of LOS for signalized and unsignalized intersections.

**TABLE 2. DESCRIPTIONS OF LEVEL OF SERVICE**

| LEVEL OF SERVICE | DESCRIPTION | UNSIGNALIZED CONTROL DELAY (sec/veh) | SIGNALIZED CONTROL DELAY (sec/veh) |
|---|---|---|---|
| **A** | Little or no delay | ≤ 10.0 | ≤ 10.0 |
| **B** | Short traffic delay | >10 and ≤ 15 | >10 and ≤ 20 |
| **C** | Average traffic delay | >15 and ≤ 25 | >20 and ≤ 35 |
| **D** | Long traffic delay | >25 and ≤ 35 | >35 and ≤ 55 |
| **E** | Very long traffic delay | >35 and ≤ 50 | >55 and ≤ 80 |
| **F** | Extreme traffic delay | > 50.0 | > 80.0 |

Source: *Highway Capacity Manual*, 6th Edition

The results of the capacity analyses for the January 2022 scenario and the current proposed scenario at the study intersections are presented in Tables 3A and 3B. As shown, all intersections and critical movements operate at the same levels of service as under the January 2022 scenario in both the AM and PM peak hours. Furthermore, the change in average delay is minimal. Capacity analyses worksheets are attached at the end of the memo.

## TABLE 9A. PROJECTED AM PEAK HOUR LEVELS OF SERVICE (PHASE 2)

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | |
|---|---|---|---|
| | | January 2022 | November 2023 |
| Bear Creek Pike and Harley Davidson Boulevard | Northbound Left-Turn | E (45.3) | E (46.1) |
| | Northbound Through/Right | B (12.1) | B (12.1) |
| | Eastbound Left-Turn | A (8.9) | A (8.9) |
| | Westbound Left-Turn | A (7.9) | A (8.0) |
| | Southbound Approach | B (12.5) | B (12.6) |
| Bear Creek Pike and Harley Davidson Boulevard **(signalized)** | **Overall Intersection** | **D (36.7)** | **D (36.7)** |
| | **Eastbound Approach** | **D (36.7)** | **D (36.6)** |
| | **Westbound Approach** | **D (51.0)** | **D (50.9)** |
| | **Northbound Approach** | **A (9.3)** | **A (9.3)** |
| | **Southbound Approach** | **B (13.5)** | **B (13.4)** |
| Bear Creek Pike and I-65 Northbound On/Off-Ramps *(signalized)* **(with westbound right-turn lane)** | Overall Intersection | C (29.1)<br>**C (29.1)** | C (28.5)<br>**C (28.5)** |
| | Eastbound Approach | C (28.8)<br>**C (28.8)** | C (27.9)<br>**C (27.9)** |
| | Westbound Approach | C (23.8)<br>**C (23.8)** | C (23.8)<br>**C (23.8)** |
| | Northbound Approach | E (64.1)<br>**E (64.1)** | E (64.1)<br>**E (64.1)** |
| Bear Creek Pike and I-65 Southbound On/Off-Ramps *(signalized)* | Overall Intersection | D (48.6) | D (49.7) |
| | Eastbound Approach | E (57.7) | E (59.2) |
| | Westbound Approach | D (50.4) | D (52.1) |
| | Southbound Approach | B (13.7) | B (13.7) |
| Bear Creek Pike and Halifax Drive | Eastbound Left-Turn | D (34.7) | D (34.7) |
| | Southbound Approach | F (>300.0) | F (>300.0) |
| Bear Creek Pike and Old Highway 99 | Eastbound Left-Turn | A (0.0) | A (0.0) |
| | Southbound Approach | D (33.4) | D (34.0) |
| Bear Creek Pike and Driveway A | Northbound Left-Turn | C (17.4) | C (17.4) |
| | Northbound Right-Turn | A (9.7) | A (9.7) |
| | Westbound Left-Turn | A (7.8) | A (7.8) |
| **"Projected with Improvements" Scenario Results** | | | |

## TABLE 9B. PROJECTED PM PEAK HOUR LEVELS OF SERVICE (PHASE 2)

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | |
|---|---|---|---|
| | | January 2022 | November 2023 |
| Bear Creek Pike and Harley Davidson Boulevard | Northbound Left-Turn | F (63.0) | F (81.1) |
| | Northbound Through/Right | B (12.9) | B (12.8) |
| | Eastbound Left-Turn | A (8.3) | A (8.3) |
| | Westbound Left-Turn | A (9.5) | A (9.5) |
| | Southbound Approach | C (18.2) | C (18.4) |
| Bear Creek Pike and Harley Davidson Boulevard **(signalized)** | **Overall Intersection** | **C (33.8)** | **C (33.5)** |
| | **Eastbound Approach** | **D (36.9)** | **D (36.8)** |
| | **Westbound Approach** | **D (38.8)** | **D (38.7)** |
| | **Northbound Approach** | **B (12.2)** | **B (12.4)** |
| | **Southbound Approach** | **B (16.3)** | **B (16.8)** |
| Bear Creek Pike and I-65 Northbound On/Off-Ramps *(signalized)* **(with westbound right-turn lane)** | Overall Intersection | C (20.4)<br>**C (20.4)** | C (20.3)<br>**C (20.3)** |
| | Eastbound Approach | B (15.7)<br>**B (15.7)** | B (15.6)<br>**B (15.6)** |
| | Westbound Approach | B (15.0)<br>**B (15.0)** | B (15.0)<br>**B (15.0)** |
| | Northbound Approach | E (61.1)<br>**E (61.1)** | E (61.1)<br>**E (61.1)** |
| Bear Creek Pike and I-65 Southbound On/Off-Ramps *(signalized)* | Overall Intersection | D (35.8) | D (35.9) |
| | Eastbound Approach | D (42.4) | D (42.5) |
| | Westbound Approach | D (36.1) | D (36.5) |
| | Southbound Approach | C (29.7) | C (29.7) |
| Bear Creek Pike and Halifax Drive | Eastbound Left-Turn | F (54.8) | F (55.5) |
| | Southbound Approach | F (224.1) | F (235.8) |
| Bear Creek Pike and Old Highway 99 | Eastbound Left-Turn | B (12.1) | B (12.2) |
| | Southbound Approach | E (36.0) | E (36.3) |
| Bear Creek Pike and Site Access A | Northbound Left-Turn | C (18.4) | C (18.5) |
| | Northbound Right-Turn | B (11.4) | B (11.4) |
| | Westbound Left-Turn | A (8.6) | A (8.6) |
| **"Projected with Improvements" Scenario Results** | | | |

## Conclusions

The I-65 and Bear Creek Pike development is located along Bear Creek Pike (SR 99) in Columbia, Tennessee. In January 2022, KCI Technologies, Inc. conducted an updated a traffic impact study for the proposed development. Phase 2 included 189 single-family residential units and 125 multi-family residential units.

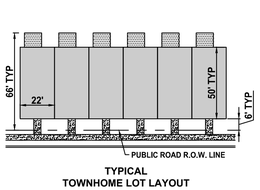
Since then, the development team has proposed changes to Phase 2 of the proposed development to include 408 multi-family residential units (398 townhomes and 10 apartment units), 5,510 square feet of office space, 7,600 square feet of retail space, and 3,800 square feet of restaurant space. This memo provided a trip generation comparison and updated capacity analysis associated with the changes between the approved development plan and the proposed development plan.

The traffic generated by the proposed development scenario is expected to be more than the traffic generated by the approved development scenario from the January 2022 TIS; however, based on the analysis in this memo, the traffic impacts of the updated site plan are expected to cause minimal changes in operations in comparison to the original plan. Therefore, the recommendations included in the January 2022 TIS remain valid. No further improvements are recommended in conjunction with the proposed development.

| LOTS 1-3 PARKING SUMMARY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LOT | OFFICE SF | PARKING SPACE REQ'D (1/200 SF) | RETAIL SF | PARKING SPACE REQ'D (1/500 SF) | RESTAURANT SF | PARKING SPACE REQ'D (1/100 SF) | SECOND FLOOR RESIDENTIAL UNITS | PARKING SPACE REQ'D (1.5 PER UNIT) | STREET PARKING PROVIDED | OFFSTREET PARKING PROVIDED |
| 1 | 5,000 | 25 | | | | | | | 6 | 20 |
| 2 | | | 3,600 | 8 | 2,400 | 24 | 5 | 8 | 9 | 31 |
| 3 | | | 3,600 | 8 | 1,200 | 12 | 4 | 6 | 12 | 20 |
| TOTAL | 5,000 | 25 | 7200 | 16 | 3600 | 36 | 9 | 14 | 27 | 71 |

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE # | LENGTH | RADIUS | DELTA | CHORD DIRECTION | CHORD LENGTH |
| C1 | 121.67' | 125.00' | 55°46'17" | S62°44'08"W | 116.93' |
| C2 | 24.69' | 90.00' | 15°43'11" | S82°45'42"W | 24.61' |
| C3 | 135.29' | 169.00' | 45°26'52" | S59°04'26"W | 131.30' |
| C4 | 62.91' | 90.00' | 40°02'57" | S54°52'33"W | 61.64' |
| C5 | 76.57' | 209.00' | 20°13'99" | S24°44'38"W | 70.29' |
| C6 | 24.66' | 165.00' | 8°33'42" | S18°54'51"W | 24.63' |
| C7 | 83.92' | 235.00' | 20°13'99" | S24°44'38"W | 82.49' |
| C8 | 39.27' | 25.00' | 90°00'00" | S13°39'06"E | 35.36' |
| C9 | 44.30' | 25.00' | 101°31'11" | S74°51'21"W | 38.76' |
| C10 | 142.37' | 125.00' | 65°15'26" | N22°31'18"W | 134.80' |
| C11 | 27.32' | 169.00' | 9°15'53" | N35°15'29"W | 27.29' |

| CURVE TABLE | | | | | |
|---|---|---|---|---|---|
| CURVE # | LENGTH | RADIUS | DELTA | CHORD DIRECTION | CHORD LENGTH |
| C12 | 154.91' | 166.00' | 53°28'23" | N17°23'46"W | 149.35' |
| C13 | 102.51' | 90.00' | 65°15'26" | N22°31'18"W | 97.05' |
| C14 | 1.77' | 206.00' | 0°30'29" | N10°21'46"E | 1.77' |
| C15 | 2.08' | 235.00' | 0°30'29" | N10°21'46"E | 2.08' |
| C16 | 1.46' | 165.00' | 0°30'29" | N10°21'46"E | 1.46' |
| C17 | 205.12' | 125.00' | 94°01'06" | N57°37'27"E | 182.87' |
| C18 | 262.53' | 166.00' | 94°01'06" | N57°37'27"E | 234.57' |
| C19 | 147.88' | 90.00' | 94°01'06" | N57°37'27"E | 131.66' |
| C20 | 39.27' | 25.00' | 90°00'00" | S39°22'00"E | 35.36' |
| C21 | 39.27' | 25.00' | 90°00'00" | S59°38'00"W | 35.36' |

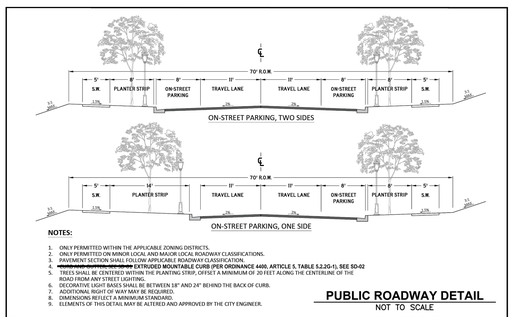



TYPICAL
TOWNHOME LOT LAYOUT

GRAPHIC SCALE

60 0 30 60

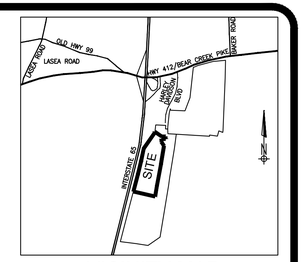
( IN FEET )
1 inch = 60 ft.




NOTES:

1. ONLY PERMITTED WITHIN THE APPLICABLE ZONING DISTRICTS.
2. ONLY PERMITTED ON MINOR LOCAL AND MAJOR LOCAL ROADWAY CLASSIFICATIONS.
3. PAVEMENT SECTION SHALL FOLLOW APPLICABLE ROADWAY CLASSIFICATION.
4. ~~EXTRUDED MOUNTABLE CURB~~ (PER ORDINANCE 4400, ARTICLE 5, TABLE 5.2.2G-1), SEE SD-02
5. TREES SHALL BE CENTERED WITHIN THE PLANTING STRIP, OFFSET A MINIMUM OF 20 FEET ALONG THE CENTERLINE OF THE ROAD FROM ANY STREET LIGHTING.
6. DECORATIVE LIGHT BASES SHALL BE BETWEEN 18" AND 24" BEHIND THE BACK OF CURB.
7. ADDITIONAL RIGHT OF WAY MAY BE REQUIRED.
8. DIMENSIONS REFLECT A MINIMUM STANDARD.
9. ELEMENTS OF THIS DETAIL MAY BE ALTERED AND APPROVED BY THE CITY ENGINEER.

**PUBLIC ROADWAY DETAIL**
NOT TO SCALE




VICINITY MAP
SCALE: 1" = 2000'

| CITY OF COLUMBIA DEVELOPMENT SERVICES DEPARTMENT ENGINEERING DIVISION | CHARACTER DISTRICT STREET URBAN NEIGHBORHOOD | DATE 6/9/2022 |
|---|---|---|
| STANDARD DETAILS | (NTS) | DS-03 |

**LEGEND**

- EXISTING SANITARY SEWER
- SANITARY SEWER — 8"SA
- WATER LINE — W — W
- SANITARY SEWER MANHOLE
- FIRE HYDRANT ASSEMBLY
- WATER VALVE
- STOP SIGN



**PURPOSE OF SUBMITTAL** - TO OBTAIN PRELIMINARY PLAT APPROVAL FOR MIXED USE DELEOPMENT ON APPROXIMATELY 20.90 ACRES PORTION OF PARCELS 2.00 & 2.01 ON TAX MAP 93 UNDER CD-4 ZONING.

**PROPERTY OWNER:**
CHR LAND, LLC
818 S. MAIN STREET
COLUMBIA, TN 38401
TAX MAP 93, PARCELS 2.00 & 2.01

**APPLICANT:**
TKC ARCHITECTURE AND ENGINEERING LLC
818 S. MAIN STREET
COLUMBIA, TN 38401
615.617.7477
COLE@TKC-AE.COM

**NOTE:**

ALL ROADS SHOWN ARE PUBLIC ROADS.

ALL ROAD NAMES TO BE APPROVED BY E-911.

TOWNHOMES MUST BE CONSTRUCTED IN ACCORDANCE WITH THE 2018 IRC.

THIS PROPERTY IS LOCATED ON F.E.M.A. FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 47119C0195E WHICH HAS NOT BEEN PRINTED FOR THIS LOCATION.

| TOWNHOME DENSITY | | |
|---|---|---|
| UNITS | ACRES | UNITS/AC. |
| 98 | 12.65 | 7.75 |

| TOWNHOME PARKING SUMMARY | | |
|---|---|---|
| TYPE UNIT | # UNITS | SURFACE PARKING PROVIDED |
| 22'X50' (NO CAR GARAGE) | 98 | 195 |
| TOTAL PARKING PROVIDED ---------- 195<br>TOTAL PARKING REQUIRED ---------- 98 X 1.5 = 147 | | |

| TOWNHOME OPEN SPACE SUMMARY |
|---|
| PRIVATE YARD SPACE PROVIDED: 100 SF / UNIT<br>= 100 X 98 = 9,800 SF = 0.22 ACRES |

# Preliminary Plat
# Mixed Use Development

**COLUMBIA, TENNESSEE**
**MAURY COUNTY**
**OCTOBER 19, 2023**

COLE O. NEWTON
REGISTERED
AGRICULTURE
ENGINEER
NUMBER
115199
STATE OF TENNESSEE
10/19/2023

NOT FOR CONSTRUCTION
DRAWING FOR PRELIMINARY REVIEW ONLY

TKC ARCHITECTURE INTERIORS CIVIL SITE

818 S. MAIN STREET, COLUMBIA, TN 38401 | 615.617.7477 | WWW.TKC-AE.COM

## TOTAL TRIP GENERATION

| ITE CODE | LAND USE | # UNITS | UNIT TYPE | ADT | AM | | | PM | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Enter | Exit | Total | Enter | Exit | Total |
| 220.1 | Multifamily Housing (Low-Rise) - Not Close to Rail Transit | 408 | welling Uni | 2691 | 39 | 124 | 163 | 123 | 73 | 196 |
| 710 | Office | 5.51 | k.s.f. | 60 | 7 | 1 | 8 | 1 | 7 | 8 |
| 822 | Strip Retail Plaza | 7.6 | k.s.f. | 550 | 11 | 7 | 18 | 25 | 25 | 50 |
| 932 | High-Turnover (Sit-Down) Restaurant | 3.8 | k.s.f. | 407 | 20 | 16 | 36 | 21 | 13 | 34 |
| | **SUBTOTAL** | | | **3708** | 77 | 148 | **225** | 170 | 118 | **288** |
| | **TOTAL NEW TRIPS** | | | **3708** | 77 | 148 | **225** | 170 | 118 | **288** |

# TRIP GENERATION

**Multifamily Housing (Low-Rise) - Not Close to Rail Transit**

220.1 ITE Land Code

408 Dwelling Units

Average Daily Traffic:

T = 6.41 * (X) + 75.31

T = 6.41 * (408) + 75.31

T = 2691

A.M. Peak Hour:

T = 0.40 * (X)

T = 0.40 * (408)

T = 163

| | | |
|---|---|---|
| Enter = | 39 | 24% |
| Exit = | 124 | 76% |

P.M. Peak Hour:

T = 0.43 * (X) + 20.55

T = 0.43 * (408) + 20.55

T = 196

| | | |
|---|---|---|
| Enter = | 123 | 63% |
| Exit = | 73 | 37% |

# TRIP GENERATION

**Office**

710 ITE Land Code

5.51 k.s.f.

Average Daily Traffic:

T = 10.84 * (X)

T = 10.84 * (5.51)

**T = 60**

A.M. Peak Hour:

T = 1.52 * (X)

T = 1.52 * (5.51)

**T = 8**

| | | |
|---|---|---|
| Enter = | 7 | 88% |
| Exit = | 1 | 12% |

P.M. Peak Hour:

T = 1.44 * (X)

T = 1.44 * (5.51)

**T = 8**

| | | |
|---|---|---|
| Enter = | 1 | 17% |
| Exit = | 7 | 83% |

# TRIP GENERATION

**Strip Retail Plaza**

822 ITE Land Code

7.6 k.s.f.

Average Daily Traffic:

T = 42.20 * (X) + 229.68

T = 42.20 * (7.6) + 229.68

T = 550

A.M. Peak Hour:

T = 2.36 * (X)

T = 2.36 * (7.6)

T = 18

| | | |
|---|---|---|
| Enter = | 11 | 60% |
| Exit = | 7 | 40% |

P.M. Peak Hour:

T = 6.59 * (X)

T = 6.59 * (7.6)

T = 50

| | | |
|---|---|---|
| Enter = | 25 | 50% |
| Exit = | 25 | 50% |

# TRIP GENERATION

**High-Turnover (Sit-Down) Restaurant**

932 ITE Land Code

3.8 k.s.f.

Average Daily Traffic:

T = 107.20 * (X)

T = 107.20 * (3.8)

**T = 407**

A.M. Peak Hour:

T = 9.57 * (X)

T = 9.57 * (3.8)

**T = 36**

| | | |
|---|---|---|
| Enter = | 20 | 55% |
| Exit = | 16 | 45% |

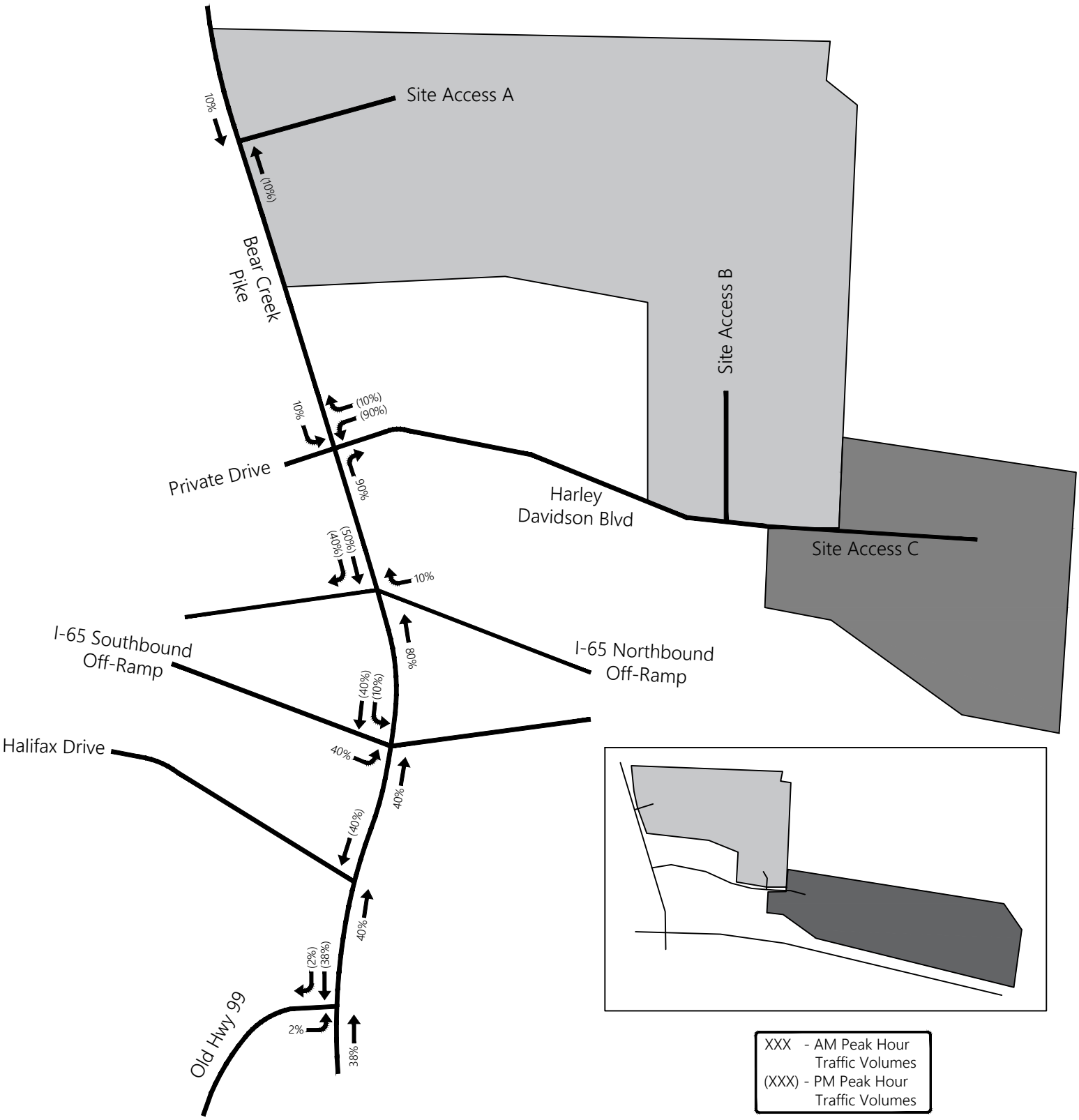
P.M. Peak Hour:

T = 9.05 * (X)

T = 9.05 * (3.8)

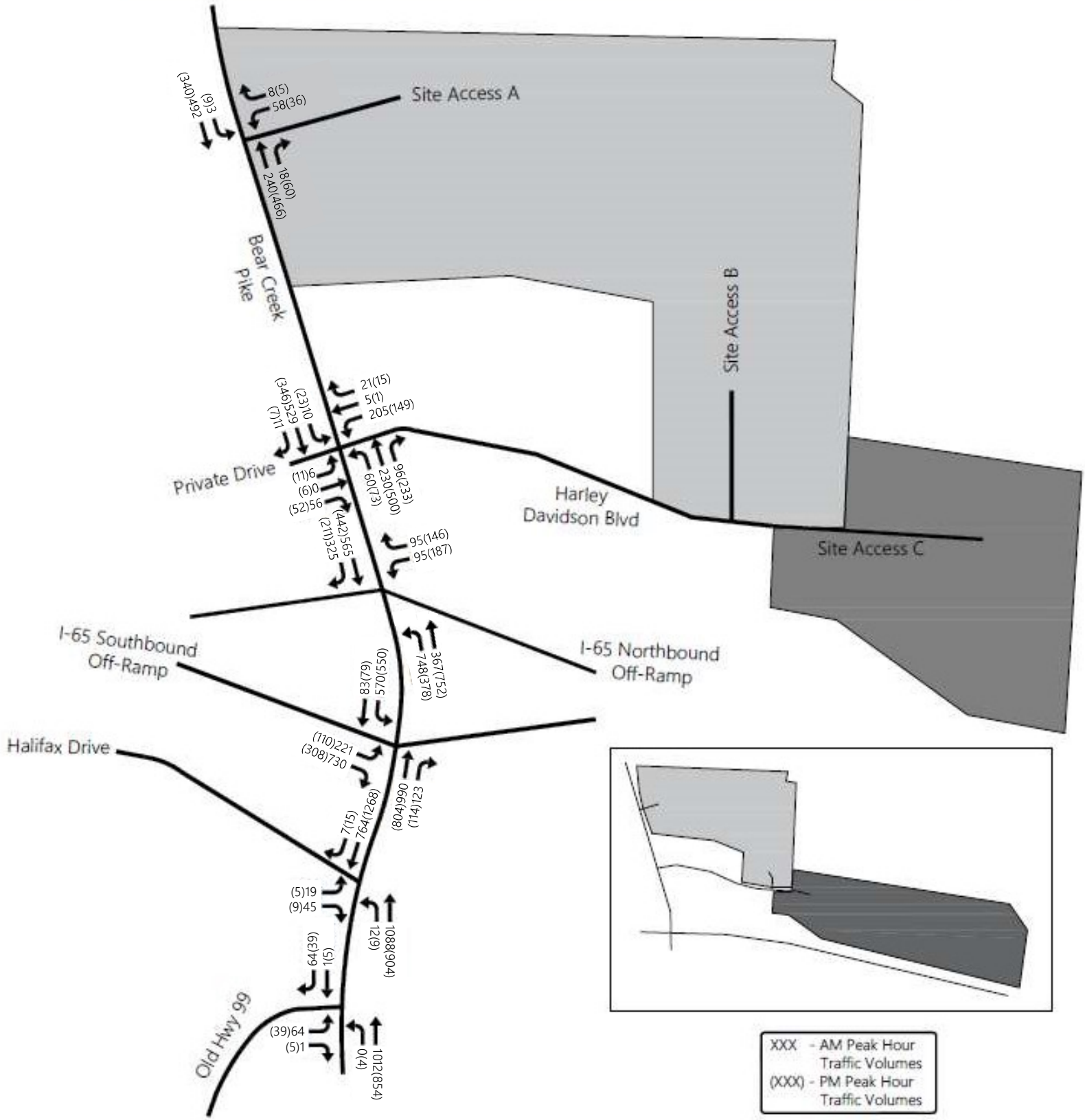
**T = 34**

| | | |
|---|---|---|
| Enter = | 21 | 61% |
| Exit = | 13 | 39% |




Distribution of Peak Hour Traffic Volumes Generated by the Project Site (Phase 2)
(Not to Scale)

Figure 9.




Total Projected Peak Hour Volumes (Phase 2)

(Not to Scale)

| Intersection | |
|---|---|
| Int Delay, s/veh | 9.1 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 60 | 230 | 96 | 10 | 529 | 11 | 205 | 5 | 21 | 6 | 0 | 56 |
| Future Vol, veh/h | 60 | 230 | 96 | 10 | 529 | 11 | 205 | 5 | 21 | 6 | 0 | 56 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 200 | - | 100 | 80 | - | - | 90 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 65 | 250 | 104 | 11 | 575 | 12 | 223 | 5 | 23 | 7 | 0 | 61 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 587 | 0 | 0 | 354 | 0 | 0 | 690 | 989 | 250 | 1049 | 1087 | 294 |
| Stage 1 | - | - | - | - | - | - | 380 | 380 | - | 603 | 603 | - |
| Stage 2 | - | - | - | - | - | - | 310 | 609 | - | 446 | 484 | - |
| Critical Hdwy | 4.13 | - | - | 4.13 | - | - | 7.33 | 6.53 | 6.23 | 7.33 | 6.53 | 6.93 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.13 | 5.53 | - | 6.53 | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.53 | 5.53 | - | 6.13 | 5.53 | - |
| Follow-up Hdwy | 2.219 | - | - | 2.219 | - | - | 3.519 | 4.019 | 3.319 | 3.519 | 4.019 | 3.319 |
| Pot Cap-1 Maneuver | 986 | - | - | 1203 | - | - | 345 | 246 | 788 | 193 | 215 | 703 |
| Stage 1 | - | - | - | - | - | - | 641 | 613 | - | 454 | 487 | - |
| Stage 2 | - | - | - | - | - | - | 676 | 484 | - | 591 | 551 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 986 | - | - | 1203 | - | - | 297 | 228 | 788 | 174 | 199 | 703 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 297 | 228 | - | 174 | 199 | - |
| Stage 1 | - | - | - | - | - | - | 599 | 573 | - | 424 | 483 | - |
| Stage 2 | - | - | - | - | - | - | 612 | 480 | - | 531 | 515 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 1.4 | 0.1 | 42.3 | 12.6 |
| HCM LOS | | | E | B |

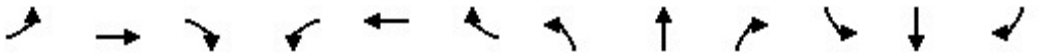
| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 297 | 535 | 986 | - | - | 1203 | - | - | 543 |
| HCM Lane V/C Ratio | 0.75 | 0.053 | 0.066 | - | - | 0.009 | - | - | 0.124 |
| HCM Control Delay (s) | 46.1 | 12.1 | 8.9 | - | - | 8 | - | - | 12.6 |
| HCM Lane LOS | E | B | A | - | - | A | - | - | B |
| HCM 95th %tile Q(veh) | 5.6 | 0.2 | 0.2 | - | - | 0 | - | - | 0.4 |



| Lane Group | EBL | EBT | WBT | NBT | NBR |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 813 | 399 | 967 | 103 | 103 |
| v/c Ratio | 0.67 | 0.26 | 0.64 | 0.57 | 0.40 |
| Control Delay | 14.1 | 0.5 | 25.7 | 62.7 | 13.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 14.1 | 0.5 | 25.7 | 62.7 | 13.8 |
| Queue Length 50th (ft) | 64 | 5 | 268 | 77 | 0 |
| Queue Length 95th (ft) | m102 | m8 | 341 | 131 | 51 |
| Internal Link Dist (ft) | | 583 | 416 | 378 | |
| Turn Bay Length (ft) | | | | | 250 |
| Base Capacity (vph) | 1220 | 1531 | 1503 | 376 | 417 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.67 | 0.26 | 0.64 | 0.27 | 0.25 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

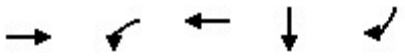


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 748 | 367 | 0 | 0 | 565 | 325 | 95 | 0 | 95 | 0 | 0 | 0 |
| Future Volume (veh/h) | 748 | 367 | 0 | 0 | 565 | 325 | 95 | 0 | 95 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 0 | 0 | 1870 | 1870 | 1870 | 1870 | 1870 | | | |
| Adj Flow Rate, veh/h | 813 | 399 | 0 | 0 | 614 | 0 | 103 | 0 | 0 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 848 | 1333 | 0 | 0 | 1526 | | 132 | 0 | | | | |
| Arrive On Green | 0.41 | 1.00 | 0.00 | 0.00 | 0.43 | 0.00 | 0.07 | 0.00 | 0.00 | | | |
| Sat Flow, veh/h | 3456 | 1870 | 0 | 0 | 3741 | 0 | 1781 | 0 | 1585 | | | |
| Grp Volume(v), veh/h | 813 | 399 | 0 | 0 | 614 | 0 | 103 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 0 | 0 | 1777 | 0 | 1781 | 0 | 1585 | | | |
| Q Serve(g_s), s | 27.4 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 6.8 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 27.4 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 6.8 | 0.0 | 0.0 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.00 | 1.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 848 | 1333 | 0 | 0 | 1526 | | 132 | 0 | | | | |
| V/C Ratio(X) | 0.96 | 0.30 | 0.00 | 0.00 | 0.40 | | 0.78 | 0.00 | | | | |
| Avail Cap(c_a), veh/h | 850 | 1333 | 0 | 0 | 1526 | | 379 | 0 | | | | |
| HCM Platoon Ratio | 1.67 | 1.67 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.20 | 0.20 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 34.8 | 0.0 | 0.0 | 0.0 | 23.6 | 0.0 | 54.6 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 6.7 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 9.5 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 10.0 | 0.0 | 0.0 | 0.0 | 5.8 | 0.0 | 3.4 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 41.5 | 0.1 | 0.0 | 0.0 | 23.8 | 0.0 | 64.1 | 0.0 | 0.0 | | | |
| LnGrp LOS | D | A | A | A | C | | E | A | | | | |
| Approach Vol, veh/h | | 1212 | | | 614 | A | | 103 | A | | | |
| Approach Delay, s/veh | | 27.9 | | | 23.8 | | | 64.1 | | | | |
| Approach LOS | | C | | | C | | | E | | | | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 90.0 | | | 34.0 | 56.0 | | 13.4 | | | | |
| Change Period (Y+Rc), s | | 4.5 | | | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | | 85.5 | | | 29.5 | 51.5 | | 25.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.0 | | | 29.4 | 16.3 | | 8.8 | | | | |
| Green Ext Time (p_c), s | | 2.4 | | | 0.0 | 4.1 | | 0.4 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.5 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



| Lane Group | EBT | WBL | WBT | SBT | SBR |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 1210 | 90 | 620 | 124 | 240 |
| v/c Ratio | 0.95 | 1.48 | 0.48 | 0.12 | 0.26 |
| Control Delay | 53.6 | 309.6 | 42.9 | 12.8 | 7.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 53.6 | 309.6 | 42.9 | 12.8 | 7.5 |
| Queue Length 50th (ft) | 472 | ~92 | 265 | 43 | 45 |
| Queue Length 95th (ft) | #622 | m#175 | 327 | 74 | 88 |
| Internal Link Dist (ft) | 294 | | 583 | 540 | |
| Turn Bay Length (ft) | | 260 | | | 500 |
| Base Capacity (vph) | 1269 | 61 | 1282 | 999 | 939 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.95 | 1.48 | 0.48 | 0.12 | 0.26 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 990 | 123 | 83 | 570 | 0 | 0 | 0 | 0 | 110 | 4 | 221 |
| Future Volume (veh/h) | 0 | 990 | 123 | 83 | 570 | 0 | 0 | 0 | 0 | 110 | 4 | 221 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | | | | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 0 | 1076 | 134 | 90 | 620 | 0 | | | | 120 | 4 | 240 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1153 | 143 | 77 | 1288 | 0 | | | | 971 | 32 | 892 |
| Arrive On Green | 0.00 | 0.36 | 0.36 | 0.36 | 0.36 | 0.00 | | | | 0.56 | 0.56 | 0.56 |
| Sat Flow, veh/h | 0 | 3274 | 396 | 462 | 3647 | 0 | | | | 1726 | 58 | 1585 |
| Grp Volume(v), veh/h | 0 | 601 | 609 | 90 | 620 | 0 | | | | 124 | 0 | 240 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1799 | 462 | 1777 | 0 | | | | 1784 | 0 | 1585 |
| Q Serve(g_s), s | 0.0 | 39.1 | 39.2 | 4.3 | 16.2 | 0.0 | | | | 3.9 | 0.0 | 9.4 |
| Cycle Q Clear(g_c), s | 0.0 | 39.1 | 39.2 | 43.5 | 16.2 | 0.0 | | | | 3.9 | 0.0 | 9.4 |
| Prop In Lane | 0.00 | | 0.22 | 1.00 | | 0.00 | | | | 0.97 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 644 | 652 | 77 | 1288 | 0 | | | | 1004 | 0 | 892 |
| V/C Ratio(X) | 0.00 | 0.93 | 0.93 | 1.18 | 0.48 | 0.00 | | | | 0.12 | 0.00 | 0.27 |
| Avail Cap(c_a), veh/h | 0 | 644 | 652 | 77 | 1288 | 0 | | | | 1004 | 0 | 892 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 0.72 | 0.72 | 0.00 | | | | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 36.8 | 36.9 | 59.5 | 29.5 | 0.0 | | | | 12.3 | 0.0 | 13.5 |
| Incr Delay (d2), s/veh | 0.0 | 22.3 | 22.4 | 141.9 | 0.9 | 0.0 | | | | 0.3 | 0.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 20.0 | 20.4 | 5.3 | 6.8 | 0.0 | | | | 1.6 | 0.0 | 3.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 59.1 | 59.3 | 201.4 | 30.5 | 0.0 | | | | 12.6 | 0.0 | 14.3 |
| LnGrp LOS | A | E | E | F | C | A | | | | B | A | B |
| Approach Vol, veh/h | | 1210 | | | 710 | | | | | | 364 | |
| Approach Delay, s/veh | | 59.2 | | | 52.1 | | | | | | 13.7 | |
| Approach LOS | | E | | | D | | | | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 48.0 | | 72.0 | | 48.0 | | | | | | |
| Change Period (Y+Rc), s | | 4.5 | | 4.5 | | 4.5 | | | | | | |
| Max Green Setting (Gmax), s | | 43.5 | | 67.5 | | 43.5 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 41.2 | | 11.4 | | 45.5 | | | | | | |
| Green Ext Time (p_c), s | | 1.5 | | 1.5 | | 0.0 | | | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 49.7 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 13.3 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 12 | 1088 | 764 | 7 | 19 | 45 |
| Future Vol, veh/h | 12 | 1088 | 764 | 7 | 19 | 45 |
| Conflicting Peds, #/hr | 717 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 1183 | 830 | 8 | 21 | 49 |

| Major/Minor | Major1 | | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1555 | 0 | - | 0 | 2169 | 1136 | |
| Stage 1 | - | - | - | - | 1551 | - | |
| Stage 2 | - | - | - | - | 618 | - | |
| Critical Hdwy | 4.14 | - | - | - | 6.84 | 6.94 | |
| Critical Hdwy Stg 1 | - | - | - | - | 5.84 | - | |
| Critical Hdwy Stg 2 | - | - | - | - | 5.84 | - | |
| Follow-up Hdwy | 2.22 | - | - | - | 3.52 | 3.32 | |
| Pot Cap-1 Maneuver | 422 | - | - | - | 40 | 196 | |
| Stage 1 | - | - | - | - | 161 | - | |
| Stage 2 | - | - | - | - | 500 | - | |
| Platoon blocked, % | | - | - | - | | | |
| Mov Cap-1 Maneuver | 134 | - | - | - | ~ 4 | 62 | |
| Mov Cap-2 Maneuver | - | - | - | - | 34 | - | |
| Stage 1 | - | - | - | - | 46 | - | |
| Stage 2 | - | - | - | - | 159 | - | |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.4 | 0 | $ 394.9 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 134 | - | - | - | 50 |
| HCM Lane V/C Ratio | 0.097 | - | - | - | 1.391 |
| HCM Control Delay (s) | 34.7 | - | - | - | $ 394.9 |
| HCM Lane LOS | D | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.3 | - | - | - | 6.5 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.2 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 1012 | 750 | 37 | 64 | 1 |
| Future Vol, veh/h | 0 | 1012 | 750 | 37 | 64 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | 100 | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1100 | 815 | 40 | 70 | 1 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 855 | 0 | - | 0 | 1915 | 408 |
| Stage 1 | - | - | - | - | 815 | - |
| Stage 2 | - | - | - | - | 1100 | - |
| Critical Hdwy | 4.13 | - | - | - | 6.63 | 6.93 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.83 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.43 | - |
| Follow-up Hdwy | 2.219 | - | - | - | 3.519 | 3.319 |
| Pot Cap-1 Maneuver | 783 | - | - | - | ~ 67 | 593 |
| Stage 1 | - | - | - | - | 397 | - |
| Stage 2 | - | - | - | - | 318 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 783 | - | - | - | ~ 67 | 593 |
| Mov Cap-2 Maneuver | - | - | - | - | 191 | - |
| Stage 1 | - | - | - | - | 397 | - |
| Stage 2 | - | - | - | - | 318 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 34 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 783 | - | - | - | 193 |
| HCM Lane V/C Ratio | - | - | - | - | 0.366 |
| HCM Control Delay (s) | 0 | - | - | - | 34 |
| HCM Lane LOS | A | - | - | - | D |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 1.6 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 240 | 18 | 3 | 492 | 58 | 8 |
| Future Vol, veh/h | 240 | 18 | 3 | 492 | 58 | 8 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 350 | - | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 261 | 20 | 3 | 535 | 63 | 9 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 281 | 0 | 802 | 261 |
| Stage 1 | - | - | - | - | 261 | - |
| Stage 2 | - | - | - | - | 541 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1282 | - | 353 | 778 |
| Stage 1 | - | - | - | - | 783 | - |
| Stage 2 | - | - | - | - | 583 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1282 | - | 352 | 778 |
| Mov Cap-2 Maneuver | - | - | - | - | 352 | - |
| Stage 1 | - | - | - | - | 783 | - |
| Stage 2 | - | - | - | - | 581 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 16.5 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 352 | 778 | - | - | 1282 | - |
| HCM Lane V/C Ratio | 0.179 | 0.011 | - | - | 0.003 | - |
| HCM Control Delay (s) | 17.4 | 9.7 | - | - | 7.8 | 0 |
| HCM Lane LOS | C | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.6 | 0 | - | - | 0 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 10.2 |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 73 | 500 | 233 | 23 | 346 | 7 | 149 | 1 | 15 | 11 | 6 | 52 |
| Future Vol, veh/h | 73 | 500 | 233 | 23 | 346 | 7 | 149 | 1 | 15 | 11 | 6 | 52 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |
| Storage Length | 200 | - | 100 | 80 | - | - | 90 | - | - | - | - | - |
| Veh in Median Storage, # | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Grade, % | - | 0 | - | - | 0 | - | - | 0 | - | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 79 | 543 | 253 | 25 | 376 | 8 | 162 | 1 | 16 | 12 | 7 | 57 |

| Major/Minor | Major1 | | | Major2 | | | Minor1 | | | Minor2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 384 | 0 | 0 | 796 | 0 | 0 | 943 | 1135 | 543 | 1266 | 1384 | 192 |
| Stage 1 | - | - | - | - | - | - | 701 | 701 | - | 430 | 430 | - |
| Stage 2 | - | - | - | - | - | - | 242 | 434 | - | 836 | 954 | - |
| Critical Hdwy | 4.13 | - | - | 4.13 | - | - | 7.33 | 6.53 | 6.23 | 7.33 | 6.53 | 6.93 |
| Critical Hdwy Stg 1 | - | - | - | - | - | - | 6.13 | 5.53 | - | 6.53 | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | - | 6.53 | 5.53 | - | 6.13 | 5.53 | - |
| Follow-up Hdwy | 2.219 | - | - | 2.219 | - | - | 3.519 | 4.019 | 3.319 | 3.519 | 4.019 | 3.319 |
| Pot Cap-1 Maneuver | 1173 | - | - | 824 | - | - | 230 | 202 | 539 | 135 | 143 | 818 |
| Stage 1 | - | - | - | - | - | - | 428 | 440 | - | 574 | 583 | - |
| Stage 2 | - | - | - | - | - | - | 741 | 580 | - | 361 | 336 | - |
| Platoon blocked, % | | - | - | | - | - | | | | | | |
| Mov Cap-1 Maneuver | 1173 | - | - | 824 | - | - | 191 | 183 | 539 | 121 | 129 | 818 |
| Mov Cap-2 Maneuver | - | - | - | - | - | - | 191 | 183 | - | 121 | 129 | - |
| Stage 1 | - | - | - | - | - | - | 399 | 411 | - | 536 | 566 | - |
| Stage 2 | - | - | - | - | - | - | 661 | 563 | - | 326 | 313 | - |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| HCM Control Delay, s | 0.8 | 0.6 | 74.5 | 18.4 |
| HCM LOS | | | F | C |

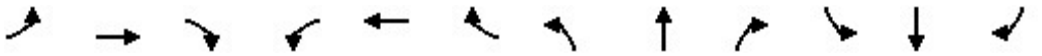
| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL | EBT | EBR | WBL | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|---|---|---|---|
| Capacity (veh/h) | 191 | 481 | 1173 | - | - | 824 | - | - | 343 |
| HCM Lane V/C Ratio | 0.848 | 0.036 | 0.068 | - | - | 0.03 | - | - | 0.219 |
| HCM Control Delay (s) | 81.1 | 12.8 | 8.3 | - | - | 9.5 | - | - | 18.4 |
| HCM Lane LOS | F | B | A | - | - | A | - | - | C |
| HCM 95th %tile Q(veh) | 6.2 | 0.1 | 0.2 | - | - | 0.1 | - | - | 0.8 |



| Lane Group | EBL | EBT | WBT | NBT | NBR |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 411 | 817 | 709 | 203 | 159 |
| v/c Ratio | 0.40 | 0.57 | 0.47 | 0.73 | 0.42 |
| Control Delay | 21.7 | 7.9 | 22.6 | 62.5 | 9.6 |
| Queue Delay | 0.0 | 1.6 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.7 | 9.5 | 22.6 | 62.5 | 9.6 |
| Queue Length 50th (ft) | 60 | 478 | 178 | 151 | 0 |
| Queue Length 95th (ft) | m130 | 657 | 233 | 220 | 57 |
| Internal Link Dist (ft) | | 583 | 416 | 378 | |
| Turn Bay Length (ft) | | | | | 250 |
| Base Capacity (vph) | 1030 | 1429 | 1493 | 376 | 461 |
| Starvation Cap Reductn | 0 | 412 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.40 | 0.80 | 0.47 | 0.54 | 0.34 |

Intersection Summary

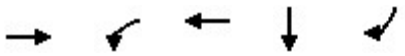
m Volume for 95th percentile queue is metered by upstream signal.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 378 | 752 | 0 | 0 | 442 | 211 | 187 | 0 | 146 | 0 | 0 | 0 |
| Future Volume (veh/h) | 378 | 752 | 0 | 0 | 442 | 211 | 187 | 0 | 146 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 0 | 0 | 1870 | 1870 | 1870 | 1870 | 1870 | | | |
| Adj Flow Rate, veh/h | 411 | 817 | 0 | 0 | 480 | 0 | 203 | 0 | 0 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 481 | 1333 | 0 | 0 | 1904 | | 238 | 0 | | | | |
| Arrive On Green | 0.28 | 1.00 | 0.00 | 0.00 | 0.54 | 0.00 | 0.13 | 0.00 | 0.00 | | | |
| Sat Flow, veh/h | 3456 | 1870 | 0 | 0 | 3741 | 0 | 1781 | 0 | 1585 | | | |
| Grp Volume(v), veh/h | 411 | 817 | 0 | 0 | 480 | 0 | 203 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 0 | 0 | 1777 | 0 | 1781 | 0 | 1585 | | | |
| Q Serve(g_s), s | 13.5 | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 13.4 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 13.4 | 0.0 | 0.0 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.00 | 1.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 481 | 1333 | 0 | 0 | 1904 | | 238 | 0 | | | | |
| V/C Ratio(X) | 0.85 | 0.61 | 0.00 | 0.00 | 0.25 | | 0.85 | 0.00 | | | | |
| Avail Cap(c_a), veh/h | 850 | 1333 | 0 | 0 | 1904 | | 379 | 0 | | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.52 | 0.52 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 42.1 | 0.0 | 0.0 | 0.0 | 15.0 | 0.0 | 50.8 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 2.4 | 1.1 | 0.0 | 0.0 | 0.1 | 0.0 | 10.3 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.0 | 0.4 | 0.0 | 0.0 | 3.3 | 0.0 | 6.5 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 44.5 | 1.1 | 0.0 | 0.0 | 15.0 | 0.0 | 61.1 | 0.0 | 0.0 | | | |
| LnGrp LOS | D | A | A | A | B | | E | A | | | | |
| Approach Vol, veh/h | | 1228 | | | 480 | A | | 203 | A | | | |
| Approach Delay, s/veh | | 15.6 | | | 15.0 | | | 61.1 | | | | |
| Approach LOS | | B | | | B | | | E | | | | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 90.0 | | | 21.2 | 68.8 | | 20.5 | | | | |
| Change Period (Y+Rc), s | | 4.5 | | | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | | 85.5 | | | 29.5 | 51.5 | | 25.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.0 | | | 15.5 | 10.7 | | 15.4 | | | | |
| Green Ext Time (p_c), s | | 6.6 | | | 1.2 | 3.1 | | 0.7 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 20.3 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

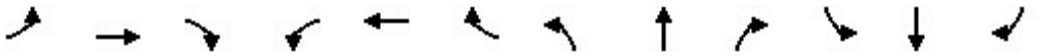


| Lane Group | EBT | WBL | WBT | SBT | SBR |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 998 | 86 | 598 | 336 | 793 |
| v/c Ratio | 0.79 | 1.18 | 0.47 | 0.34 | 0.84 |
| Control Delay | 39.0 | 197.0 | 37.2 | 15.4 | 28.0 |
| Queue Delay | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.1 | 197.0 | 37.2 | 15.4 | 28.0 |
| Queue Length 50th (ft) | 354 | ~66 | 254 | 134 | 424 |
| Queue Length 95th (ft) | 439 | #166 | 313 | 195 | 641 |
| Internal Link Dist (ft) | 294 | | 583 | 540 | |
| Turn Bay Length (ft) | | 260 | | | 500 |
| Base Capacity (vph) | 1268 | 73 | 1282 | 998 | 944 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 22 | 0 | 0 | 8 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.80 | 1.18 | 0.47 | 0.34 | 0.84 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 804 | 114 | 79 | 550 | 0 | 0 | 0 | 0 | 308 | 1 | 730 |
| Future Volume (veh/h) | 0 | 804 | 114 | 79 | 550 | 0 | 0 | 0 | 0 | 308 | 1 | 730 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | | | | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 0 | 874 | 124 | 86 | 598 | 0 | | | | 335 | 1 | 793 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1133 | 161 | 125 | 1288 | 0 | | | | 999 | 3 | 892 |
| Arrive On Green | 0.00 | 0.36 | 0.36 | 0.36 | 0.36 | 0.00 | | | | 0.56 | 0.56 | 0.56 |
| Sat Flow, veh/h | 0 | 3218 | 443 | 564 | 3647 | 0 | | | | 1776 | 5 | 1585 |
| Grp Volume(v), veh/h | 0 | 497 | 501 | 86 | 598 | 0 | | | | 336 | 0 | 793 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1791 | 564 | 1777 | 0 | | | | 1782 | 0 | 1585 |
| Q Serve(g_s), s | 0.0 | 29.7 | 29.7 | 13.8 | 15.5 | 0.0 | | | | 12.2 | 0.0 | 52.6 |
| Cycle Q Clear(g_c), s | 0.0 | 29.7 | 29.7 | 43.5 | 15.5 | 0.0 | | | | 12.2 | 0.0 | 52.6 |
| Prop In Lane | 0.00 | | 0.25 | 1.00 | | 0.00 | | | | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 644 | 649 | 125 | 1288 | 0 | | | | 1002 | 0 | 892 |
| V/C Ratio(X) | 0.00 | 0.77 | 0.77 | 0.69 | 0.46 | 0.00 | | | | 0.34 | 0.00 | 0.89 |
| Avail Cap(c_a), veh/h | 0 | 644 | 649 | 125 | 1288 | 0 | | | | 1002 | 0 | 892 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 0.88 | 0.88 | 0.00 | | | | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 33.9 | 33.9 | 54.8 | 29.3 | 0.0 | | | | 14.2 | 0.0 | 23.0 |
| Incr Delay (d2), s/veh | 0.0 | 8.7 | 8.6 | 24.0 | 1.1 | 0.0 | | | | 0.9 | 0.0 | 12.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 13.8 | 13.9 | 3.4 | 6.5 | 0.0 | | | | 4.9 | 0.0 | 21.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 42.6 | 42.5 | 78.8 | 30.4 | 0.0 | | | | 15.1 | 0.0 | 35.9 |
| LnGrp LOS | A | D | D | E | C | A | | | | B | A | D |
| Approach Vol, veh/h | | 998 | | | 684 | | | | | | 1129 | |
| Approach Delay, s/veh | | 42.5 | | | 36.5 | | | | | | 29.7 | |
| Approach LOS | | D | | | D | | | | | | C | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 48.0 | | 72.0 | | 48.0 | | | | | | |
| Change Period (Y+Rc), s | | 4.5 | | 4.5 | | 4.5 | | | | | | |
| Max Green Setting (Gmax), s | | 43.5 | | 67.5 | | 43.5 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 31.7 | | 54.6 | | 45.5 | | | | | | |
| Green Ext Time (p_c), s | | 4.6 | | 4.5 | | 0.0 | | | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 35.9 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.7 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 9 | 904 | 1268 | 15 | 5 | 9 |
| Future Vol, veh/h | 9 | 904 | 1268 | 15 | 5 | 9 |
| Conflicting Peds, #/hr | 717 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 983 | 1378 | 16 | 5 | 10 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 2111 | 0 | - | 0 | 2615 | 1414 |
| Stage 1 | - | - | - | - | 2103 | - |
| Stage 2 | - | - | - | - | 512 | - |
| Critical Hdwy | 4.14 | - | - | - | 6.84 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.84 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.84 | - |
| Follow-up Hdwy | 2.22 | - | - | - | 3.52 | 3.32 |
| Pot Cap-1 Maneuver | 256 | - | - | - | 20 | 127 |
| Stage 1 | - | - | - | - | 80 | - |
| Stage 2 | - | - | - | - | 567 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 81 | - | - | - | ~ 2 | 40 |
| Mov Cap-2 Maneuver | - | - | - | - | 18 | - |
| Stage 1 | - | - | - | - | 22 | - |
| Stage 2 | - | - | - | - | 180 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.5 | 0 | 235.8 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 81 | - | - | - | 28 |
| HCM Lane V/C Ratio | 0.121 | - | - | - | 0.543 |
| HCM Control Delay (s) | 55.5 | - | - | - | 235.8 |
| HCM Lane LOS | F | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.4 | - | - | - | 1.7 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 4 | 854 | 1156 | 94 | 39 | 5 |
| Future Vol, veh/h | 4 | 854 | 1156 | 94 | 39 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | 100 | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 928 | 1257 | 102 | 42 | 5 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1359 | 0 | - | 0 | 2193 | 629 |
| Stage 1 | - | - | - | - | 1257 | - |
| Stage 2 | - | - | - | - | 936 | - |
| Critical Hdwy | 4.13 | - | - | - | 6.63 | 6.93 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.83 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.43 | - |
| Follow-up Hdwy | 2.219 | - | - | - | 3.519 | 3.319 |
| Pot Cap-1 Maneuver | 504 | - | - | - | 44 | 426 |
| Stage 1 | - | - | - | - | 232 | - |
| Stage 2 | - | - | - | - | 381 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 504 | - | - | - | 44 | 426 |
| Mov Cap-2 Maneuver | - | - | - | - | 150 | - |
| Stage 1 | - | - | - | - | 230 | - |
| Stage 2 | - | - | - | - | 381 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.1 | 0 | 36.3 |
| HCM LOS | | | E |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 504 | - | - | - | 162 |
| HCM Lane V/C Ratio | 0.009 | - | - | - | 0.295 |
| HCM Control Delay (s) | 12.2 | - | - | - | 36.3 |
| HCM Lane LOS | B | - | - | - | E |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 1.2 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 466 | 60 | 9 | 340 | 36 | 5 |
| Future Vol, veh/h | 466 | 60 | 9 | 340 | 36 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 350 | - | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 507 | 65 | 10 | 370 | 39 | 5 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 572 | 0 | 897 | 507 |
| Stage 1 | - | - | - | - | 507 | - |
| Stage 2 | - | - | - | - | 390 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1001 | - | 310 | 566 |
| Stage 1 | - | - | - | - | 605 | - |
| Stage 2 | - | - | - | - | 684 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1001 | - | 306 | 566 |
| Mov Cap-2 Maneuver | - | - | - | - | 306 | - |
| Stage 1 | - | - | - | - | 605 | - |
| Stage 2 | - | - | - | - | 675 | - |

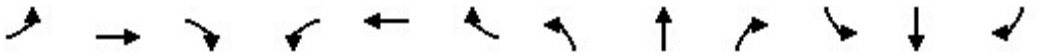
| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0.2 | 17.6 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 306 | 566 | - | - | 1001 | - |
| HCM Lane V/C Ratio | 0.128 | 0.01 | - | - | 0.01 | - |
| HCM Control Delay (s) | 18.5 | 11.4 | - | - | 8.6 | 0 |
| HCM Lane LOS | C | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | 0 | - | - | 0 | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 65 | 250 | 104 | 11 | 587 | 223 | 28 | 68 |
| v/c Ratio | 0.33 | 0.43 | 0.19 | 0.05 | 0.77 | 0.26 | 0.03 | 0.08 |
| Control Delay | 43.6 | 47.8 | 15.8 | 34.9 | 50.8 | 12.9 | 5.7 | 2.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 43.6 | 47.8 | 15.8 | 34.9 | 50.8 | 12.9 | 5.7 | 2.6 |
| Queue Length 50th (ft) | 40 | 159 | 24 | 7 | 224 | 76 | 2 | 0 |
| Queue Length 95th (ft) | 60 | 173 | 45 | 22 | 272 | 137 | 16 | 17 |
| Internal Link Dist (ft) | | 416 | | | 760 | | 382 | 154 |
| Turn Bay Length (ft) | 200 | | 100 | 80 | | 90 | | |
| Base Capacity (vph) | 219 | 877 | 800 | 389 | 1221 | 890 | 1013 | 810 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.30 | 0.29 | 0.13 | 0.03 | 0.48 | 0.25 | 0.03 | 0.08 |

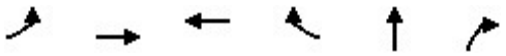
Intersection Summary



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 60 | 230 | 96 | 10 | 529 | 11 | 205 | 5 | 21 | 6 | 0 | 56 |
| Future Volume (veh/h) | 60 | 230 | 96 | 10 | 529 | 11 | 205 | 5 | 21 | 6 | 0 | 56 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 65 | 250 | 104 | 11 | 575 | 12 | 223 | 5 | 23 | 7 | 0 | 61 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 165 | 512 | 434 | 226 | 698 | 15 | 946 | 190 | 872 | 97 | 23 | 762 |
| Arrive On Green | 0.04 | 0.27 | 0.27 | 0.20 | 0.20 | 0.20 | 0.07 | 0.65 | 0.65 | 0.54 | 0.00 | 0.54 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 1027 | 3560 | 74 | 1781 | 291 | 1338 | 119 | 43 | 1412 |
| Grp Volume(v), veh/h | 65 | 250 | 104 | 11 | 287 | 300 | 223 | 0 | 28 | 68 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 1027 | 1777 | 1857 | 1781 | 0 | 1629 | 1574 | 0 | 0 |
| Q Serve(g_s), s | 3.4 | 13.4 | 6.1 | 1.1 | 18.6 | 18.6 | 6.3 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 3.4 | 13.4 | 6.1 | 5.2 | 18.6 | 18.6 | 6.3 | 0.0 | 0.7 | 2.4 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.04 | 1.00 | | 0.82 | 0.10 | | 0.90 |
| Lane Grp Cap(c), veh/h | 165 | 512 | 434 | 226 | 348 | 364 | 946 | 0 | 1061 | 883 | 0 | 0 |
| V/C Ratio(X) | 0.39 | 0.49 | 0.24 | 0.05 | 0.82 | 0.82 | 0.24 | 0.00 | 0.03 | 0.08 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 250 | 881 | 746 | 380 | 614 | 642 | 1177 | 0 | 1061 | 883 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.97 | 0.97 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 36.7 | 36.5 | 33.9 | 42.6 | 46.3 | 46.3 | 9.4 | 0.0 | 7.4 | 13.3 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 1.5 | 0.7 | 0.3 | 0.1 | 4.9 | 4.7 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.5 | 6.1 | 2.3 | 0.3 | 8.3 | 8.6 | 2.5 | 0.0 | 0.3 | 0.9 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 38.2 | 37.2 | 34.2 | 42.7 | 51.2 | 51.0 | 9.5 | 0.0 | 7.5 | 13.4 | 0.0 | 0.0 |
| LnGrp LOS | D | D | C | D | D | D | A | A | A | B | A | A |
| Approach Vol, veh/h | | 419 | | | 598 | | | 251 | | | 68 | |
| Approach Delay, s/veh | | 36.6 | | | 50.9 | | | 9.3 | | | 13.4 | |
| Approach LOS | | D | | | D | | | A | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 82.7 | | 37.3 | 13.4 | 69.3 | 9.3 | 28.0 | | | | |
| Change Period (Y+Rc), s | | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | | |
| Max Green Setting (Gmax), s | | 54.5 | | 56.5 | 24.5 | 25.5 | 10.5 | 41.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.7 | | 15.4 | 8.3 | 4.4 | 5.4 | 20.6 | | | | |
| Green Ext Time (p_c), s | | 0.1 | | 1.7 | 0.6 | 0.3 | 0.0 | 2.9 | | | | |

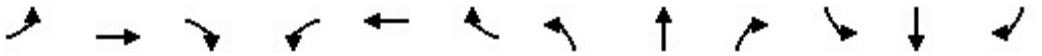
| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 36.7 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |



| Lane Group | EBL | EBT | WBT | WBR | NBT | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 813 | 399 | 614 | 353 | 103 | 103 |
| v/c Ratio | 0.67 | 0.26 | 0.40 | 1.00 | 0.57 | 0.40 |
| Control Delay | 14.1 | 0.5 | 24.7 | 54.2 | 62.7 | 13.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 14.1 | 0.5 | 24.7 | 54.2 | 62.7 | 13.8 |
| Queue Length 50th (ft) | 64 | 5 | 170 | 0 | 77 | 0 |
| Queue Length 95th (ft) | m102 | m8 | 218 | #189 | 131 | 51 |
| Internal Link Dist (ft) | | 583 | 416 | | 378 | |
| Turn Bay Length (ft) | | | | | | 250 |
| Base Capacity (vph) | 1220 | 1531 | 1518 | 353 | 376 | 417 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.67 | 0.26 | 0.40 | 1.00 | 0.27 | 0.25 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

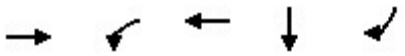


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 748 | 367 | 0 | 0 | 565 | 325 | 95 | 0 | 95 | 0 | 0 | 0 |
| Future Volume (veh/h) | 748 | 367 | 0 | 0 | 565 | 325 | 95 | 0 | 95 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 0 | 0 | 1870 | 1870 | 1870 | 1870 | 1870 | | | |
| Adj Flow Rate, veh/h | 813 | 399 | 0 | 0 | 614 | 0 | 103 | 0 | 0 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 848 | 1333 | 0 | 0 | 1526 | | 132 | 0 | | | | |
| Arrive On Green | 0.41 | 1.00 | 0.00 | 0.00 | 0.43 | 0.00 | 0.07 | 0.00 | 0.00 | | | |
| Sat Flow, veh/h | 3456 | 1870 | 0 | 0 | 3647 | 1585 | 1781 | 0 | 1585 | | | |
| Grp Volume(v), veh/h | 813 | 399 | 0 | 0 | 614 | 0 | 103 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 0 | 0 | 1777 | 1585 | 1781 | 0 | 1585 | | | |
| Q Serve(g_s), s | 27.4 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 6.8 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 27.4 | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 6.8 | 0.0 | 0.0 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 848 | 1333 | 0 | 0 | 1526 | | 132 | 0 | | | | |
| V/C Ratio(X) | 0.96 | 0.30 | 0.00 | 0.00 | 0.40 | | 0.78 | 0.00 | | | | |
| Avail Cap(c_a), veh/h | 850 | 1333 | 0 | 0 | 1526 | | 379 | 0 | | | | |
| HCM Platoon Ratio | 1.67 | 1.67 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.20 | 0.20 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 34.8 | 0.0 | 0.0 | 0.0 | 23.6 | 0.0 | 54.6 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 6.7 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 9.5 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 10.0 | 0.0 | 0.0 | 0.0 | 5.8 | 0.0 | 3.4 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 41.5 | 0.1 | 0.0 | 0.0 | 23.8 | 0.0 | 64.1 | 0.0 | 0.0 | | | |
| LnGrp LOS | D | A | A | A | C | | E | A | | | | |
| Approach Vol, veh/h | | 1212 | | | 614 | A | | 103 | A | | | |
| Approach Delay, s/veh | | 27.9 | | | 23.8 | | | 64.1 | | | | |
| Approach LOS | | C | | | C | | | E | | | | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 90.0 | | | 34.0 | 56.0 | | 13.4 | | | | |
| Change Period (Y+Rc), s | | 4.5 | | | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | | 85.5 | | | 29.5 | 51.5 | | 25.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.0 | | | 29.4 | 16.3 | | 8.8 | | | | |
| Green Ext Time (p_c), s | | 2.4 | | | 0.0 | 4.1 | | 0.4 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 28.5 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

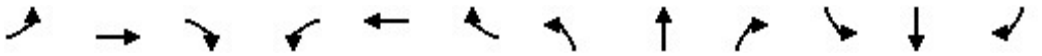


| Lane Group | EBT | WBL | WBT | SBT | SBR |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 1210 | 90 | 620 | 124 | 240 |
| v/c Ratio | 0.95 | 1.48 | 0.48 | 0.12 | 0.26 |
| Control Delay | 53.6 | 319.8 | 50.3 | 12.8 | 7.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 53.6 | 319.8 | 50.3 | 12.8 | 7.5 |
| Queue Length 50th (ft) | 472 | ~93 | 272 | 43 | 45 |
| Queue Length 95th (ft) | #622 | #200 | 333 | 74 | 88 |
| Internal Link Dist (ft) | 294 | | 583 | 540 | |
| Turn Bay Length (ft) | | 260 | | | 500 |
| Base Capacity (vph) | 1269 | 61 | 1282 | 999 | 939 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.95 | 1.48 | 0.48 | 0.12 | 0.26 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 990 | 123 | 83 | 570 | 0 | 0 | 0 | 0 | 110 | 4 | 221 |
| Future Volume (veh/h) | 0 | 990 | 123 | 83 | 570 | 0 | 0 | 0 | 0 | 110 | 4 | 221 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | | | | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 0 | 1076 | 134 | 90 | 620 | 0 | | | | 120 | 4 | 240 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1153 | 143 | 77 | 1288 | 0 | | | | 971 | 32 | 892 |
| Arrive On Green | 0.00 | 0.36 | 0.36 | 0.36 | 0.36 | 0.00 | | | | 0.56 | 0.56 | 0.56 |
| Sat Flow, veh/h | 0 | 3274 | 396 | 462 | 3647 | 0 | | | | 1726 | 58 | 1585 |
| Grp Volume(v), veh/h | 0 | 601 | 609 | 90 | 620 | 0 | | | | 124 | 0 | 240 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1799 | 462 | 1777 | 0 | | | | 1784 | 0 | 1585 |
| Q Serve(g_s), s | 0.0 | 39.1 | 39.2 | 4.3 | 16.2 | 0.0 | | | | 3.9 | 0.0 | 9.4 |
| Cycle Q Clear(g_c), s | 0.0 | 39.1 | 39.2 | 43.5 | 16.2 | 0.0 | | | | 3.9 | 0.0 | 9.4 |
| Prop In Lane | 0.00 | | 0.22 | 1.00 | | 0.00 | | | | 0.97 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 644 | 652 | 77 | 1288 | 0 | | | | 1004 | 0 | 892 |
| V/C Ratio(X) | 0.00 | 0.93 | 0.93 | 1.18 | 0.48 | 0.00 | | | | 0.12 | 0.00 | 0.27 |
| Avail Cap(c_a), veh/h | 0 | 644 | 652 | 77 | 1288 | 0 | | | | 1004 | 0 | 892 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 0.92 | 0.92 | 0.00 | | | | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 36.8 | 36.9 | 59.5 | 29.5 | 0.0 | | | | 12.3 | 0.0 | 13.5 |
| Incr Delay (d2), s/veh | 0.0 | 22.3 | 22.4 | 153.4 | 1.2 | 0.0 | | | | 0.3 | 0.0 | 0.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 20.0 | 20.4 | 5.5 | 6.8 | 0.0 | | | | 1.6 | 0.0 | 3.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 59.1 | 59.3 | 212.9 | 30.7 | 0.0 | | | | 12.6 | 0.0 | 14.3 |
| LnGrp LOS | A | E | E | F | C | A | | | | B | A | B |
| Approach Vol, veh/h | | 1210 | | | 710 | | | | | | 364 | |
| Approach Delay, s/veh | | 59.2 | | | 53.8 | | | | | | 13.7 | |
| Approach LOS | | E | | | D | | | | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 48.0 | | 72.0 | | 48.0 | | | | | | |
| Change Period (Y+Rc), s | | 4.5 | | 4.5 | | 4.5 | | | | | | |
| Max Green Setting (Gmax), s | | 43.5 | | 67.5 | | 43.5 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 41.2 | | 11.4 | | 45.5 | | | | | | |
| Green Ext Time (p_c), s | | 1.5 | | 1.5 | | 0.0 | | | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 50.3 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 13.3 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 12 | 1088 | 764 | 7 | 19 | 45 |
| Future Vol, veh/h | 12 | 1088 | 764 | 7 | 19 | 45 |
| Conflicting Peds, #/hr | 717 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 13 | 1183 | 830 | 8 | 21 | 49 |

| Major/Minor | Major1 | | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|---|
| Conflicting Flow All | 1555 | 0 | - | 0 | 2169 | 1136 | |
| Stage 1 | - | - | - | - | 1551 | - | |
| Stage 2 | - | - | - | - | 618 | - | |
| Critical Hdwy | 4.14 | - | - | - | 6.84 | 6.94 | |
| Critical Hdwy Stg 1 | - | - | - | - | 5.84 | - | |
| Critical Hdwy Stg 2 | - | - | - | - | 5.84 | - | |
| Follow-up Hdwy | 2.22 | - | - | - | 3.52 | 3.32 | |
| Pot Cap-1 Maneuver | 422 | - | - | - | 40 | 196 | |
| Stage 1 | - | - | - | - | 161 | - | |
| Stage 2 | - | - | - | - | 500 | - | |
| Platoon blocked, % | | - | - | - | | | |
| Mov Cap-1 Maneuver | 134 | - | - | - | ~ 4 | 62 | |
| Mov Cap-2 Maneuver | - | - | - | - | 34 | - | |
| Stage 1 | - | - | - | - | 46 | - | |
| Stage 2 | - | - | - | - | 159 | - | |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.4 | 0 | $ 394.9 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 134 | - | - | - | 50 |
| HCM Lane V/C Ratio | 0.097 | - | - | - | 1.391 |
| HCM Control Delay (s) | 34.7 | - | - | - | $ 394.9 |
| HCM Lane LOS | D | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.3 | - | - | - | 6.5 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.2 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 1012 | 750 | 37 | 64 | 1 |
| Future Vol, veh/h | 0 | 1012 | 750 | 37 | 64 | 1 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | 100 | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 0 | 1100 | 815 | 40 | 70 | 1 |

| Major/Minor | Major1 | | | Major2 | | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 855 | 0 | - | 0 | 1915 | 408 |
| Stage 1 | - | - | - | - | 815 | - |
| Stage 2 | - | - | - | - | 1100 | - |
| Critical Hdwy | 4.13 | - | - | - | 6.63 | 6.93 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.83 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.43 | - |
| Follow-up Hdwy | 2.219 | - | - | - | 3.519 | 3.319 |
| Pot Cap-1 Maneuver | 783 | - | - | - | ~ 67 | 593 |
| Stage 1 | - | - | - | - | 397 | - |
| Stage 2 | - | - | - | - | 318 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 783 | - | - | - | ~ 67 | 593 |
| Mov Cap-2 Maneuver | - | - | - | - | 191 | - |
| Stage 1 | - | - | - | - | 397 | - |
| Stage 2 | - | - | - | - | 318 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 34 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 783 | - | - | - | 193 |
| HCM Lane V/C Ratio | - | - | - | - | 0.366 |
| HCM Control Delay (s) | 0 | - | - | - | 34 |
| HCM Lane LOS | A | - | - | - | D |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 1.6 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 240 | 18 | 3 | 492 | 58 | 8 |
| Future Vol, veh/h | 240 | 18 | 3 | 492 | 58 | 8 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 350 | - | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 261 | 20 | 3 | 535 | 63 | 9 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 281 | 0 | 802 | 261 |
| Stage 1 | - | - | - | - | 261 | - |
| Stage 2 | - | - | - | - | 541 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1282 | - | 353 | 778 |
| Stage 1 | - | - | - | - | 783 | - |
| Stage 2 | - | - | - | - | 583 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1282 | - | 352 | 778 |
| Mov Cap-2 Maneuver | - | - | - | - | 352 | - |
| Stage 1 | - | - | - | - | 783 | - |
| Stage 2 | - | - | - | - | 581 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0 | 16.5 |
| HCM LOS | | | C |

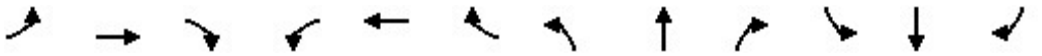
| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 352 | 778 | - | - | 1282 | - |
| HCM Lane V/C Ratio | 0.179 | 0.011 | - | - | 0.003 | - |
| HCM Control Delay (s) | 17.4 | 9.7 | - | - | 7.8 | 0 |
| HCM Lane LOS | C | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.6 | 0 | - | - | 0 | - |



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 79 | 543 | 253 | 25 | 384 | 162 | 17 | 76 |
| v/c Ratio | 0.23 | 0.78 | 0.36 | 0.19 | 0.37 | 0.22 | 0.02 | 0.11 |
| Control Delay | 38.9 | 59.5 | 26.5 | 33.3 | 34.1 | 16.5 | 8.0 | 11.4 |
| Queue Delay | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 38.9 | 60.0 | 26.5 | 33.3 | 34.1 | 16.5 | 8.0 | 11.4 |
| Queue Length 50th (ft) | 57 | 427 | 112 | 15 | 127 | 60 | 0 | 9 |
| Queue Length 95th (ft) | m88 | 491 | 166 | 35 | 147 | 123 | 14 | 50 |
| Internal Link Dist (ft) | | 416 | | | 760 | | 382 | 154 |
| Turn Bay Length (ft) | 200 | | 100 | 80 | | 90 | | |
| Base Capacity (vph) | 342 | 1047 | 960 | 208 | 1603 | 753 | 885 | 711 |
| Starvation Cap Reductn | 0 | 197 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.64 | 0.26 | 0.12 | 0.24 | 0.22 | 0.02 | 0.11 |

Intersection Summary

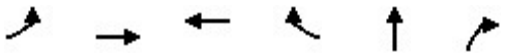
m Volume for 95th percentile queue is metered by upstream signal.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 73 | 500 | 233 | 23 | 346 | 7 | 149 | 1 | 15 | 11 | 6 | 52 |
| Future Volume (veh/h) | 73 | 500 | 233 | 23 | 346 | 7 | 149 | 1 | 15 | 11 | 6 | 52 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 79 | 543 | 253 | 25 | 376 | 8 | 162 | 1 | 16 | 12 | 7 | 57 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 309 | 635 | 538 | 107 | 914 | 19 | 845 | 55 | 882 | 134 | 94 | 579 |
| Arrive On Green | 0.05 | 0.34 | 0.34 | 0.26 | 0.26 | 0.26 | 0.06 | 0.59 | 0.59 | 0.49 | 0.49 | 0.49 |
| Sat Flow, veh/h | 1781 | 1870 | 1585 | 682 | 3558 | 76 | 1781 | 94 | 1505 | 203 | 193 | 1190 |
| Grp Volume(v), veh/h | 79 | 543 | 253 | 25 | 188 | 196 | 162 | 0 | 17 | 76 | 0 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 1870 | 1585 | 682 | 1777 | 1857 | 1781 | 0 | 1599 | 1587 | 0 | 0 |
| Q Serve(g_s), s | 3.8 | 32.4 | 15.1 | 4.2 | 10.5 | 10.6 | 5.2 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 |
| Cycle Q Clear(g_c), s | 3.8 | 32.4 | 15.1 | 26.8 | 10.5 | 10.6 | 5.2 | 0.0 | 0.5 | 3.0 | 0.0 | 0.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 0.04 | 1.00 | | 0.94 | 0.16 | | 0.75 |
| Lane Grp Cap(c), veh/h | 309 | 635 | 538 | 107 | 456 | 477 | 845 | 0 | 937 | 806 | 0 | 0 |
| V/C Ratio(X) | 0.26 | 0.86 | 0.47 | 0.23 | 0.41 | 0.41 | 0.19 | 0.00 | 0.02 | 0.09 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h | 355 | 1052 | 892 | 242 | 807 | 843 | 950 | 0 | 937 | 806 | 0 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.82 | 0.82 | 0.82 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh | 29.9 | 36.9 | 31.2 | 54.0 | 37.0 | 37.1 | 12.5 | 0.0 | 10.4 | 16.6 | 0.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.4 | 3.2 | 0.5 | 1.1 | 0.6 | 0.6 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.6 | 14.7 | 5.5 | 0.7 | 4.4 | 4.6 | 2.1 | 0.0 | 0.2 | 1.2 | 0.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 30.2 | 40.1 | 31.7 | 55.1 | 37.6 | 37.6 | 12.6 | 0.0 | 10.5 | 16.8 | 0.0 | 0.0 |
| LnGrp LOS | C | D | C | E | D | D | B | A | B | B | A | A |
| Approach Vol, veh/h | | 875 | | | 409 | | | 179 | | | 76 | |
| Approach Delay, s/veh | | 36.8 | | | 38.7 | | | 12.4 | | | 16.8 | |
| Approach LOS | | D | | | D | | | B | | | B | |

| Timer - Assigned Phs | | 2 | | 4 | 5 | 6 | 7 | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 74.8 | | 45.2 | 11.9 | 62.8 | 9.9 | 35.3 | | | | |
| Change Period (Y+Rc), s | | 4.5 | | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | | | |
| Max Green Setting (Gmax), s | | 43.5 | | 67.5 | 14.5 | 24.5 | 8.5 | 54.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.5 | | 34.4 | 7.2 | 5.0 | 5.8 | 28.8 | | | | |
| Green Ext Time (p_c), s | | 0.1 | | 4.4 | 0.2 | 0.3 | 0.0 | 2.0 | | | | |

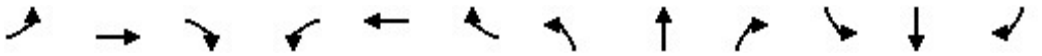
| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 33.5 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |



| Lane Group | EBL | EBT | WBT | WBR | NBT | NBR |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 411 | 817 | 480 | 229 | 203 | 159 |
| v/c Ratio | 0.40 | 0.57 | 0.32 | 1.00 | 0.73 | 0.42 |
| Control Delay | 21.7 | 7.9 | 23.4 | 67.3 | 62.5 | 9.6 |
| Queue Delay | 0.0 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.7 | 9.5 | 23.4 | 67.3 | 62.5 | 9.6 |
| Queue Length 50th (ft) | 60 | 478 | 126 | 0 | 151 | 0 |
| Queue Length 95th (ft) | m130 | 657 | 168 | #161 | 220 | 57 |
| Internal Link Dist (ft) | | 583 | 416 | | 378 | |
| Turn Bay Length (ft) | | | | | | 250 |
| Base Capacity (vph) | 1030 | 1429 | 1518 | 229 | 376 | 461 |
| Starvation Cap Reductn | 0 | 412 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.40 | 0.80 | 0.32 | 1.00 | 0.54 | 0.34 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

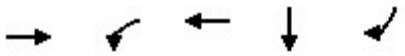


| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 378 | 752 | 0 | 0 | 442 | 211 | 187 | 0 | 146 | 0 | 0 | 0 |
| Future Volume (veh/h) | 378 | 752 | 0 | 0 | 442 | 211 | 187 | 0 | 146 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1870 | 1870 | 0 | 0 | 1870 | 1870 | 1870 | 1870 | 1870 | | | |
| Adj Flow Rate, veh/h | 411 | 817 | 0 | 0 | 480 | 0 | 203 | 0 | 0 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 481 | 1333 | 0 | 0 | 1904 | | 238 | 0 | | | | |
| Arrive On Green | 0.28 | 1.00 | 0.00 | 0.00 | 0.54 | 0.00 | 0.13 | 0.00 | 0.00 | | | |
| Sat Flow, veh/h | 3456 | 1870 | 0 | 0 | 3647 | 1585 | 1781 | 0 | 1585 | | | |
| Grp Volume(v), veh/h | 411 | 817 | 0 | 0 | 480 | 0 | 203 | 0 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | 1728 | 1870 | 0 | 0 | 1777 | 1585 | 1781 | 0 | 1585 | | | |
| Q Serve(g_s), s | 13.5 | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 13.4 | 0.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | 13.5 | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 13.4 | 0.0 | 0.0 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 481 | 1333 | 0 | 0 | 1904 | | 238 | 0 | | | | |
| V/C Ratio(X) | 0.85 | 0.61 | 0.00 | 0.00 | 0.25 | | 0.85 | 0.00 | | | | |
| Avail Cap(c_a), veh/h | 850 | 1333 | 0 | 0 | 1904 | | 379 | 0 | | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.52 | 0.52 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | 42.1 | 0.0 | 0.0 | 0.0 | 15.0 | 0.0 | 50.8 | 0.0 | 0.0 | | | |
| Incr Delay (d2), s/veh | 2.4 | 1.1 | 0.0 | 0.0 | 0.1 | 0.0 | 10.3 | 0.0 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.0 | 0.4 | 0.0 | 0.0 | 3.3 | 0.0 | 6.5 | 0.0 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 44.5 | 1.1 | 0.0 | 0.0 | 15.0 | 0.0 | 61.1 | 0.0 | 0.0 | | | |
| LnGrp LOS | D | A | A | A | B | | E | A | | | | |
| Approach Vol, veh/h | | 1228 | | | 480 | A | | 203 | A | | | |
| Approach Delay, s/veh | | 15.6 | | | 15.0 | | | 61.1 | | | | |
| Approach LOS | | B | | | B | | | E | | | | |
| Timer - Assigned Phs | | 2 | | | 5 | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 90.0 | | | 21.2 | 68.8 | | 20.5 | | | | |
| Change Period (Y+Rc), s | | 4.5 | | | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | | 85.5 | | | 29.5 | 51.5 | | 25.5 | | | | |
| Max Q Clear Time (g_c+I1), s | | 2.0 | | | 15.5 | 10.7 | | 15.4 | | | | |
| Green Ext Time (p_c), s | | 6.6 | | | 1.2 | 3.1 | | 0.7 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.3 |
| HCM 6th LOS | C |

**Notes**

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

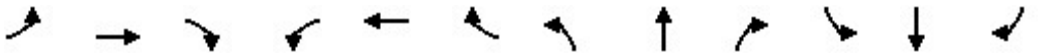


| Lane Group | EBT | WBL | WBT | SBT | SBR |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 998 | 86 | 598 | 336 | 793 |
| v/c Ratio | 0.79 | 1.18 | 0.47 | 0.34 | 0.84 |
| Control Delay | 39.0 | 203.6 | 42.7 | 15.4 | 28.0 |
| Queue Delay | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.1 | 203.6 | 42.7 | 15.4 | 28.0 |
| Queue Length 50th (ft) | 354 | ~66 | 260 | 134 | 424 |
| Queue Length 95th (ft) | 439 | #166 | 318 | 195 | 641 |
| Internal Link Dist (ft) | 294 | | 583 | 540 | |
| Turn Bay Length (ft) | | 260 | | | 500 |
| Base Capacity (vph) | 1268 | 73 | 1282 | 998 | 944 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 22 | 0 | 0 | 8 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.80 | 1.18 | 0.47 | 0.34 | 0.84 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 804 | 114 | 79 | 550 | 0 | 0 | 0 | 0 | 308 | 1 | 730 |
| Future Volume (veh/h) | 0 | 804 | 114 | 79 | 550 | 0 | 0 | 0 | 0 | 308 | 1 | 730 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1870 | 1870 | 1870 | 1870 | 0 | | | | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 0 | 874 | 124 | 86 | 598 | 0 | | | | 335 | 1 | 793 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1133 | 161 | 125 | 1288 | 0 | | | | 999 | 3 | 892 |
| Arrive On Green | 0.00 | 0.36 | 0.36 | 0.36 | 0.36 | 0.00 | | | | 0.56 | 0.56 | 0.56 |
| Sat Flow, veh/h | 0 | 3218 | 443 | 564 | 3647 | 0 | | | | 1776 | 5 | 1585 |
| Grp Volume(v), veh/h | 0 | 497 | 501 | 86 | 598 | 0 | | | | 336 | 0 | 793 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1777 | 1791 | 564 | 1777 | 0 | | | | 1782 | 0 | 1585 |
| Q Serve(g_s), s | 0.0 | 29.7 | 29.7 | 13.8 | 15.5 | 0.0 | | | | 12.2 | 0.0 | 52.6 |
| Cycle Q Clear(g_c), s | 0.0 | 29.7 | 29.7 | 43.5 | 15.5 | 0.0 | | | | 12.2 | 0.0 | 52.6 |
| Prop In Lane | 0.00 | | 0.25 | 1.00 | | 0.00 | | | | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 644 | 649 | 125 | 1288 | 0 | | | | 1002 | 0 | 892 |
| V/C Ratio(X) | 0.00 | 0.77 | 0.77 | 0.69 | 0.46 | 0.00 | | | | 0.34 | 0.00 | 0.89 |
| Avail Cap(c_a), veh/h | 0 | 644 | 649 | 125 | 1288 | 0 | | | | 1002 | 0 | 892 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 0.96 | 0.96 | 0.00 | | | | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 33.9 | 33.9 | 54.8 | 29.3 | 0.0 | | | | 14.2 | 0.0 | 23.0 |
| Incr Delay (d2), s/veh | 0.0 | 8.7 | 8.6 | 25.9 | 1.2 | 0.0 | | | | 0.9 | 0.0 | 12.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 13.8 | 13.9 | 3.5 | 6.6 | 0.0 | | | | 4.9 | 0.0 | 21.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 42.6 | 42.5 | 80.7 | 30.5 | 0.0 | | | | 15.1 | 0.0 | 35.9 |
| LnGrp LOS | A | D | D | F | C | A | | | | B | A | D |
| Approach Vol, veh/h | | 998 | | | 684 | | | | | | 1129 | |
| Approach Delay, s/veh | | 42.5 | | | 36.8 | | | | | | 29.7 | |
| Approach LOS | | D | | | D | | | | | | C | |

| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | | 48.0 | | 72.0 | | 48.0 | | | | | | |
| Change Period (Y+Rc), s | | 4.5 | | 4.5 | | 4.5 | | | | | | |
| Max Green Setting (Gmax), s | | 43.5 | | 67.5 | | 43.5 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 31.7 | | 54.6 | | 45.5 | | | | | | |
| Green Ext Time (p_c), s | | 4.6 | | 4.5 | | 0.0 | | | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 36.0 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.7 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 9 | 904 | 1268 | 15 | 5 | 9 |
| Future Vol, veh/h | 9 | 904 | 1268 | 15 | 5 | 9 |
| Conflicting Peds, #/hr | 717 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 983 | 1378 | 16 | 5 | 10 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 2111 | 0 | - | 0 | 2615 | 1414 |
| Stage 1 | - | - | - | - | 2103 | - |
| Stage 2 | - | - | - | - | 512 | - |
| Critical Hdwy | 4.14 | - | - | - | 6.84 | 6.94 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.84 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.84 | - |
| Follow-up Hdwy | 2.22 | - | - | - | 3.52 | 3.32 |
| Pot Cap-1 Maneuver | 256 | - | - | - | 20 | 127 |
| Stage 1 | - | - | - | - | 80 | - |
| Stage 2 | - | - | - | - | 567 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 81 | - | - | - | ~ 2 | 40 |
| Mov Cap-2 Maneuver | - | - | - | - | 18 | - |
| Stage 1 | - | - | - | - | 22 | - |
| Stage 2 | - | - | - | - | 180 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.5 | 0 | 235.8 |
| HCM LOS | | | F |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 81 | - | - | - | 28 |
| HCM Lane V/C Ratio | 0.121 | - | - | - | 0.543 |
| HCM Control Delay (s) | 55.5 | - | - | - | 235.8 |
| HCM Lane LOS | F | - | - | - | F |
| HCM 95th %tile Q(veh) | 0.4 | - | - | - | 1.7 |

| Notes | | | |
|---|---|---|---|
| ~: Volume exceeds capacity | $: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.8 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 4 | 854 | 1156 | 94 | 39 | 5 |
| Future Vol, veh/h | 4 | 854 | 1156 | 94 | 39 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 10 | - | - | 100 | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 928 | 1257 | 102 | 42 | 5 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1359 | 0 | - | 0 | 2193 | 629 |
| Stage 1 | - | - | - | - | 1257 | - |
| Stage 2 | - | - | - | - | 936 | - |
| Critical Hdwy | 4.13 | - | - | - | 6.63 | 6.93 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.83 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.43 | - |
| Follow-up Hdwy | 2.219 | - | - | - | 3.519 | 3.319 |
| Pot Cap-1 Maneuver | 504 | - | - | - | 44 | 426 |
| Stage 1 | - | - | - | - | 232 | - |
| Stage 2 | - | - | - | - | 381 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 504 | - | - | - | 44 | 426 |
| Mov Cap-2 Maneuver | - | - | - | - | 150 | - |
| Stage 1 | - | - | - | - | 230 | - |
| Stage 2 | - | - | - | - | 381 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Control Delay, s | 0.1 | 0 | 36.3 |
| HCM LOS | | | E |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 504 | - | - | - | 162 |
| HCM Lane V/C Ratio | 0.009 | - | - | - | 0.295 |
| HCM Control Delay (s) | 12.2 | - | - | - | 36.3 |
| HCM Lane LOS | B | - | - | - | E |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 1.2 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 466 | 60 | 9 | 340 | 36 | 5 |
| Future Vol, veh/h | 466 | 60 | 9 | 340 | 36 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | 350 | - | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 507 | 65 | 10 | 370 | 39 | 5 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 572 | 0 | 897 | 507 |
| Stage 1 | - | - | - | - | 507 | - |
| Stage 2 | - | - | - | - | 390 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1001 | - | 310 | 566 |
| Stage 1 | - | - | - | - | 605 | - |
| Stage 2 | - | - | - | - | 684 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1001 | - | 306 | 566 |
| Mov Cap-2 Maneuver | - | - | - | - | 306 | - |
| Stage 1 | - | - | - | - | 605 | - |
| Stage 2 | - | - | - | - | 675 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Control Delay, s | 0 | 0.2 | 17.6 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 306 | 566 | - | - | 1001 | - |
| HCM Lane V/C Ratio | 0.128 | 0.01 | - | - | 0.01 | - |
| HCM Control Delay (s) | 18.5 | 11.4 | - | - | 8.6 | 0 |
| HCM Lane LOS | C | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | 0 | - | - | 0 | - |

November 17, 2023
Mr. Cole Newton
TKC Architecture and Engineering LLC
2004 Carmack Blvd Suite C
Columbia, TN 38401
***Sent via email: cole@tkc-ae.com***
**RE: Water Availability Letter**
**Harley Davidson Blvd Mixed Use**
**Harley Davidson Blvd**
**Tax Map 93, Parcel 2.01**
***Columbia, Maury County, TN***

Dear Mr. Newton:

Columbia Power and Water Systems ("the Utility"/CPWS) is a municipal corporation authorized to provide water services in accordance with State law. CPWS has adopted rules, regulations, and standard operation procedures, prescribing the conditions under which CPWS will furnish water service. In addition, certain State laws delegate authority to the Tennessee Department of Environment and Conservation, various Planning Commissions and other authorities in Cities and Counties. These Cities and Counties have also adopted rules and regulations. Subject to the payment of all charges and fees imposed by CPWS and the approval of any and all required governmental agencies, water service will be made available on a first-come, first-served basis, subject to availability of all CPWS furnished equipment and materials appropriate for the development and provided the applicant complies with all rules and regulations of CPWS and conditions set out herein.

The proposed development includes 98 townhome units, a one-story office building, and 2 two-story retail/residential buildings. CPWS has evaluated the projected water demands for the proposed development in the water system hydraulic model and is able to meet a fire-flow capacity of 1,000 gpm at 20 psi while maintaining the existing level of service and pressures in this portion of the distribution system. CPWS can provide water for the proposed development according to the following requirements:

- **Sprinklers are mandatory for the commercial buildings, based on available flow and the fire requirements as provided by the applicant.**
- Domestic waterline connection will be made to the existing 12-inch water main located on Harley Davidson Boulevard.
- Domestic and fire protection service for each commercial building will be served by a single ultra-sonic fire-rated master meter. Irrigation, if any, will be provided as a separate metered connection.

CPWS

The above requirements are to be constructed and paid for by the Applicant and dedicated to CPWS once complete up to and including the meter. No construction of CPWS infrastructure shall be initiated until final construction plans have been approved by TDEC and all parties have fully executed a water service agreement.

Once you have received this Water Availability Letter, next steps in the process to obtain water service from CPWS are as follows:

- Provide site base CAD files in DWG format, including roads, lot lines, existing and proposed contours, and other existing and proposed utilities, for use in development of water construction drawings.
- Remit to CPWS new water service fees:

| | |
|---|---|
| New Water Service Fee: $1,500 + $370 per SFU (120.8 SFUs) | $46,196.00 |

- CPWS will then develop water construction drawings and submit to TDEC for approval. Upon approval by TDEC and payment of meter and impact fees by the applicant, applicant may then schedule a pre-construction meeting with CPWS. Pre-construction meeting will not be scheduled until fees are paid in full or surety is provided in lieu of full payment. Final meter and impact fees are subject to change based on final design and meter size determination. Meter fees are subject to change based on market costs at time of purchase. Meters will not be set until meter and impact fees are paid.

| | |
|---|---|
| Meter Fee: $540 per 3/4" meter (98 meters) | $52,920.00 |
| Meter Fee: $7,000 per 6" ultra-sonic fire-rated meter (3 meters) | $21,000.00 |
| Impact Fee: $4,500 per 3/4" meter equivalent (98 equivalents) | $441,000.00 |
| Impact Fee: $25,000 per 2" meter equivalent (3 equivalents) | $75,000.00 |
| **Total Meter and Impact Fees Due =** | **$589,920.00** |

- After the pre-construction meeting, CPWS will then issue a formal notice to proceed. No construction of CPWS infrastructure may take place prior to the pre-construction meeting.
- Applicant is then required to construct all public water infrastructure per CPWS standard specifications and provide CPWS personnel unregulated access to the site to inspect the construction of the water infrastructure.

If you have any questions, please feel free to contact me at 423-774-0349 or eric.king@inflodesign.com. This letter is valid for one-hundred twenty (120) days from the date of this letter.

Sincerely,



Eric King, P.E.
Inflo Design Group, LLC
on behalf of Columbia Power and Water Systems

cc: Jonathan Hardin, CPWS
File 23-061

CITY OF COLUMBIA
TENNESSEE

WASTEWATER DEPARTMENT

7 November 2023

Cole Newton
818 South Main St
Columbia, TN 38401

RE: Mixed Use Development, End of Harley Davidson, Adjacent to Pumpkin Creek Townhomes

Cole,

This letter serves as confirmation that the City of Columbia Wastewater Department has the available capacity to service the above-referenced development. Major or minor improvements to existing infrastructure may or may not be necessary to satisfactorily convey the additional sanitary sewer flow from the above-referenced proposed development. Any extension to the existing sewer infrastructure will be initiated by the owner/developer, reviewed by our department and approved by the State of Tennessee. The project must be advanced in accordance with local, state and federal rules, regulations and policies. Funding and construction of those improvements will remain the responsibility of the owner/developer. New customers will be required to pay all fees applicable at the time of connection. No detailed design plan for an extension of the sewer has been proposed at this time.

The site has partial availability already in-place to the north, but availability to the south depends upon other development and a proposed pump station that has not yet been approved, but some comments have been addressed in the planning stages. Capacity in the area may be a concern in the future given other developments in the I-65 area of Bear Creek Pike and may need to be addressed at a later date.

Donnie Boshers, Director
City of Columbia, TN
Wastewater Department

TKC ARCHITECTURE
INTERIORS
CIVIL SITE

818 South Main Street
COLUMBIA, TN 38401
TKC-AE.COM
615.617.7477

November 20th, 2023

Development Services
City of Columbia
700 N. Garden Street
Columbia, TN 38401

Project: Mixed Use Development (adjacent to Pumpkin Creek Townhomes)

Subject: Preliminary Plat Submittal

Staff,

We are requesting preliminary plat approval for a Preliminary Plat for a project located at the end of Harley Davidson Blvd. adjacent to the Pumpkin Creek Townhomes project. The Plat follow the City's Zoning Ordinance 4400. The plat proposes 98 townhomes, two mixed use buildings/properties with first floor commercial and upper story residential and one commercial building/property. We are proposing a playground for the site and we are proposing installing trails and landscaping within the tree save area (not removing any trees that provide canopy cover) to include the space as civil green space.

The included development plan includes the overall site details and detailed landscape plans will be included with the construction plans

If you have any comments or questions please contact Cole Newton at TKC Architecture and Engineering at cole@tkc-ae.com or 615.617.7477.

Thank you,

Cole Newton

Cole Newton, PE, LEED AP
TKC Architecture and Engineering LLC
615.617.7477 (o)
931.797.3323 (c)
cole@tkc-ae.com

CITY OF
COLUMBIA
TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# Preliminary Plat, Site Development Plan, and PUD Checklist

Development: Mixed Use Development (adjacent to Pumpkin Creek Townhomes)

*This checklist shall be completed, and included with the submittal documents. If the submittal does not contain a completed checklist, it shall be deemed incomplete. All below listed items shall be included in the submittal documents and plans, as well as any further information required by the City of Columbia to evaluate compliance and to perform a full and complete review. See Zoning Ordinance Article 8 and Subdivision Regulations.*

**General**

- ☒ Name of development
- ☒ Contact info for the owner and licensed design professional(s) preparing plan: name, address, email, phone
- ☒ Plan sealed by a Design Professional licensed in the State of Tennessee.
- ☒ North Arrow, legend, and site vicinity map
- ☒ Graphic Scale: between 1 in. = 10 ft. and 1 in. =100 ft.
- ☒ Survey stamped by a State of Tennessee Licensed Professional Land Surveyor, with all project boundaries including bearings and angles to the nearest hundredth, utilities, and existing streets and rights-of-way.
- ☒ Note referencing Tennessee State Plane Coordinate System, NAD 83 Datum
- ☒ All property boundaries, existing easements, and encumbrances
- ☒ Parcel identification, owner, and deed and plat references of adjoining properties
- ☒ Proposed phasing and timetable for all phases of development
- ☒ Traffic Impact Study, as required.
- ☒ The substance of all existing and proposed covenants, easements, or other restrictions.

**Lots and Land-Use**

- ☒ The size of total property to be developed in square feet and acres
- ☒ Lot numbers of all proposed lots, with dimensions, locations, and square footage
- ☒ A tabulation of the land area to be devoted to various uses and activities and overall densities.
- ☒ Typical lot layout depicting proposed setbacks, yards, and easements, where applicable

**Structures**

- ☒ Location and approximate dimensions of all existing and proposed structures.
- ☒ Location of all earth retaining structures, with approximate top and bottom of wall elevations.
- ☒ Existing and intended use of all buildings and structures on site, including the number of dwelling units and density, where applicable
- ☒ Location, type, and size of proposed signs (none at this time)
- ☒ Approximate height, bulk, and the utilization of structures including activities and the number of living units.

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

**Grading, Drainage, and Storm**

- ☒ Existing conditions and contours at vertical intervals of not more than two (2) feet
- ☒ General proposed contours at vertical intervals of not more than two (2) feet
- ☒ FEMA Special Flood Hazard Area (SFHA), 100-year Floodplain (F-P), and Floodway (F-W) boundaries with elevations and the exact location of the nearest benchmark. Indicate the Flood Insurance Rate Map (FIRM) panel number, its effective date, and flood insurance zones
- ☒ Location and dimension of aquatic buffer zones (n/a)
- ☒ General layout of the proposed storm drainage system including surface and subsurface drainage systems, areas for detention, and water quality devices.
- ☒ Identification of all critical lots (no proposed critical lots)

**Streets, Parking, and Pedestrian Elements**

- ☒ Proposed street and alley rights-of-way, typical sections, widths, classification, names, and proposed ownership and maintenance responsibility
- ☒ Proposed connections to existing and proposed streets (including classification) located outside the development
- ☒ Proposed improvements as identified in the Traffic Impact Study, as required
- ☒ Existing and proposed sidewalks, trails, and other pedestrian elements
- ☒ Existing and proposed on-street and off-street parking and loading areas
- ☒ Summary of all provided and required parking

**Landscaping, Open Space, and Amenities**

- ☒ Natural features on site including, but not limited to, wetlands, streams, ponds, springs, sinkholes, wells, rock outcroppings, excessive slopes, and forested areas
- ☒ Landscaped areas and buffers with details on proposed plantings, existing vegetation, and other features. (discussed with staff and detailed landscape plans will be provided with site construction plans)
- ☒ The location and size of all common open space, parkland dedications, and dedications and reservations of land for public uses.
- ☒ Any amenity features and structures for private or public benefit. (Playground and Civil Space)
- ☒ Location, dimension, and materials of fences and walls (no walls / fences proposed)
- ☒ Tree Canopy retention

**Utilities**

- ☒ General layout and location of existing and proposed utilities and utility features including, but not limited to potable water, fire hydrants, sanitary sewer, storm sewer, and power and communication facilities.
- ☒ Acknowledgement from water, sewer, and power utility providers that the proposed development may be adequately served with existing infrastructure, or if improvements are required to adequately serve the development, a general statement of the improvements.

CITY OF
COLUMBIA
TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

**PUD Specific Items**

- ❑ Legal Description of Property
- ❑ Owner's Affidavit
- ❑ List of all variances requested
- ❑ The nature of the landholder's interest in the land proposed to be developed and a written statement of concurrence from all parties having a beneficial interest in the affected property.
- ❑ Location and approximate dimensions of all existing and proposed structures including approximate height, bulk, and the utilization of structures including activities and the number of living units. Include architectural renderings of all proposed structures with materials listed.
- ❑ The substance of covenants, grants of easements or other restrictions to be imposed upon the use of the land, buildings and structures including proposed easements for public utilities on the property or documentation of off-site easements.
- ❑ Exterior lighting

*If the application is deemed incomplete by the Zoning Administrator, a written request shall be made within ten days after the original submittal, for further information. In such case the application shall be held in abeyance until deemed complete for final review. No plan shall be formally presented for Planning Commission action until such plan is found complete, compliant with City standards, and ready for review.*

**Checklist Completed By:**

| Cole Newton | Cole Newton | 11/21/23 |
|---|---|---|
| Print Name | Signature | Date |

TKC ARCHITECTURE INTERIORS CIVIL SITE

2004 CARMACK BLVD, SUITE C
COLUMBIA, TN 38401
TKC-AE.COM
615.617.7477

November 20th, 2023

Development Services
City of Columbia
700 N. Garden Street
Columbia, TN 38401

Project: Mixed Use Development – (adjacent to Pumpkin Creek Townhomes)

Subject: Preliminary Plat Submittal Owner's Consent

As the property owner of the property located at Map 93, Parcel 2.01, I hereby give consent for TKC Architecture and Engineering LLC to submit a preliminary plat for approval on our property and represent that the project to the City.

Sincerely,



Owners Signature

CHR Land, LLC – Gary Martin
Owners Printed Name

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | | | |
| | TAX MAP: 93 | GROUP: | PARCEL: 2.01 |
| SUMMARY OF NATURE OF REQUEST AND WORK | To obtain Preliminary Plat approval for Mixed Use Development consisting of 1 commercial lot, 2 live/work lots and 98 townhomes. The submittal follows the 4400 Zoning Ordinance. Included with the submittal is the Preliminary Plat, Site Development Plan, Survey, and Project Letter. | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | 10/11/23 | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ❑ Annexation<br>❑ Rezoning<br>☒ Preliminary Plat<br>❑ Final Plat<br>❑ PUD Preliminary Master Plan<br>❑ PUD Final Site Plan<br>❑ Multi-Family Site Plan<br>❑ Other:<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>❑ Written Legal Description copy<br>❑ Requested Zone Listed<br>❑ Compliance with Comprehensive Plan<br>❑ Annexation Permission Form<br>❑ Plans and/or Plats conforming to City standards with check list completed<br>❑ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>❑ Project Name (include Sections & Phases)<br>Mixed Use Development<br>❑ Total Number of Lots<br>101<br>❑ Total acreage<br>20.90 |

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

All communications go to the Applicant's email that is provided.

| | | | |
|---|---|---|---|
| NAME | TKC Architecture & Engineering LLC | PHONE | 615-617-7477 |
| ADDRESS | 818 S. Main Street, Columbia, TN 38401 | EMAIL | cole@tkc-ae.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | CHR Land LLC | PHONE | 615-812-2147 |
| ADDRESS | 818 S. Main Street, Columbia, TN 38401 | EMAIL | gary@martinengrg.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

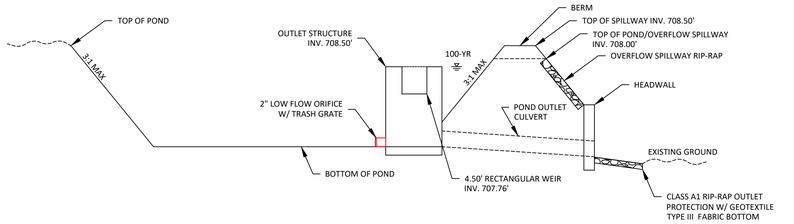
| | | |
|---|---|---|
| Cole Newton (TKC A&E) | Cole Newton | 11/17/23 |
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |
| CHR Land LLC | | 11/17/23 |
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

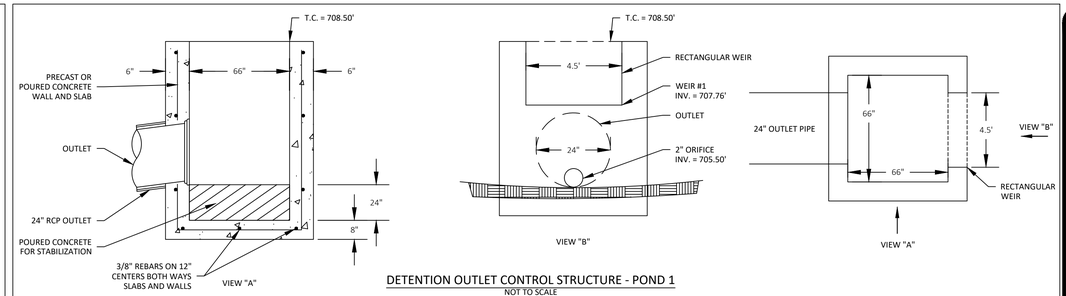
| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |



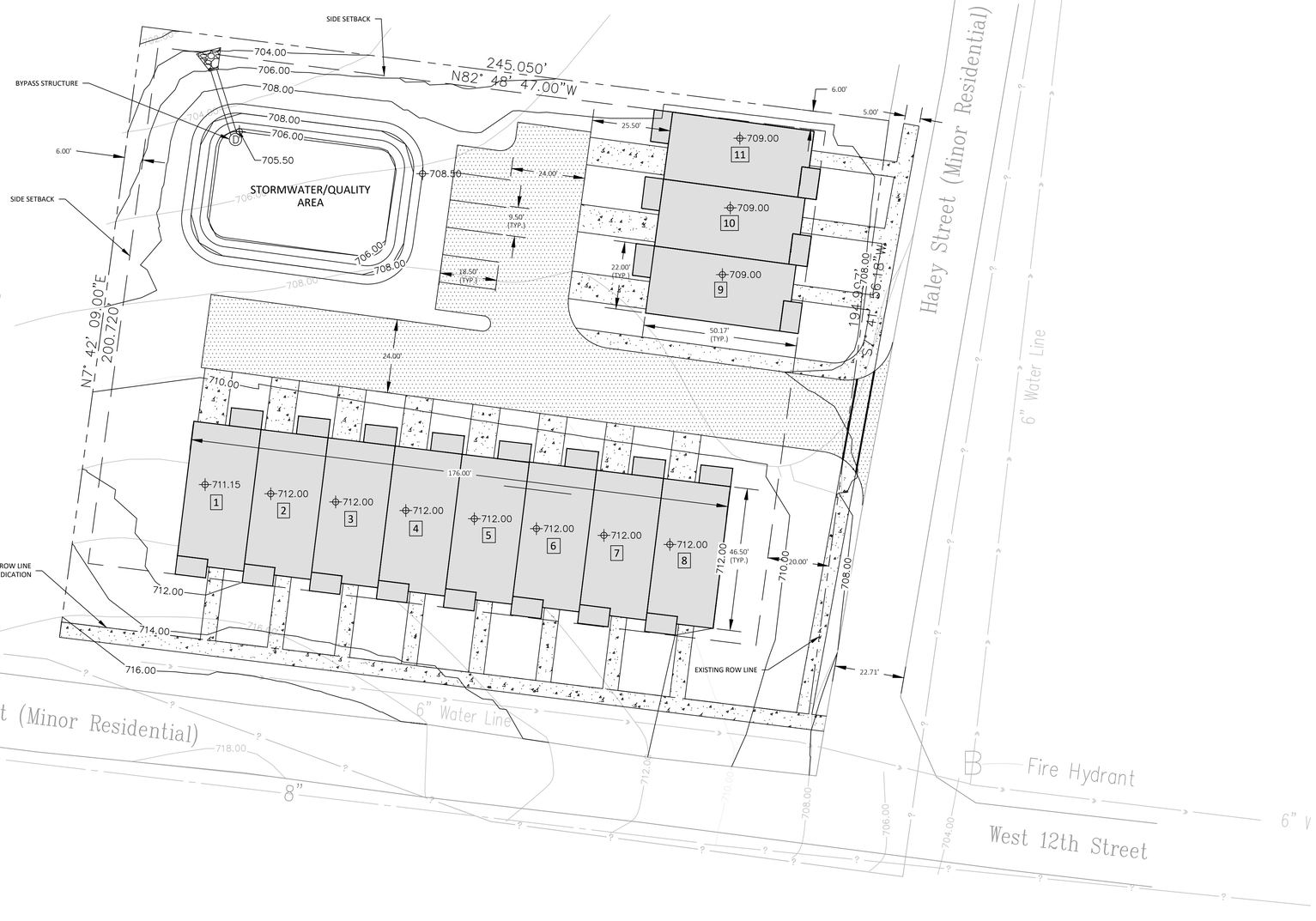

DETENTION POND CROSS-SECTION
NOT TO SCALE




DETENTION OUTLET CONTROL STRUCTURE - POND 1
NOT TO SCALE

Michael H. Gibson
DB R1795, PG 288
ROMC, TN

| POND #1 | | |
|---|---|---|
| Water Quality Voume Calcs for 80% TSS | | |
| **WQ** | **4,987** | $ft^3$ |
| **P** | **2.500** | **in** |
| A | 0.549 | acres |
| IMP Area | 23,936 | sf |
| | | |
| **Orifice size** | **2 inches** | |
| a | 0.008 | sf |
| avg SA | 1,267 | sf |
| C | 0.66 | orifice coefficient |
| T | 24.00 | hours |
| g | 32.2 | $ft/sec^2$ |
| H | 707.76 | ft |
| $H_0$ | 705.5 | ft |




Michael H. Gibson
DB R1795, PG 288
ROMC, TN

## SITE DATA TABLE

| | |
|---|---|
| SITE ADDRESS: | 700 W 12TH ST<br>COLUMBIA, TN 37066 |
| OWNER: | KHATERA SAFI |
| PARCEL ID: | 100E F 02500 000; 100E F 02501 000;<br>100E F 02502 000; 100E F 02503 000 |
| COUNCIL DISTRICT:<br>COUNCIL MEMBER: | 2<br>DEBBIE WILES |
| SITE AREA:<br>SITE AREA W/ 5' ROW DED.: | +/- 1.13 ACRES (49,223 SF)<br>+/- 1.10 ACRES (47,877 SF) |
| EXISTING IMPERVIOUS AREA:<br>PROPOSED IMPERVIOUS AREA:<br>NET IMPERVIOUS AREA: | +/- 0.05 ACRES (2,247 SF)<br>+/- 0.55 ACRES (23,936 SF)<br>+/- 0.50 ACRES (21,689 SF) |
| EXISTING ZONING:<br>PROPOSED ZONING: | CD-3<br>CD-4 |
| EXISTING USE:<br>PROPOSED USE: | SINGLE FAMILY HOME/VACANT<br>RESIDENTIAL/TOWNHOMES |
| # OF UNITS PROVIDED: | 11 UNITS |
| SETBACKS:<br>FRONT:<br>REAR:<br>SIDE: | REQUIRED<br>20'<br>N/A<br>6' |
| MAX BUILDING HEIGHT: | 3 STORIES |
| PARKING REQUIRED:<br>PARKING PROVIDED: | 17 SPCS (1.5 SPCS/UNIT)<br>20 SPCS (11 GARAGE SPCS, 3 DRIVEWAY PADS, 6 PARKING SPCS) |

NOTES:

1. EXISTING SURVEY INFORMATION IS DERIVED FROM A BOUNDARY AND TOPOGRAPHIC SURVEY PROVIDED BY ARROWHEAD SURVEY, DATED 6-2-2021.

0 20 40 Feet

615 DESIGN GROUP
360 QUEENSBERRY CIRCLE, FAIRVIEW, TN 37167
(615) 838-2020
www.615designgroup.com

# 700 W 12TH TOWNHOMES

RESIDENTIAL SITE PLAN SUBMITTAL

700 W 12TH STREET, COLUMBIA, TN 38401

| REVISIONS | | |
|---|---|---|
| NUMBER | DESCRIPTION | DATE |

| | |
|---|---|
| PROJECT #: | 1061001 |
| DESIGNED BY: | CMN |
| DRAWN BY: | CMN |
| DATE: | 11/17/2023 |

SITE PLAN

C2.0

CPWS

January 15, 2024

Mr. Corey Nelsen
615 Design Group
360 Quecreek Circle
Smyrna, TN 37167
***Sent via email: corey@615designgroup.com***

**RE: Water Availability Letter**
**700 W. 12th St. Townhomes – 12 Units**
**Tax Map 100E, Parcel 20500**
***Columbia, Maury County, TN***

Dear Mr. Nelsen:

Columbia Power and Water Systems ("the Utility"/CPWS) is a municipal corporation authorized to provide water services in accordance with State law. CPWS has adopted rules, regulations, and standard operation procedures, prescribing the conditions under which CPWS will furnish water service. In addition, certain State laws delegate authority to the Tennessee Department of Environment and Conservation, various Planning Commissions and other authorities in Cities and Counties. These Cities and Counties have also adopted rules and regulations. Subject to the payment of all charges and fees imposed by CPWS and the approval of any and all required governmental agencies, water service will be made available on a first-come, first-served basis, subject to availability of all CPWS furnished equipment and materials appropriate for the development and provided the applicant complies with all rules and regulations of CPWS and conditions set out herein.

The proposed development consists of 12 units. CPWS has evaluated the projected water demands for the proposed residential development in the water system hydraulic model and is able to meet a fire-flow capacity of 1,000 gpm at 20 psi while maintaining the existing level of service and pressures in this portion of the distribution system. CPWS can provide water for the proposed development according to the following requirements:

- Domestic waterline connections will be made to the existing 8-inch and 6-inch water mains located on Haley Street and West 12th Street.
- Townhomes will be served via gang-meter vaults.

All of the above requirements are to be constructed and paid for by the Applicant and dedicated to CPWS once complete up to and including the meter. No construction of CPWS infrastructure shall be initiated until final construction plans have been approved by TDEC and all parties have fully executed a water service agreement.

Once you have received this Water Availability Letter, next steps in the process to obtain water service from CPWS are as follows:

- Present the attached hydrant analysis report for coordination and approval of development from the Columbia Fire & Rescue Fire Marshall.

- Remit to CPWS new water service fees:

| | |
|---|---|
| New Water Service Fee: $1,500 + $370 per SFU (12 SFUs) | $5,940.00 |

- Provide site utility drawings in PDF format for review and comment. Drawings should include the proposed location of gang vaults and taps.
- Upon resolution of all comments, applicant may then schedule a pre-construction meeting with CPWS, at which time meter and impact fees will be due. Pre-construction meeting will be cancelled unless fees are paid in full or surety is provided in lieu of full payment 48-hours prior to meeting. Final meter and impact fees are subject to change based on final design and meter size determination. Meter fees are subject to change based on market costs at time of purchase. Meters will not be set until meter and impact fees are paid.

| | |
|---|---|
| Meter Fee: $540 per 3/4" meter (12 meters) | $6,480.00 |
| Impact Fee: $4,500 per 3/4" meter (12 meters) | $54,000.00 |
| **Total Meter and Impact Fees Due =** | **$60,480.00** |

- After the pre-construction meeting, CPWS will then issue a formal notice to proceed. No construction of CPWS infrastructure may take place prior to the pre-construction meeting.
- Applicant is then required to construct all public water infrastructure per CPWS standard specifications and provide CPWS personnel unregulated access to the site to inspect the construction of the water infrastructure.

If you have any questions, please feel free to contact me at 423-774-0349 or eric.king@inflodesign.com. This letter is valid for one-hundred twenty (120) days from the date of this letter.

Sincerely,

Eric King, P.E.
Inflo Design Group, LLC
on behalf of Columbia Power and Water Systems

cc: Jonathan Hardin, CPWS
File 23-064

# Columbia Power and Water Systems

## Application for Water Service

This is an application to Columbia Power and Water Systems (CPWS) to evaluate the request for water service for the property set forth in this application, for any parcel of real property requiring new or increased service, or requiring a public water line extension.

This application package consists of this application form, a fire flow requirements letter from the Columbia Fire Marshall, and a digital copy of the site plan of the project (developed in CAD/GIS and submitted in PDF format, no hand-drawn plans will be accepted). All of these documents must be provided to CPWS before any action will be taken on this application.

Project Name: 700 W 12th St - Townhomes

Project Location: 700 W 12th St - Townhomes

Tax Map & Parcel Number(s): 100E F 02500 000; 100E F 02501 000; 100E F 02502 000; 100E F 02503 00(

Is this part of a larger development? ☐ YES

Located within City limits? ☒ YES

Annexation? ☐ YES

Approved by the Planning Commission? ☐ YES

Section/Phase number: Phase 1 of 1

Approximate date water service is desired: 08/01/2024

Please indicate the primary contact for coordination with CPWS (provide contact info for all):

☐ Developer ☐ Owner ☒ Engineer

Developer Name: Khatera Safi

Authorized Representative: Khatera Safi

Title: Owner

*Contact info for Authorized Representative*

Address: 263 Cornice Drive, La Vergne

Telephone: 519-400-7005

Email: kat.safi@yahoo.ca

Property Owner Name (if different):

Authorized Representative:

Title:

Address:

Telephone:

Email:

| | |
|---|---|
| Engineer/Company Name: | 615 Design Group |
| Contact: | Corey Nelsen |
| Title: | Project Engineer |
| Address: | 360 Quecreek Circle, Smyrna TN 37167 |
| Telephone: | 716-499-7719 |
| Email: | corey@615designgroup.com |

**FOR RESIDENTIAL PROJECTS**

| | | | |
|---|---|---|---|
| Number of Single-Family units, this phase (townhome or SFD): | 12 | Total number of planned units (for multi-phase projects): | |

*For Multi-Family Units Only*

Number of 1-bedroom units:

Number of 2-bedroom units:

Number of 3-bedroom units:

Number of 4-bedroom units:

Please describe any additional amenities needing water service (pool house, irrigation for common areas, etc.):

**FOR COMMERCIAL/INSTITUTIONAL PROJECTS**

| | |
|---|---|
| Flow and residual pressure (PSI) required for each type of service: | Fire: |
| | Irrigation: |

For each building, please indicate number of stories and square footage of each use type:

# HYDRANT FLOW ANALYSIS

HYDRANT # & LOCATION: 1144 W 12th St

DATE: 1/15/2024

MODEL BY: Inflo Design Group, LLC

SYS. DEMAND Max Day

DURATION: 2

WATER SUPPLIED BY: Columbia Power and Water Systems

PURPOSE OF TEST: 700 W 12th St Townhomes

## MODEL DATA

| FLOW HYDRANT(S) | 1144 | n/a | n/a |
|---|---|---|---|
| GPM: | **1000** | 0 | 0 |

TOTAL FLOW DURING SIMULATION: **1000** GPM

GAUGE HYDRANT

HYDRANT # & LOCATION:

Hydrant 1144

STATIC 61 PSI RESIDUAL: 56 PSI

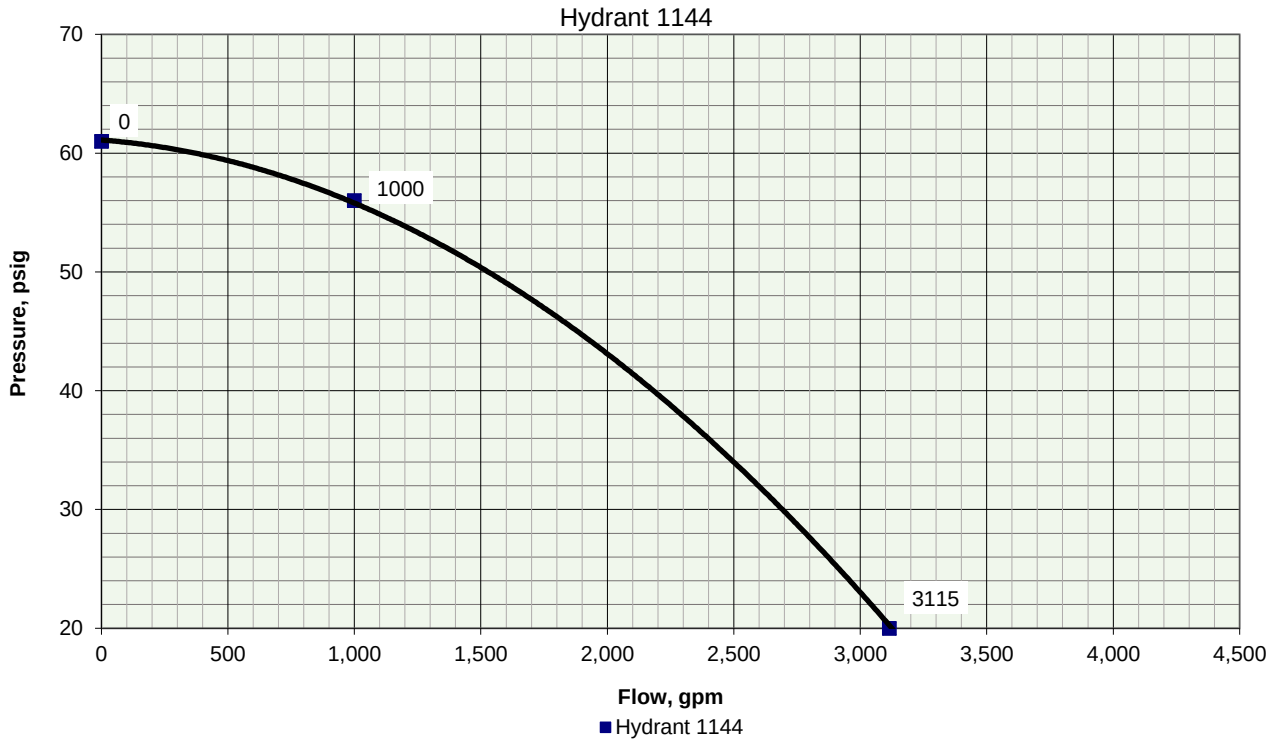
STATIC _____ PSI RESIDUAL: _____ PSI

RESULTS: AT 20 PSI RESIDUAL

CONDITION 1 **3115** GPM

CONDITION 2 **---** GPM

REMARKS: Performance based on service elevations of 701' and current CPWS water infrastructure and does not account for additional losses associated with development piping.



# Columbia Fire & Rescue

## Fire Flow Requirements

Water Purveyor: Columbia Power & Water System

Date: 12/11/2023
Name: Corey Nelsen
Phone: 716-499-7719
Email: corey@615designgroup.com
Address/Parcel ID: 100E F 02500 000; 100E F 02501 000; 100E F 02502 000
Property Type: (•) Residential ( ) Commercial ( ) Industrial
Construction Type: TOWNHOME
Enclosed Area (ft²): 1023 SF PER UNIT (12

---

## FILLED OUT BY COLUMBIA FIRE AND RESCUE

NFPA Sprinkler Type: _____

**Water System Demand without Sprinkler Credit**

*Fire flow Requirements (International Fire Code Appendix B)*

Fire Flow: _____ gpm Duration: _____ hours

*Fire Hydrant Location and Distribution (International Fire Code Appendix C)*

Minimum number of hydrants: _____

Average spacing between hydrants: _____ft.

Maximum distance from frontage to hydrant: _____ ft.

**Water System Demand with Sprinkler Credit**

*Fire flow requirements (International Fire Code Appendix B)*

Fire Flow: _____ gpm Duration: _____ hours

*Fire Hydrant Location and Distribution (International Fire Code Appendix C)*

Minimum number of hydrants: _____

Average spacing between hydrants: _____ft.

Maximum distance from frontage to hydrant: _____ ft.

Fire Plan Reviewer: _____ Date: _____

## Certificate of Ownership and Dedication

I (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon as evidenced in Book Number _____, page _____, Maury County Registers Office, and that I (we) hereby adopt this plan of subdivision with my (our) free consent, establish the minimum building restriction lines, and that offers of irrevocable dedication for all public ways, utilities, and other facilities have been filed.

_____, 20__ _____

Date

_____

Title (if action for partnership or corporation)

## Certificate of Survey Accuracy

I (we) hereby certify that to the best of my (our) knowledge and belief this is a true and accurate survey of the property shown hereon; that this is a Class "1" Land Survey as defined in Title 62, Chapter 18, Tennessee Code Annotaded Annotated, and that the ratio of precision is greater than or equal to 1: 10,000.

JUNE 2, 2021. _____ TN PLS# 1859

Date Registered Land Surveyor Number

## Certificate of Approval of Water System

I hereby certify that the water system(s) outlined or indicated on the final subdivision plat entitled _____ has/have been installed in accordance with current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

_____, 20__ _____

Date Name, Title, Agency of Authorized Approving Agent

## Certificate of Approval of Streets, Drainage, and Utilities

I hereby certify that the streets, drainage and utilities designated in _____ Subdivision have been installed in accordance with City specifications, or a performance bond in the amount of $_____ for streets and drainage has been posted with the City of Columbia, Tennessee, to assure completion of such improvements.

_____ _____

City Engineer Date
Columbia, Tennessee

## Certificate of Approval for Recording

I hereby certify that the subdivision plat shown hereon has been found to comply with the Columbia Subdivision Regulations, with the exception of such variances, if any, as noted in the minutes of the Planning Commission, and that it has been approved for recording in the Office of the County Register.

_____ _____

Secretary, Planning Commission Date
Columbia, Tennessee

## Certificate of Approval of Subdivision Name and Street Names

Subdivision name and street names approved by the City Engineering Department and by E-911 Maury County.

_____ _____

Maury County E911 Date

## Certificate of Approval for Sewer System

I hereby certify that the sewer system outlined or indicated on this final subdivision plat has been installed in accordance with the current local and state government requirements, or a sufficient bond or other surety has been filed to guarantee said installation.

_____ _____

Director of Wastewater Department Date
Columbia, Tennessee

## Certificate of Compliance

I hereby certify that the subdivision plat shown hereon has been found to comply with the Columbia Subdivision Regulations and other adopted ordinances and policies.

_____ _____

City Engineer Date
Columbia, Tennessee

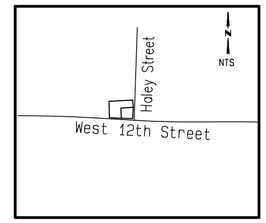
| Lot Area | | |
|---|---|---|
| Lot 1 | 10099 sf | 0.23 Acres |
| Lot 2 | 12291 sf | 0.28 Acres |
| Lot 3 | 12025 sf | 0.28 Acres |

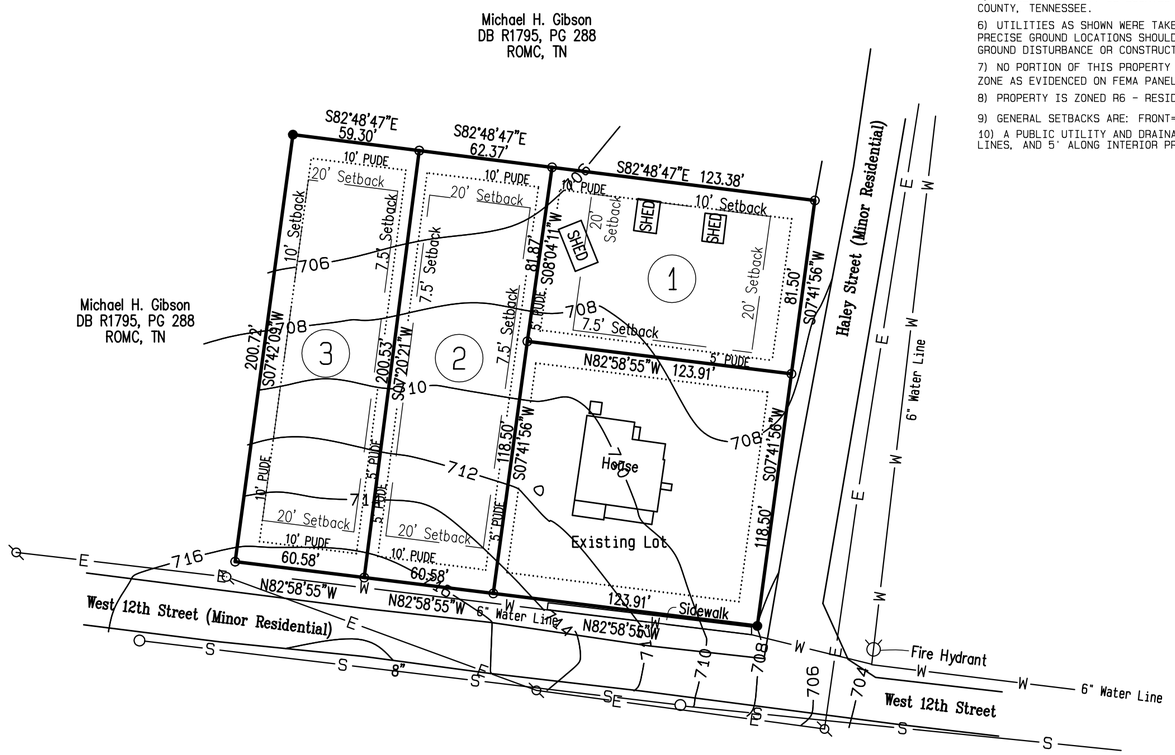
LEGEND
- IRON PIN FOUND
- IRON PIN SET
- UTILITY POLE
- SS MANHOLE
- PUDE LINE
- E ELECTRIC LINE
- W WATER LINE
- S SANITARY SEWER LINE

PUDE= PUBLIC UTILITY & DRAINAGE EASEMENT

GRAPHIC SCALE 1: 50

0 50 100




## GENERAL NOTES

1) THE PURPOSE OF THIS PLAT IS TO DIVIDE PARCEL 25.01 OF MAP 100E INTO 3 LOTS.
2) BEARINGS ARE BASED ON GPS.
3) THIS SURVEY WAS PREPARED USING THE CURRENT DEEDS OF RECORD. NO TITLE REPORT WAS FURNISHED TO THIS SURVEYOR, THEREFORE, THIS SURVEY IS SUBJECT TO THE FINDINGS OF A TITLE SEARCH.
4) ALL DEED BOOK REFERENCES PERTAIN TO REGISTER'S OFFICE OF MAURY, TENNESSEE.
5) SUBJECT PROPERTY IS LOCATED IN THE CITY OF COLUMBIA, 9TH CIVIL DISTRICT, MAURY COUNTY, TENNESSEE.
6) UTILITIES AS SHOWN WERE TAKEN FROM VISIBLE FIELD LOCATIONS. UTILITY DETAILS AND PRECISE GROUND LOCATIONS SHOULD BE OBTAINED FROM THE PROPER AUTHORITIES BEFORE ANY GROUND DISTURBANCE OR CONSTRUCTION IS STARTED.
7) NO PORTION OF THIS PROPERTY IS LOCATED IN AN AREA DESIGNATED AS A 100 YEAR FLOOD ZONE AS EVIDENCED ON FEMA PANEL #47119C0285E OF MAURY COUNTY, TN, DATED 04/16/2007.
8) PROPERTY IS ZONED R6 - RESIDENTIAL
9) GENERAL SETBACKS ARE: FRONT=20'; SIDES=7.5'; REAR=20'.
10) A PUBLIC UTILITY AND DRAINAGE EASEMENT (PUDE) 10' ALONG FRONT AND REAR PROPERTY LINES, AND 5' ALONG INTERIOR PROPERTY LINES IS REQUIRED FOR THIS SITE.


ARROWHEAD SURVEY
4151 OLD HILLSBORO ROAD
FRANKLIN, TN 37064
615-599-7347


J. MARK CANTRELL PROFESSIONAL LAND SURVEYOR XVI AGRICULTURE COMMERCE TENNESSEE NO. 1859

6/2/2021

CITY OF COLUMBIA MUNICIPAL PLANNING COMMISSION
STATE OF TENNESSEE

# FINAL PLAT

| MINOR SUBDIVISION | |
|---|---|
| LOT 1, 2, & 3<br>RECURVE LLC PROPERTY | |
| TOTAL ACRES = 1.13 | TOTAL LOTS =4 |
| MILES NEW ROADS =0.00 | ACRES NEW ROADS = 0.00 |
| PARCEL: 25.01 OF TAX MAP: 100E GROUP: F<br>PLAT BOOK 22, PAGE 151, LOT 1 & 2 | |
| OWNER: RECURVE LLC<br>114 Churchill Place, Franklin, TN 37067 | |
| CIVIL DISTRICT: 9TH / SCALE: 1"= 50' | CLOSURE: 1/15,000 |
| DATE: 6/02/2021 | SHEET 1 OF 1 |

615 DESIGN GROUP

January 16th, 2024,
Development Services
Columbia TN Planning Commission
700 North Garden Street
Columbia, TN 38401

## RE: 700 W 12th Street Townhomes – Request for Rezoning

To whom it may concern,

This memo is to inform you of the intent of my client, Khatera Safi, to rezone the 4 parcels located at the corner of 700 W 12th Street. Parcel IDs are 100E F 02500 000; 100E F 02501 000; 100E F 02502 000; 100E F 02503 000. Currently there is a single-family home with some secondary structures onsite. The Client is seeking to take the current zoning of CD-3 and rezone it to CD-4. Currently there are CD-4 rezones that have occurred on W 12th street between School Street and Parker Street, as well as others in the vicinity.

The client is seeking to conform to all city codes and ordinances set forth in CD-4 with the express intent to develop the property for the use of townhomes.

We have included a Concept Plan for the site and hope to satisfy both the City's and internal department's requirements for this site, along with the City Of Columbia's Comprehensive Plan.

Thank you for your time reading over the rezoning request. If you have any questions at all regarding the request, you may contact me at **716-499-7719** or at corey@615designgroup.com.

Thank you,

Corey Nelsen, P.E.
615 Design Group
360 Quecreek Circle
Smyrna, TN 37167

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

## SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | 700 W 12TH STREET | | |
| | TAX MAP: 100E | GROUP: F | PARCEL: 02500, 02501, 02502, 02503 |
| SUMMARY OF NATURE OF REQUEST AND WORK | REZONE THE PROPERTIES FROM CD-3 TO CD-4 | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | 12-06-2023 | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ❑ Annexation<br>☒ Rezoning<br>❑ Preliminary Plat<br>❑ Final Plat<br>❑ PUD Preliminary Master Plan<br>❑ PUD Final Site Plan<br>❑ Multi-Family Site Plan<br>☒ Other:<br>CONCEPTUAL PLAN<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>❑ Written Legal Description copy<br>☒ Requested Zone Listed<br>☒ Compliance with Comprehensive Plan<br>❑ Annexation Permission Form<br>☒ Plans and/or Plats conforming to City standards with check list completed<br>☒ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>☒ Project Name (include Sections & Phases)<br>700 W 12TH TOWNHOMES<br>☒ Total Number of Lots<br>11 proposed townhome units<br>☒ Total acreage<br>1.13 acres |

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

All communications go to the Applicant's email that is provided.

| | | | |
|---|---|---|---|
| NAME | COREY NELSEN | PHONE | 716-499-7719 |
| ADDRESS | 360 QUECREEK CIRCLE, SMYRNA, TN | EMAIL | corey@615designgroup.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | KHATERA SAFI | PHONE | 519-400-7005 |
| ADDRESS | 263 CORNICE DRIVE, LA VERGNE, TN | EMAIL | kat.safi@yahoo.ca |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

COREY NELSEN
APPLICANT NAME



12/18/2023
DATE

KHATERA SAFI
PROPERTY OWNER NAME



PROPERTY OWNER SIGNATURE

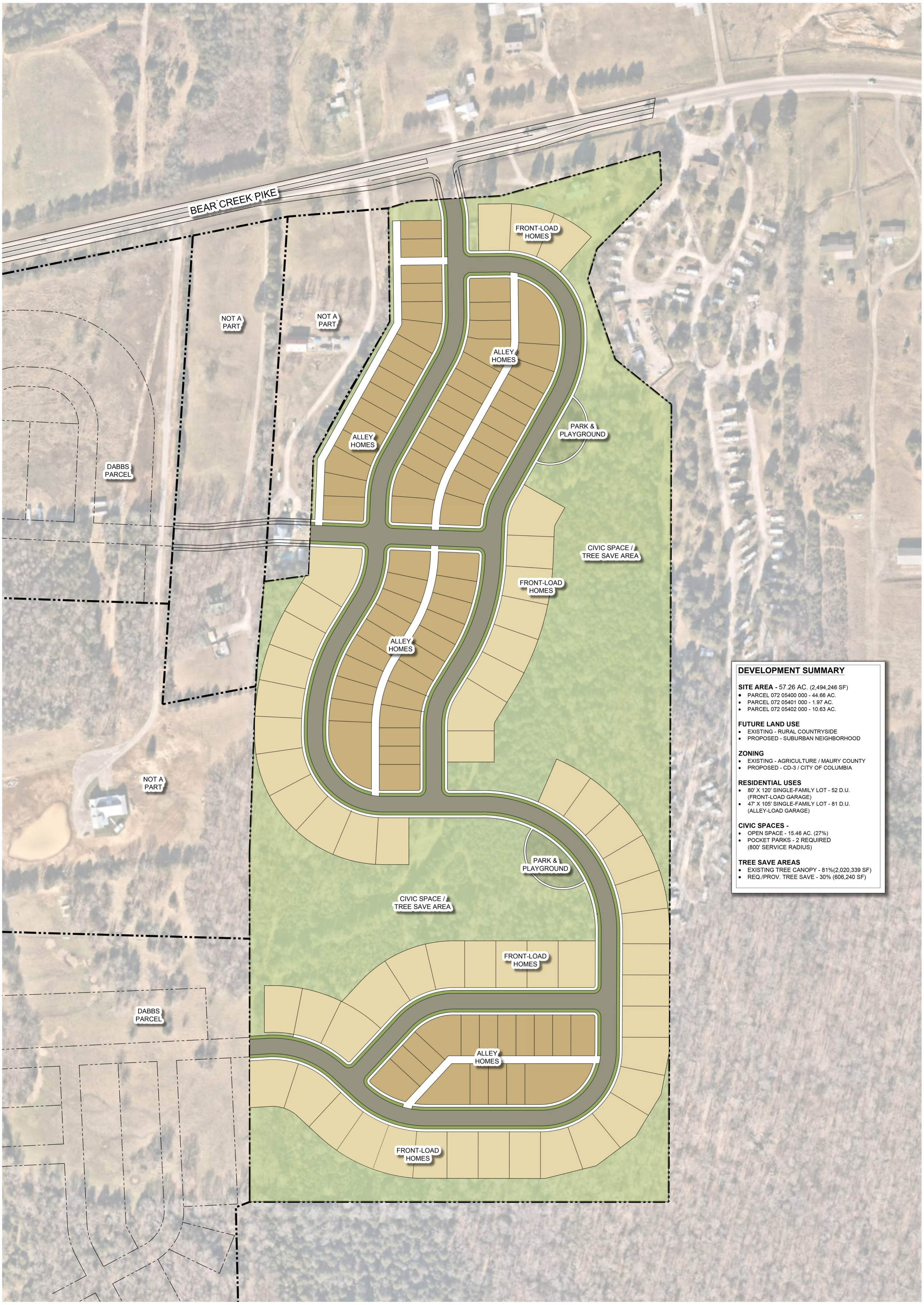
12/18/2023
DATE

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |




## DEVELOPMENT SUMMARY

**SITE AREA -** 57.26 AC. (2,494,246 SF)
- PARCEL 072 05400 000 - 44.66 AC.
- PARCEL 072 05401 000 - 1.97 AC.
- PARCEL 072 05402 000 - 10.63 AC.

**FUTURE LAND USE**
- EXISTING - RURAL COUNTRYSIDE
- PROPOSED - SUBURBAN NEIGHBORHOOD

**ZONING**
- EXISTING - AGRICULTURE / MAURY COUNTY
- PROPOSED - CD-3 / CITY OF COLUMBIA

**RESIDENTIAL USES**
- 80' X 120' SINGLE-FAMILY LOT - 52 D.U. (FRONT-LOAD GARAGE)
- 47' X 105' SINGLE-FAMILY LOT - 81 D.U. (ALLEY-LOAD GARAGE)

**CIVIC SPACES -**
- OPEN SPACE - 15.46 AC. (27%)
- POCKET PARKS - 2 REQUIRED (800' SERVICE RADIUS)

**TREE SAVE AREAS**
- EXISTING TREE CANOPY - 81%(2,020,339 SF)
- REQ./PROV. TREE SAVE - 30% (606,240 SF)

Kimley»Horn

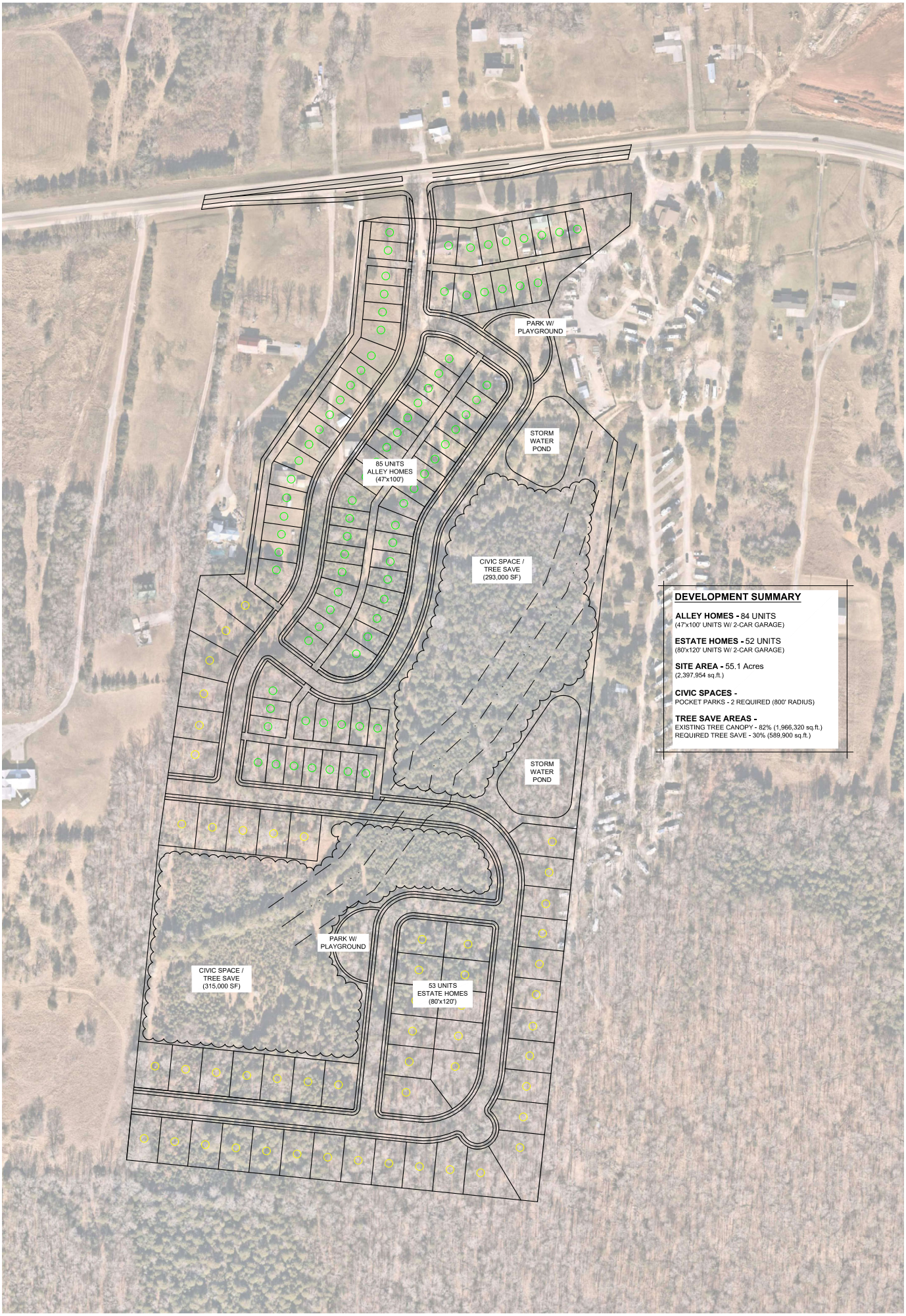
Bowman Farm Property - Columbia, TN

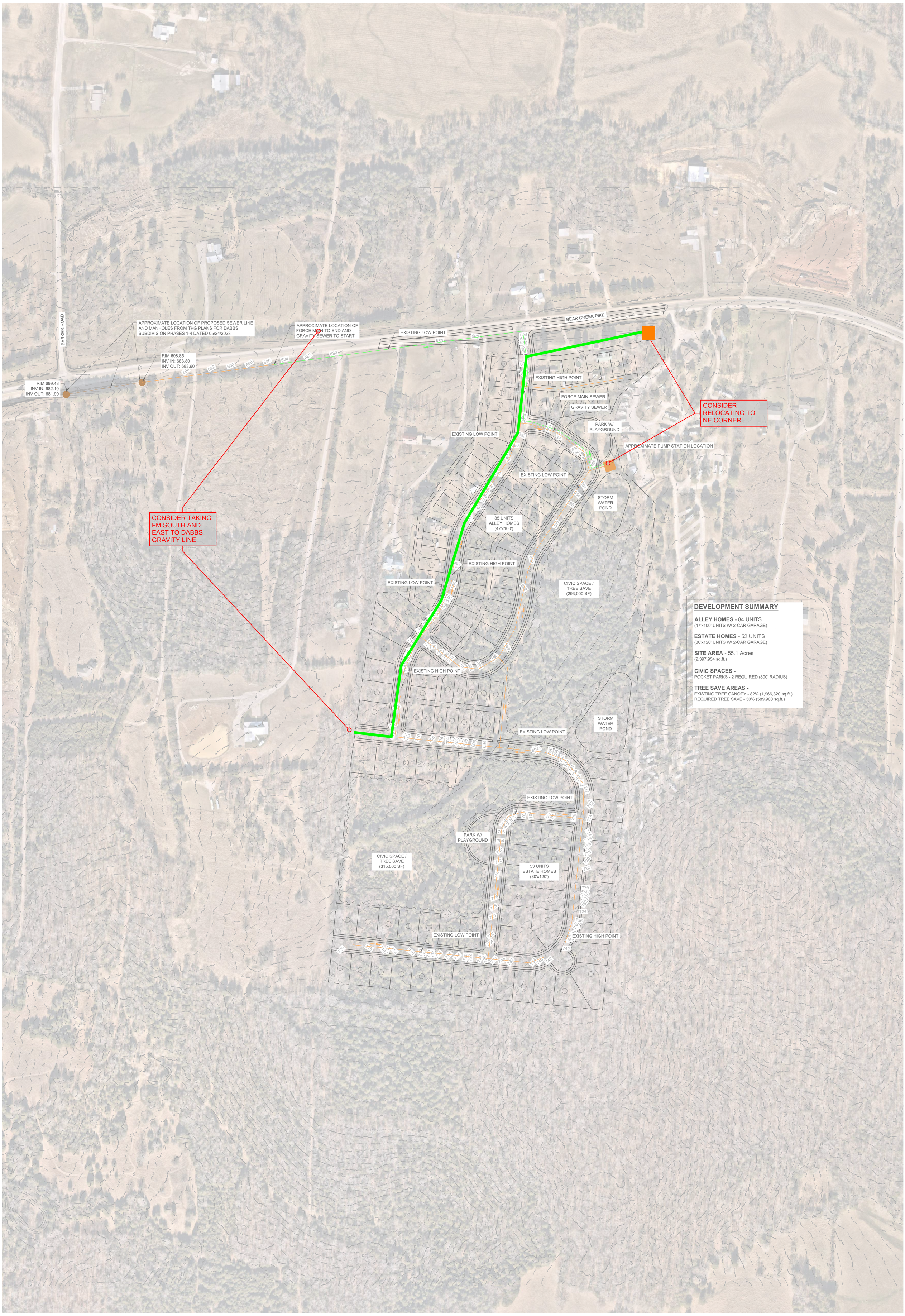
CONCEPTUAL MASTER PLAN for RYAN HOMES

NORTH

January 16, 2024

0 50 100 200 300


PARK W/ PLAYGROUND
STORM WATER POND
85 UNITS ALLEY HOMES (47'x100')
CIVIC SPACE / TREE SAVE (293,000 SF)
STORM WATER POND
PARK W/ PLAYGROUND
CIVIC SPACE / TREE SAVE (315,000 SF)
53 UNITS ESTATE HOMES (80'x120')
DEVELOPMENT SUMMARY
ALLEY HOMES - 84 UNITS
(47'x100' UNITS W/ 2-CAR GARAGE)
ESTATE HOMES - 52 UNITS
(80'x120' UNITS W/ 2-CAR GARAGE)
SITE AREA - 55.1 Acres
(2,397,954 sq.ft.)
CIVIC SPACES -
POCKET PARKS - 2 REQUIRED (800' RADIUS)
TREE SAVE AREAS -
EXISTING TREE CANOPY - 82% (1,966,320 sq.ft.)
REQUIRED TREE SAVE - 30% (589,900 sq.ft.)




Kimley»Horn

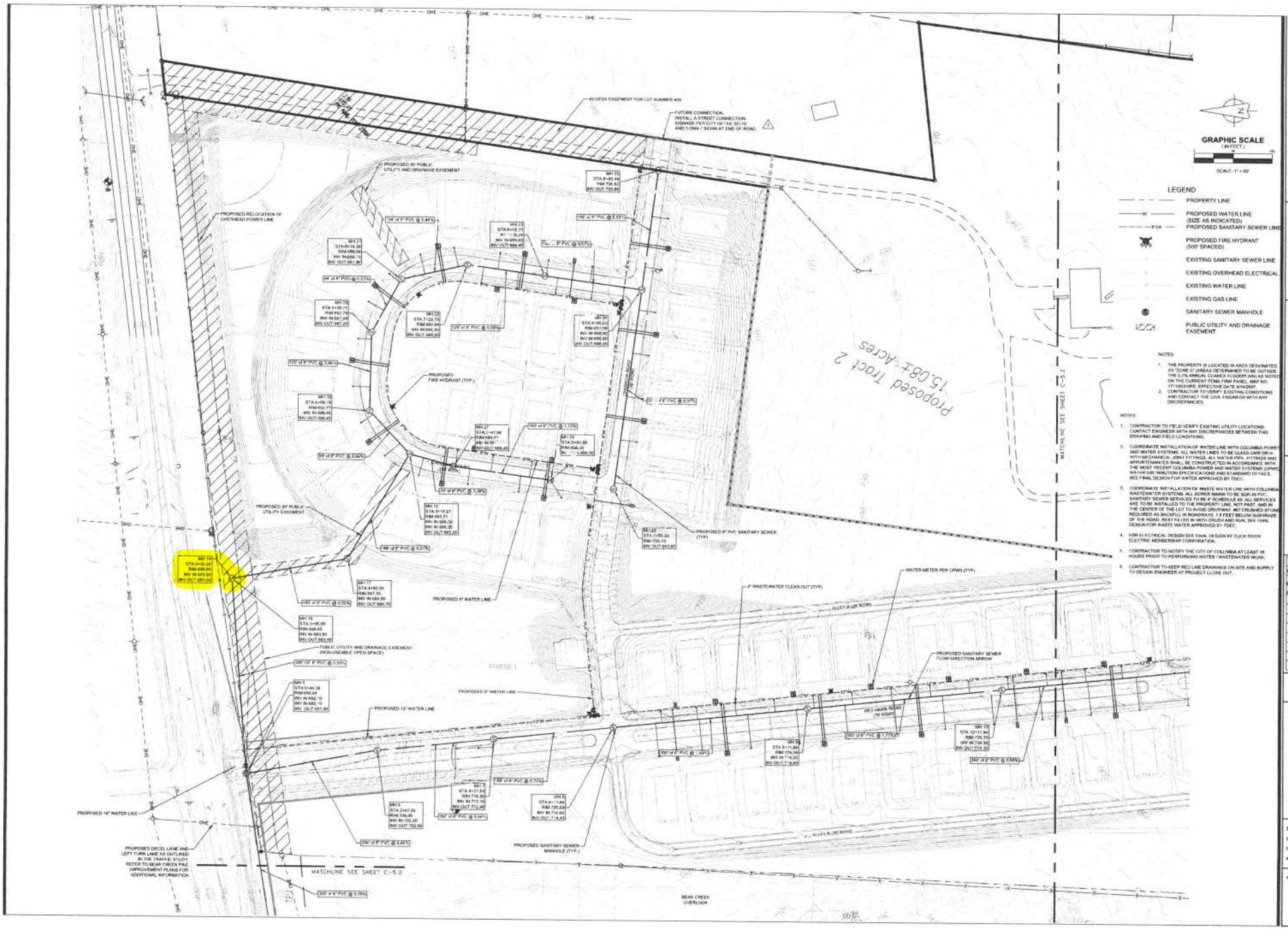
Bowman Farm Property - Columbia, TN

CONCEPTUAL SANITARY SEWER LAYOUT

NORTH

November 30, 2023

0 100 150 300 450




TKC
ARCHITECTURE
INTERIORS
CIVIL SITE

DABBS SUBDIVISION
PHASES 1 - 4

COLE D NEWTON - TN
REG.#118292
11/7/2023

| Revision | | |
|---|---|---|
| No. | Date | Description |
| 1 | 07/31/23 | PER CITY COMMEN |
| 2 | 11/7/23 | PER CITY/TDOT COMMENTS |

UTILITY PLAN 2
(60-SCALE)

CONSTRUCTION PLANS
DATE: 07/24/2023
DRAWN BY: TS
PROJECT NO.: 2124

C - 5.1

CPWS

January 15, 2024

Mr. Gray Harrison
Kimley-Horn
4031 Aspen Grove Drive Suite 200
Franklin, TN 37067
***Sent via email: gray.harrison@kimley-horn.com***

**RE: Water Availability Letter**
**Bowman Farms – 135 Units**
**1748 Bear Creek Pike**
**Tax Map 72, Parcel 54.00, 54.01, 54.02**
***Columbia, Maury County, TN***

Dear Mr. Harrison:

Columbia Power and Water Systems ("the Utility"/CPWS) is a municipal corporation authorized to provide water services in accordance with State law. CPWS has adopted rules, regulations, and standard operation procedures, prescribing the conditions under which CPWS will furnish water service. In addition, certain State laws delegate authority to the Tennessee Department of Environment and Conservation, various Planning Commissions and other authorities in Cities and Counties. These Cities and Counties have also adopted rules and regulations. Subject to the payment of all charges and fees imposed by CPWS and the approval of any and all required governmental agencies, water service will be made available on a first-come, first-served basis, subject to availability of all CPWS furnished equipment and materials appropriate for the development and provided the applicant complies with all rules and regulations of CPWS and conditions set out herein.

The proposed development consists of 135 units. CPWS has evaluated the projected water demands for the proposed residential development in the water system hydraulic model and is able to meet a fire-flow capacity of 1,000 gpm at 20 psi while maintaining the existing level of service and pressures in this portion of the distribution system. CPWS can provide water for the proposed development according to the following requirements:

- A minimum size 12-inch diameter water main must be extended from the existing 16-inch main West of Merkel Road to the entrance of the development, or to the mid-point of the frontage on Bear Creek Pike, whichever is furthest. Coordination with other developments on Bear Creek Pike may reduce the length of pipe installation required.
- Minimum size 8-inch water mains will be required throughout the development.

All of the above requirements are to be constructed and paid for by the Applicant and dedicated to CPWS once complete up to and including the meter. No construction of CPWS infrastructure shall be initiated until final construction plans have been approved by TDEC and all parties have fully executed a water service agreement.

CPWS

Once you have received this Water Availability Letter, next steps in the process to obtain water service from CPWS are as follows:

- Provide site base CAD files in DWG format, including roads, lot lines, existing and proposed contours, and other existing and proposed utilities, for use in development of water construction drawings.
- Remit to CPWS new water service fees:

| | |
|---|---|
| New Water Service Fee: $1,500 + $370 per SFU (135 SFUs) | $51,450.00 |

- CPWS will then develop water construction drawings and submit to TDEC for approval. Upon approval by TDEC and payment of meter and impact fees by the applicant, applicant may then schedule a pre-construction meeting with CPWS. Pre-construction meeting will not be scheduled until fees are paid in full or surety is provided in lieu of full payment. Final meter and impact fees are subject to change based on final design and meter size determination. Meter fees are subject to change based on market costs at time of purchase. Meters will not be set until meter and impact fees are paid.

| | |
|---|---|
| Meter Fee: $540 per 3/4" meter (135 meters) | $72,900.00 |
| Impact Fee: $4,500 per 3/4" meter (135 meters) | $607,500.00 |
| **Total Meter and Impact Fees Due =** | **$680,400.00** |

- After the pre-construction meeting, CPWS will then issue a formal notice to proceed. No construction of CPWS infrastructure may take place prior to the pre-construction meeting.
- Applicant is then required to construct all public water infrastructure per CPWS standard specifications and provide CPWS personnel unregulated access to the site to inspect the construction of the water infrastructure.

If you have any questions, please feel free to contact me at 423-774-0349 or eric.king@inflodesign.com. This letter is valid for one-hundred twenty (120) days from the date of this letter.

Sincerely,

Eric King, P.E.
Inflo Design Group, LLC
on behalf of Columbia Power and Water Systems

cc: Jonathan Hardin, CPWS
File 23-063

CITY OF COLUMBIA
TENNESSEE

WASTEWATER DEPARTMENT

12 January 2024

Gray Harrison
4031 Aspen Grove Drive
Franklin, TN 37067

RE: Bowman Farms, 1748 Bear Creek Pike, 072 05400, 072 05401, 072 05402

Gray,

This letter serves as confirmation that the City of Columbia Wastewater Department has the available capacity to service the above-referenced development. Major or minor improvements to existing infrastructure may or may not be necessary to satisfactorily convey the additional sanitary sewer flow from the above-referenced proposed development. Any extension to the existing sewer infrastructure will be initiated by the owner/developer, reviewed by our department and approved by the State of Tennessee. The project must be advanced in accordance with local, state and federal rules, regulations and policies. Funding and construction of those improvements will remain the responsibility of the owner/developer. New customers will be required to pay all fees applicable at the time of connection. No detailed design plan for an extension of the sewer has been proposed at this time.

The Sanitary Sewer Pump Station for this development shall be located off-site, across and north of Bear Creek Pike. Easements and property acquisition is required to do so. The Pump Station shall be located in such a manner as to allow the surrounding properties to be able to have sanitary sewer that can gravity flow to the Station. The station shall be sized for that sewer shed as well. The Station and its plans may need to be designed and/or reviewed by the City of Columbia's Engineers of Record.

Donnie Boshers, Director
City of Columbia, TN
Wastewater Department

# Columbia Fire & Rescue

## Fire Flow Requirements

Water Purveyor: Columbia Power & Water System

Date: 11/15/2023
Name: Gray Harrison
Phone: 615-823-1272
Email: Gray.Harrison@Kimley-Horn.com
Address/Parcel ID: 072 05400, 05401, 05402
Property Type: (•) Residential ( ) Commercial ( ) Industrial
Construction Type: Single Family
Enclosed Area ($ft^2$): Less than 3,600

---

## FILLED OUT BY COLUMBIA FIRE AND RESCUE

NFPA Sprinkler Type: NFPA 13D

**Water System Demand without Sprinkler Credit**

*Fire flow Requirements (International Fire Code Appendix B)*

Fire Flow: 1,000 gpm Duration: 1 hours

*Fire Hydrant Location and Distribution (International Fire Code Appendix C)*

Minimum number of hydrants: 1

Average spacing between hydrants: 500 ft.

Maximum distance from frontage to hydrant: 250 ft.

**Water System Demand with Sprinkler Credit**

*Fire flow requirements (International Fire Code Appendix B)*

Fire Flow: 500 gpm Duration: 1/2 hours

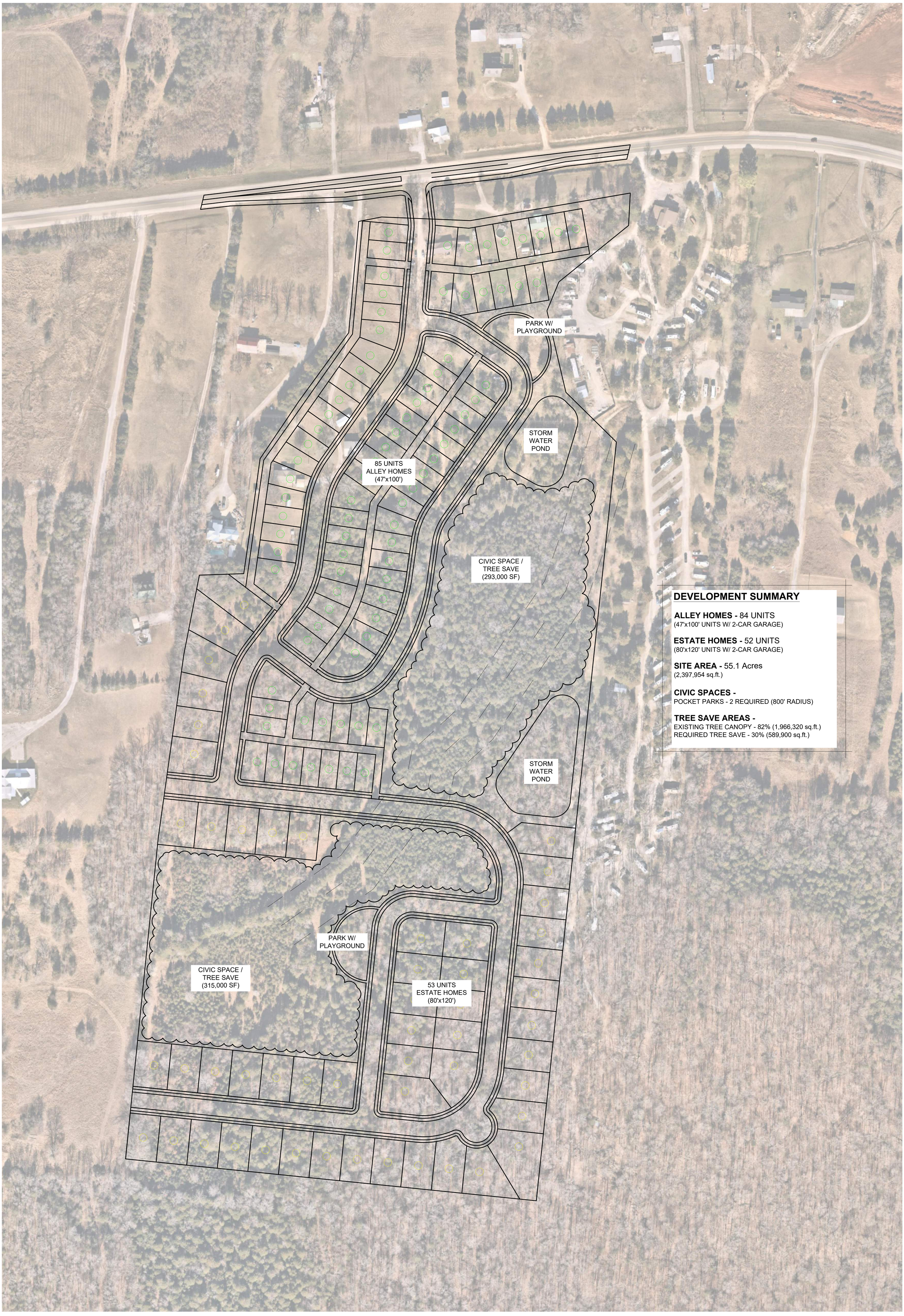
*Fire Hydrant Location and Distribution (International Fire Code Appendix C)*

Minimum number of hydrants: 1

Average spacing between hydrants: 500 ft.

Maximum distance from frontage to hydrant: 250 ft.

Fire Plan Reviewer: Brad Massey Date: 11-20-2023




## DEVELOPMENT SUMMARY

**ALLEY HOMES -** 84 UNITS
(47'x100' UNITS W/ 2-CAR GARAGE)

**ESTATE HOMES -** 52 UNITS
(80'x120' UNITS W/ 2-CAR GARAGE)

**SITE AREA -** 55.1 Acres
(2,397,954 sq.ft.)

**CIVIC SPACES -**
POCKET PARKS - 2 REQUIRED (800' RADIUS)

**TREE SAVE AREAS -**
EXISTING TREE CANOPY - 82% (1,966,320 sq.ft.)
REQUIRED TREE SAVE - 30% (589,900 sq.ft.)

Kimley»Horn

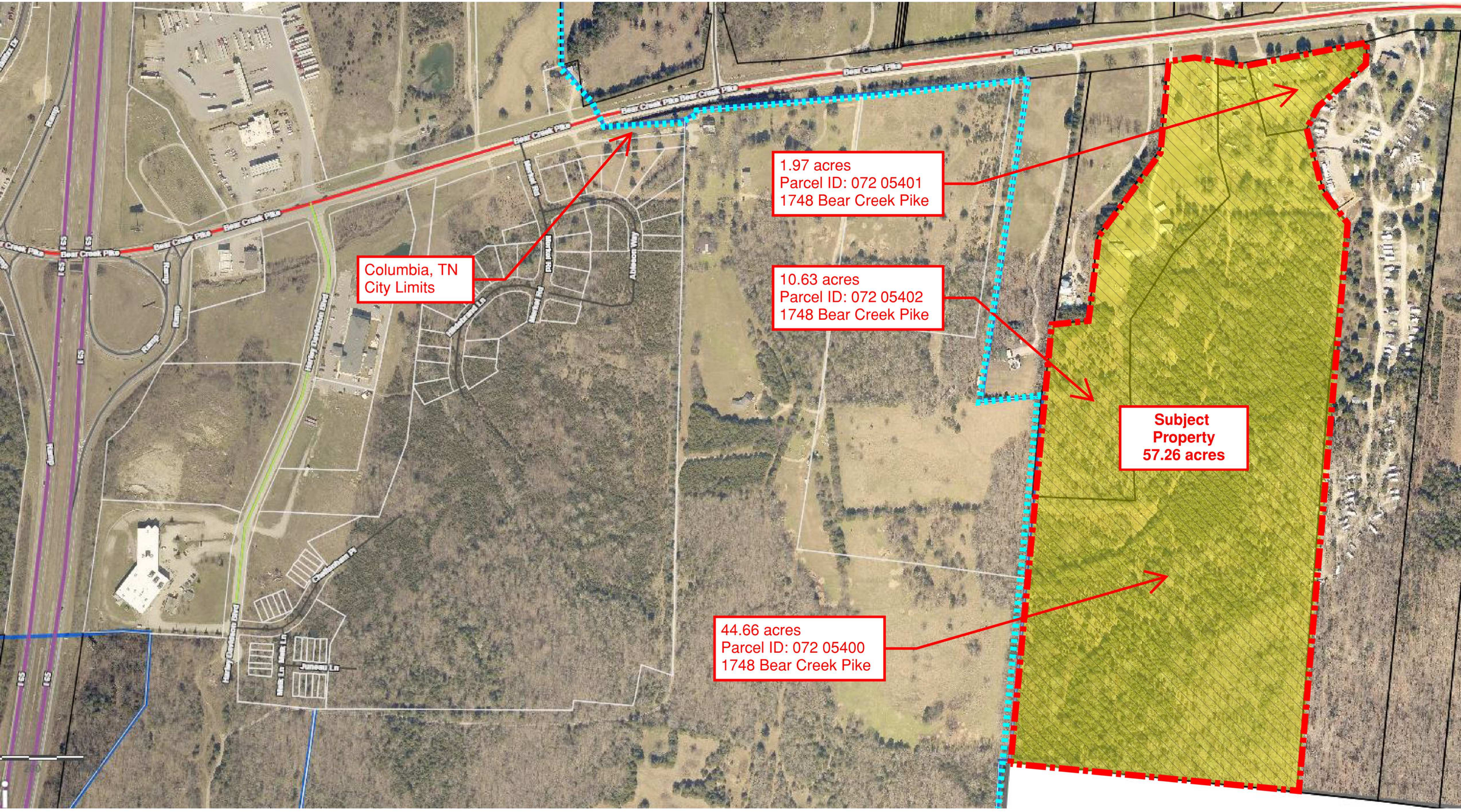
Bowman Farm Property - Columbia, TN

CONCEPTUAL MASTER PLAN for RYAN HOMES

NORTH

November 16, 2023

0 50 100 200 300


Columbia, TN
City Limits
1.97 acres
Parcel ID: 072 05401
1748 Bear Creek Pike
10.63 acres
Parcel ID: 072 05402
1748 Bear Creek Pike
Subject
Property
57.26 acres
44.66 acres
Parcel ID: 072 05400
1748 Bear Creek Pike
Bear Creek Pike
Harley Davidson Blvd
Juneau Ln
Abhaven Way
I 65

| DATA CHART | |
|---|---|
| SITE ZONING: | CD-3 |
| SITE ACREAGE: | 56 ACRES |
| LOTS ALLOWED: | 220 LOTS |
| LOTS PROPOSED: | 131 LOTS |
| MIN. LOT WIDTH: | 65' |
| MIN. LOT AREA: | 6500 SF |
| MAX. LOT AREA: | 10,500 SF |

N

**GRAPHIC SCALE**
( IN FEET )
0 100 200
SCALE: 1" = 100'

LEGEND
PROPERTY LINE
EXISTING CONTOURS




NOT FOR CONSTRUCTION

TKC
ARCHITECTURE
INTERIORS
CIVIL SITE
2904 CARMACK BLVD, SUITE C, COLUMBIA, TN 38401 | 615.617.7477 | WWW.TKC-AE.COM

CONSULTANTS:

PROJECT TITLE:
NRV SUBDIVISION
BEAR CREEK PK
COLUMBIA, TN

PRELIMINARY DRAWINGS

| Revision | | |
|---|---|---|
| No. | Date | Description |
| | | |
| | | |
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THIS DRAWING IS THE PROPERTY OF TKC ARCHITECTURE & ENGINEERING (TKC A&E). ANY UNAUTHORIZED REPRODUCTION OR USAGE WITHOUT THE PRIOR WRITTEN CONSENT OF TKC A&E IS PROHIBITED.

SHEET TITLE:
SITE PLAN - EXHIBIT 2

Preliminary Drawings
DATE: 02/16/2023
DRAWN BY: RT
PROJECT NO.: xx

SHEET NO.:
EX - 2

CITY OF COLUMBIA
TENNESSEE

DEVELOPMENT SERVICES

I, __Chrissy Paul____ being the sole owner of the _1748 Bear Creek Pike property _ more particularly described as ___Parcel/Tax ID 072 054.02_ on Plat of Record in Plat Book __R1912__ Page _1430&1431____ in the Maury County Register of Deeds office, do hereby, formally, request that the City of Columbia, Tennessee annex such property into such City.

Chrissy Paul
Print Name

1/16/2024
Date

Chrissy Paul
Signature

| STAFF USE ONLY | |
|---|---|
| Docket Number: | Requested Agenda: |

CITY OF COLUMBIA
TENNESSEE

DEVELOPMENT SERVICES

I, __Teresa Bobo___ being the sole owner of the _1768 & 1774 Bear Creek Pike properties__ more particularly described as __parcel Tax IDs 072 054.00 & 072 054.01__ on Plat of Record in Plat Book _665___ Page _385&386____, Plat of Record in Plat Book _1264__ Page _920&921____ and in the Maury County Register of Deeds office, do hereby, formally, request that the City of Columbia, Tennessee annex such property into such City.

Teresa Bobo
Print Name

1/16/2024
Date

Teresa Bobo
Signature

| STAFF USE ONLY | |
|---|---|
| Docket Number: | Requested Agenda: |

PERSON RESPONSIBLE FOR TAXES:

mail: Bobby Bobo
Rt. 2
Columbia, Tenn.
c/o Homer Brown

INSTRUMENT PREPARED BY:

Stella L. Hargrove
Attorney at Law
Columbia, Tennessee

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS, that for and in consideration of the sum of Ten ($10.00) Dollars, cash in hand paid, and other good and valuable considerations, including the love and affection which I have for my daughter, I, EULA BROWN, hereinafter called "Grantor", have this date bargained and sold and do hereby sell, transfer and convey unto BOBBY BOBO and wife, TERESA BOBO, hereinafter called "Grantees", as tenants by the entirety, their heirs and assigns, the following described real estate located in the Fourth (4th) Civil District of Maury County, Tennessee, to-wit:

BOUNDED on the North by State Highway 99; East by Phillips Recreational Enterprises, Inc.; South by Phillips Recreational Enterprises, Inc. and Eula Brown; and West by Eula Brown, and more particularly described as follows:

BEGINNING at an iron pin in the South margin of State Highway 99 Right-of-way, being the Northwest corner of Phillips Recreational Enterprises, Inc. tract, and the Northeast corner of the herein described tract; thence South with fence and Phillips Recreational Enterprises, Inc. South 6° 47' East, 112.27 feet to an iron pin; thence with fence and Phillips Recreational Enterprises, Inc. South 58° 34' West, 84.70 feet to an angle iron; thence with fence and Phillips Recreational Enterprises, Inc. South 51° 21' West, 94.93 feet to an iron pin; thence with fence and Phillips Recreational Enterprises, Inc. South 14° 42' West 107.01 feet to an angle iron; thence with fence and Eula Brown South 80° 18' West 177.84 feet to an angle iron; thence along a staked line and with Eula Brown North 18° 24' West 272.68 feet to a concrete highway Right-of-way monument in the South margin of State Highway 99 Right-of-way; thence with fence and State Highway 99 Right-of-way North 79° 52' East 350.42 feet to a concrete highway Right-of-way monument in the South margin of State Highway 99 Right-of-way; thence with highway Right-of-way North 69° 56' East 81.69 feet to the point of beginning, containing 1.97 acres, by survey of James D. Webb, Engineer-Surveyor, Maury County, Tennessee, dated August 28, 1980.

Being a portion of the same property conveyed to Homer Brown and wife, Eula Brown, by Deed of record in Book 409, page 402, Register's Office, Maury County, Tennessee. The said Homer Brown being now deceased, Eula Brown is the sole owner of this property by operation of law; and the said Eula Brown

I hereby certify that I registered the above Instrument the 8 day of Sept 1980
Louise W. Andrews Register
Katherine H. Scott D.C.

REGISTER OFFICE MAURY COUNTY, TENNESSEE
Received for record this 5 day of Sept 1980
at 3:55 P M. and noted in
Book T63 Page 682
Fee
Louise W. Andrews Register
Katherine H. Scott D.C.

remains a widow as of the date of this conveyance.

TO HAVE AND TO HOLD said real estate together with all of the rights, titles, interests, easements and appurtenances thereunto belonging unto Bobby Bobo and wife, Teresa Bobo, as tenants by the entirety, their heirs and assigns, in fee simple forever.

I COVENANT with the said Grantees, their heirs and assigns, that I am lawfully seized and possessed of said real estate, have a good and lawful right to sell and convey the same and that it is unencumbered.

I FURTHER COVENANT and hereby bind myself, my heirs and personal representatives, that I will forever warrant and defend the title to said real estate unto the Grantees, their heirs and assigns, against the lawful claims and demands of all persons whomsoever.

WITNESS my signature, this the 5 day of September, 1980.

Eula Brown
EULA BROWN

STATE OF TENNESSEE
COUNTY OF MAURY

Personally appeared before me, the undersigned ~~Notary Public~~ Deputy Clerk in and for the said state and county, the within named Eula Brown, the bargainor, with whom I am personally acquainted and who acknowledged that she executed the within instrument for the purposes therein contained and expressed.

WITNESS my hand and official seal at Columbia, Tennessee, this the 5 day of September, 1980.

Nancy W. Thompson, Clerk
by Jan Maddux DC
~~NOTARY PUBLIC~~ County Clerk

My commission expires: 9-1-82

STATE OF TENNESSEE
COUNTY OF MAURY

I, or we, hereby swear or affirm that the actual consideration for this transfer or value of the property transferred, whichever is greater is $ 3,000.00, which amount is equal to or greater than the amount which the property transferred would command at a fair voluntary sale.

Eula Brown
AFFIANT

SWORN TO AND SUBSCRIBED before me, this the 5 day of September, 1980.

Nancy W. Thompson, Clerk
by Jan Maddux DC
~~NOTARY PUBLIC~~ County Clerk

My commission expires: 9-1-82

STATE OF TENNESSEE, MAURY COUNTY
Transfer Tax $ 2.80 Mortgage Tax $
Recording Fee $ .50 Total Paid $ 8.30
Receipt No 8277 Received By KL
3 Day Of Sept. 1980

This instrument prepared by Bobby W. Sands, Sands & Sands, P.O. Box 1660, Columbia, TN 38402-1660.

Send Tax Bills to:

Mrs. Eula Brown
1768 Bear Creek Pike
Columbia, TN 38401

MAP 72
PARCEL 54

## QUITCLAIM DEED

**FOR AND IN CONSIDERATION** for the love and affection of my daughter and son-in-law, the receipt of which is hereby acknowledged, **EULA BROWN**, a widow, Grantor, by these presents, does hereby quitclaim and convey unto **TERESA BOBO and husband, BOBBY BOBO**, Grantees, their successors and assigns of all her right, title and interest, with the exception that I retain a life estate for and during my natural life, in and to the following described property located in the Fourth (4th) Civil District of Maury County, Tennessee, to-wit:

Beginning at a stake in the corner of Salmon's line, thence S. 88 deg. E. with Salmon and Burt's line 88 poles to a stake, thence N. 3 deg. E. 200 poles to a rock pile, thence N. 88 deg. W. 80 poles to a stake, thence 200 poles with Salmon's line to the beginning, containing 100 acres, more or less. Included in the above description but excluded from this conveyance is one acre heretofore sold to Davis Hays and 14 acres heretofore sold to Sam Jones, making 15 acres all of which lies on the N. side of the Bear Creek Pike; leaving 85 acres more or less, hereby conveyed which is generally bounded on the N. by the Bear Creek Pike; East by Silas Derryberry; South by Will Jones and W. by C. W. Knight, containing 85 acres, more or less. Being all of the land lying S. of said Bear Creek Pike, conveyed to Mrs. Nannie Peay by deed of record in Book 181, Page 227, and the same property conveyed by Mrs. Nannie Peay to Homer Brown and wife, Eula Brown, by deed dated January 31, 1956, and recorded in Book 317, Page 253, and being the same property conveyed by Homer Brown and wife, Eula Brown, to J. L. Gobble by deed dated February 2, 1963, recorded in Book 409, Page 123, all in the Register's Office of Maury County, Tennessee.

Being the same property conveyed to Homer Brown and wife, Eula Brown, by deed of record in Book 409, Page 402, Register's Office of Maury County, Tennessee. The said Homer Brown having died on the 10th day of October, 1975. The said Eula Brown being the surviving tenant by the entirety.

**THE ABOVE DESCRIPTION IS THE SAME AS IN PRIOR DEED.**

**INCLUDED IN THE ABOVE DESCRIPTION BUT SPECIFICALLY EXCLUDED** therefrom are the following parcels of land:

**EXCLUSION ONE:** A tract of land containing 21.28 acres conveyed to Ross Anderson, Jr. and wife, Mary Jean Anderson, being more particularly described in Deed of

MAURY COUNTY, STATE OF TENNESSEE
Received for record this 15 day of SEP 1995 at 11:20 o'clock A.M.
Note Book 17 Page 68 Receipt #58327 Recording Fee 8.00
State Tax 70 Probate Fee Total 8.00
Book 1264 Page 920 Witness my Hand,
MAURY COUNTY REGISTER OF DEEDS
A. Wayne White

record in Book 505, Page 306, Register's Office of Maury County, Tennessee.

**EXCLUSION TWO:** A tract of land containing 1.97 acres conveyed to Bobby Bobo and wife, Teresa Bobo, being more particularly described in Deed of record in Book 665, Page 385, Register's Office of Maury County, Tennessee.

**EXCLUSION THREE:** A tract of land containing 14.87 acres conveyed to Ricky Eugene Brown, being more particularly described in Deed of record in Book 669, Page 653, Register's Office of Maury County, Tennessee. See also Deed Book 689, Page 305, Register's Office of Maury County, Tennessee.

IN WITNESS WHEREOF, I have hereunto set my hand, this the 13th day of September, 1995.

Eula R. Brown
**EULA BROWN**

STATE OF TENNESSEE

COUNTY OF MAURY

Personally appeared before me, a Notary Public in and for said State and County, the within named **EULA BROWN**, a widow, the bargainor, with whom I am personally acquainted, or proved to be on the basis of satisfactory evidence, and who acknowledged that she executed the foregoing instrument for the purposes therein contained.

Witness my hand and official seal at office in Columbia, Tennessee, this the 13th day of September, 1995.

Notary Public

My Commission Expires:

10-29-95

AS PROVIDED IN T.C.A. 67-4-409(3)(5) THIS CONVEYANCE IS EXEMPT FROM THE PAYMENT OF RECORDATION TAX.

MAURY COUNTY REGISTER, STATE OF TENNESSEE
I or we hereby swear or affirm that the actual Consideration or true value of the property transferred whichever is greater is -0-, which amount is equal to or greater than the amount which the property transferred would command at a fair voluntary sale.
Eula R. Brown Affiant
Subscribed and sworn before me this 15 day of SEPT 19 95
R. Wayne [illegible]

BOOK 1264 PAGE 921

BK/PG:R1912/1430-1431

06005629

2 PGS : AL - QUITCLAIM DEED
SUSIE BATCH: 48076
04/12/2006 - 03:55 PM

| | |
|---|---|
| VALUE | 0.00 |
| MORTGAGE TAX | 0.00 |
| TRANSFER TAX | 0.00 |
| RECORDING FEE | 10.00 |
| DP FEE | 2.00 |
| REGISTER'S FEE | 0.00 |
| TOTAL AMOUNT | 12.00 |

STATE of TENNESSEE, MAURY COUNTY
JOHN FLEMING
REGISTER OF DEEDS

Prepared By:
Security Title & Escrow Co., LLC
500 West 7th Street
Columbia, TN 38401

# QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS, this indenture entered into between **Jo Ann Brown**, FIRST PARTY, which expression shall include heirs, assigns and personal representatives, and **Chrissy Potts,** SECOND PARTY, which expression shall include heirs, assigns, and Personal Representatives.

WITNESSETH:

For the consideration of the sum of TEN DOLLARS ($10.00), and other good and valuable considerations, the receipt of all of which is hereby acknowledged, FIRST PARTY conveys, and quitclaims unto SECOND PARTY the following described property:

**See Exhibit "A"**

**Being the same property conveyed to Jo Ann Brown and Chrissy Potts by Co-Administrators' Deed of record in Book R1805, Page 963-966, Register's Office for Maury County, Tennessee.**

**Map 72, Parcel 54.02**

IN WITNESS WHEREOF, this conveyance has been executed on the 10 day of ~~March~~ April, 2006.

Jo Ann Brown

STATE OF TENNESSEE
COUNTY OF MAURY

Personally appeared before me, the undersigned, **Jo Ann Brown**, with whom I am personally acquainted, and who acknowledged that he executed this instrument for the purposes therein contained.

WITNESS my hand, at office, this the 10 day of ~~March~~ April, 2006.

My commission expires:
8-21-06

Notary Public

STATE OF TENNESSEE – MAURY COUNTY

I hereby affirm that the actual consideration for this transfer or value of the property transferred, whichever is greater is $ **-0-**.

Affiant

Subscribed and sworn to before me, this 10th day of ~~March~~ April, 2006.

My commission expires:
August 16, 2008

Notary Public

NEW PROPERTY OWNER:

**Chrissy Potts**
**528 Bragg Avenue**
**Smyrna, TN 37167**

PERSON RESPONSIBLE FOR TAXES:

**SAME**

EXHIBIT A

Located in the Fourth (4th) Civil District of Maury County, Tennessee and more particularly bounded and described as follows:

Bounded on the N. by State Highway 99; E. by Eula Brown; S. by Eula Brown, and W. by James L. Waldrum, and more particularly described as follows: Beginning at an angle iron in the S. margin of State Highway 99 right-of-way, being the NE corner of James L. Waldrum tract, and the NW corner of the herein described tract; thence with highway right-of-way N. 79 deg, 50 min E. 378.17 ft., to a concrete highway right-of-way monument; thence with highway right-of -way N. 89 deg, 48 min. E. 166.68 ft. to a railroad spike in center of driveway, being the NW corner of Eula Brown tract and the NE corner of the herein described tract; thence with the center of driveway and Eula Brown S. 1 deg, 46 min, E. 164.72 ft. to a railroad spike in center of driveway; thence wiht center of driveway and Eula Brown S. 6 deg, 31 min, E. 169.66 ft. to a railroad spike in ceter of driveway; thence with driveway and Eula Brown S. 15 deg, 36 min, E. 160.66 ft. to an angle iron near edge of driveway; thence along a staked line and with Eula Brown S. 41 deg, 56 min, W. 322.13 ft. to an angle iron; thence along staked line and with Eula Brown S. 27 deg, 15, min W. 264.61 ft. to an angle iron; thence along a staked line with Eula Brown S. 6 deg, 30 min E. 680.07 ft. to an angle iron in an old fence line, being the SE corner of the herein described tract; thence with old fence line and Eula Brown S. 88 deg, 25 min, W. 387.41 ft. to an angle iron in fence line, being the E. boundary line of James L. Waldrum tract and being the SW corner of the herein described tract; thence with fence and James L. Waldrum N. 3 deg, 19 min, E. 648.87 ft. to an angle iron in fence line, being the E. boundary line of James L. Waldrum tract and the W. boundary line of the herein described tract; thence with fence and James L. Waldrum N. 4 deg 12 min E. 916.94 ft. to the beginning, containing 14.87 acres by survey of James D. Webb, Engineer-Surveyor, Maury County, Tennessee, dated August 28, 1980.

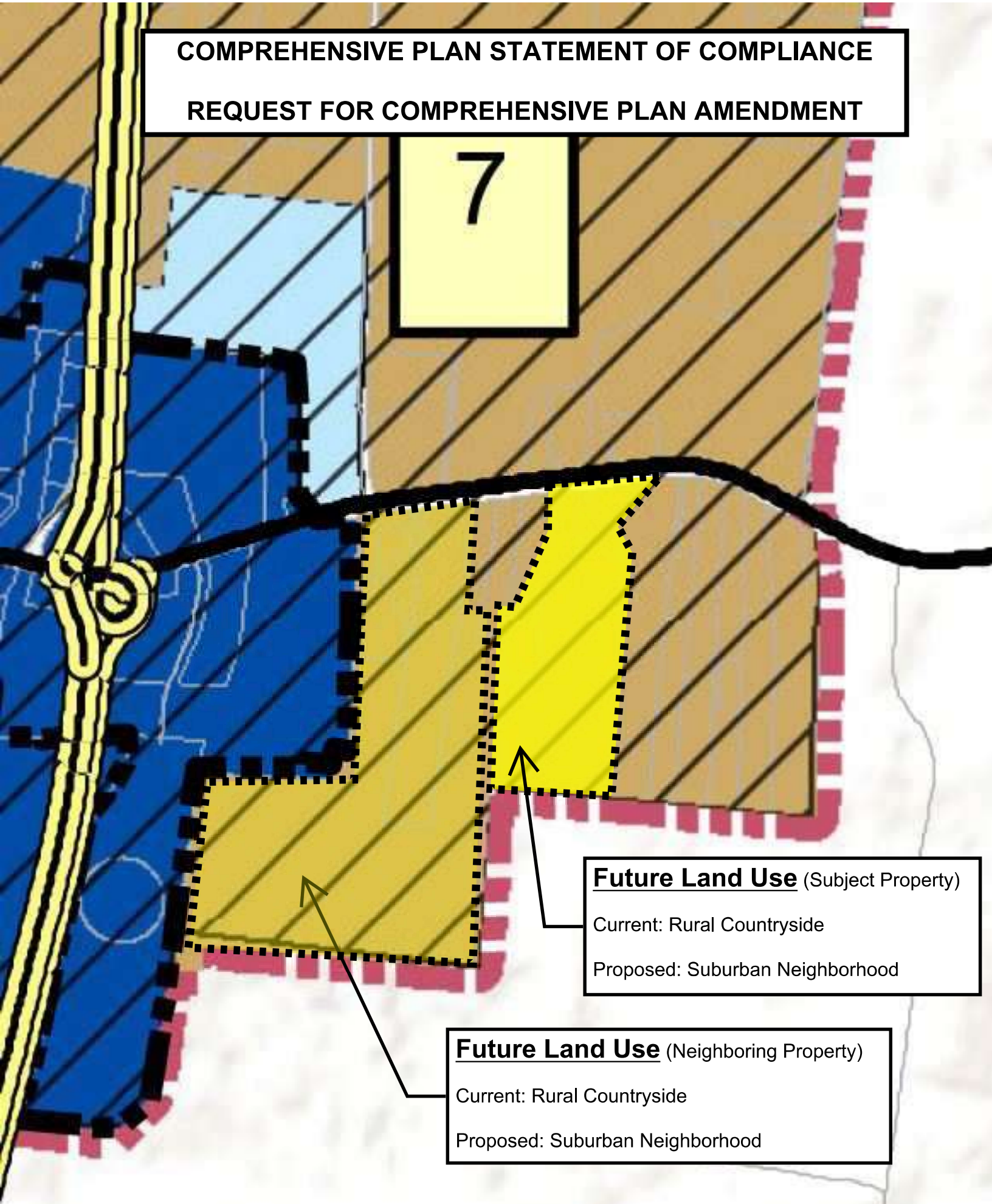
Included in the above description, but excluded from the conveyance herein is the following described property: Located in the Fourth (4th) Civil District of Maury County, Tennessee, and being the same property described but excluding the following: Bounded on the north by State Highway 99, on the east and south by the remaining lands of Ricky Brown, and on the west on the west by Billy Pressnell, Deed Book 817, Page 508, and more particularly described as follows:

Beginning at an angle iron set in the south margin of State Highway 99, the northeast corner of Billy Pressnell, the northwest corner of Ricky Brown, Deed Book 689, Page 305, and the northwest corner of the tract being described; thence with the south margin of Highway 99, North 79 deg. 50 mins. east 293.20 feet to an iron pipe; thence leaving State Highway 99 and with the remaining lands of Ricky Brown as follows: South 1 deg. 54 mins. west 306.00 feet to an iron pipe, south 32 deg. 54 mins. west 358.20 ft. to an iron pipe, south 3 deg. 50 mins. west 326.47 feet to an iron pipe, and south 85 deg. 58 mins. west 124.30 ft. to an iron pipe set in the fence row, the southwest corner of the tract being described, and a point on the east boundary of Pressnell; thence with Pressnell and a fence north 4 deg. 00 mins. east 891.46 feet to the beginning and containing 4.24 acres as surveyed by William J. Heischman, R.L.S. #1315, on August 8, 1990.

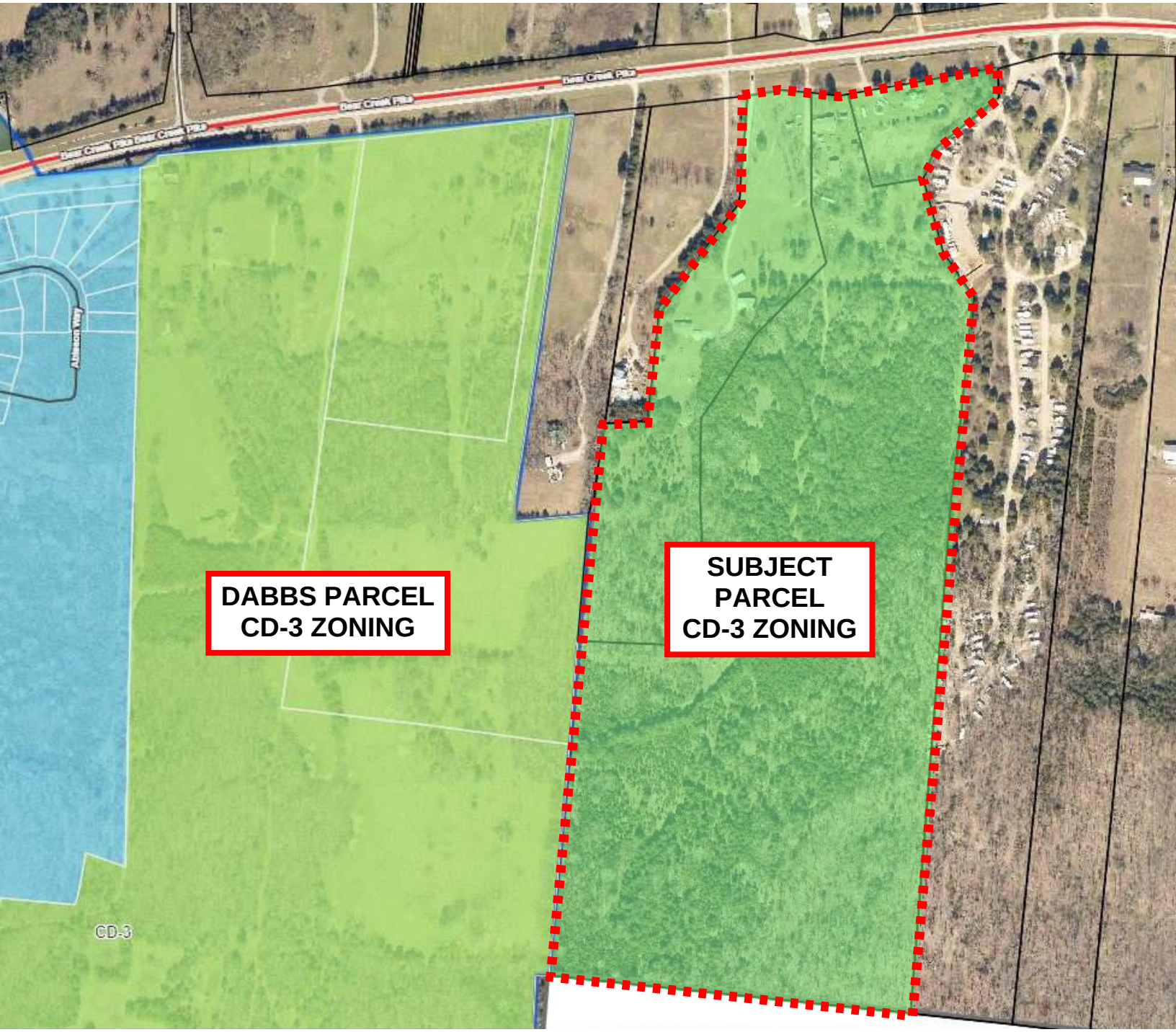
# COMPREHENSIVE PLAN STATEMENT OF COMPLIANCE

# REQUEST FOR COMPREHENSIVE PLAN AMENDMENT

7



# REQUESTING REZONING FROM MAURY COUNTY / AGRICULTURAL USE TO CD-3 TO MATCH ADJACENT DABBS ZONING



CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

## SUBMITTAL REQUIREMENTS

** 1 hard copy of all materials for submittal + PDF copy on a USB thumb drive or CD (no multiple applications on one storage device)*
*Fold hard copy submittals larger than 8½"x11"*

| | | | |
|---|---|---|---|
| ADDRESS/LOCATION | | | |
| | TAX MAP: 072 | GROUP: 05 | PARCEL: 402 |
| SUMMARY OF NATURE OF REQUEST AND WORK | Requesting Annexation, CD-3 Zoning, Comprehensive Plan Amendment from Rural Transition to Suburban Neighborhood | | |

| | | |
|---|---|---|
| DATE OF PRE-APPLICATION CONFERENCE | 12/6/2023 | *Pre-application meetings are scheduled for Wednesdays.* |

| SELECT REQUEST | SUBMITTALS SHALL INCLUDE BUT NOT LIMITED TO: |
|---|---|
| ☒ Annexation<br>☒ Rezoning<br>☐ Preliminary Plat<br>☐ Final Plat<br>☐ PUD Preliminary Master Plan<br>☐ PUD Final Site Plan<br>☐ Multi-Family Site Plan<br>☒ Other: Future Land Use Plan Amendment<br><br>**File naming nomenclature examples:*<br><br>*Freedom Point Site Plan*<br>*Freedom Point Master Plan*<br>*Freedom Point Final Plat* | **Annexations/Rezoning/PUD's:**<br>☒ Written Legal Description copy<br>☒ Requested Zone Listed<br>☒ Compliance with Comprehensive Plan<br>☒ Annexation Permission Form<br>☒ Plans and/or Plats conforming to City standards with check list completed<br>☒ Columbia Water System Availability Letter<br><br>**Plats/PUDs:**<br>☐ Project Name (include Sections & Phases)<br>_____<br>☐ Total Number of Lots<br>_____<br>☐ Total acreage<br>_____ |

Applications and all required submittals must be filed with the Department of Development Services prior to the established deadline. Both the applicant and property owner (if different from applicant) must sign the application.

Any requests to defer or move the item to future meetings dates must be requested by the resubmittal date listed on the Planning Commission schedule.

## APPLICANT

All communications go to the Applicant's email that is provided.

| | | | |
|---|---|---|---|
| NAME | Josh Rowland | PHONE | 615-823-2209 |
| ADDRESS | 10 Lea Avenue, Suite 400 | EMAIL | josh.rowland@kimley-horn.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | Chrissy Paul | PHONE | |
| ADDRESS | 1748 Bear Creek Pike | EMAIL | chrissy.paul@gmail.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

| Josh Rowland | Josh Rowland | 1/16/2024 |
|---|---|---|
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |
| Chrissy Paul | Chrissy Paul | 1/16/2024 |
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

| | |
|---|---|
| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |

CITY OF COLUMBIA TENNESSEE

**DEVELOPMENT SERVICES**
700 NORTH GARDEN STREET
COLUMBIA, TN 38401
PHONE: (931) 560-1560
FAX: (931) 560-1541

# PLANNING COMMISSION
# PROJECT DEVELOPMENT APPLICATION

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*Fold hard copy submittals larger than 8½"x11"*

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|---|---|---|---|
| ADDRESS/LOCATION | | | |
| | TAX MAP: 072 | GROUP: 05 | PARCEL: 400, 401, 402 |
| SUMMARY OF NATURE OF REQUEST AND WORK | Requesting Annexation, CD-3 Zoning, Comprehensive Plan Amendment from Rural Transition to Suburban Neighborhood | | |

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| NAME | Josh Rowland | PHONE | 615-823-2209 |
| ADDRESS | 10 Lea Avenue, Suite 400 | EMAIL | josh.rowland@kimley-horn.com |

| | | | |
|---|---|---|---|
| PROPERTY OWNER NAME | Teresa Bobo | PHONE | |
| ADDRESS | 1768 Bear Creek Pike | EMAIL | boboteresa1@gmail.com |

*In filling out this application, I attest that (1) I am familiar with the rules, regulations, and procedures of the City of Columbia & (2) all information contained herein is accurate & true to the best of my knowledge.*

| Josh Rowland | Josh Rowland | 1/16/2024 |
|---|---|---|
| APPLICANT NAME | APPLICANT SIGNATURE | DATE |

| Teresa Bobo | Teresa Bobo | 1/16/2024 |
|---|---|---|
| PROPERTY OWNER NAME | PROPERTY OWNER SIGNATURE | DATE |

*STAFF USE ONLY*

| | | | |
|---|---|---|---|
| DOCKET NO. | | FEE PAID | |
| RECEIPT NO. | | REQUESTED AGENDA | |

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| DATE NOTICES SENT TO ADJACENT PROPERTY OWNERS | |
| DATE OF PUBLIC NOTICES IN DAILY HERALD | |

| | |
|---|---|
| BOARD ACTION | |