

**REPORT OF THE VIRGINIA DEPARTMENT OF
TRANSPORTATION**

**Amherst County Connector Study
(2025 Appropriation Act, Item
444.O.)**

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



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AMHERST COUNTY CONNECTOR STUDY

NOVEMBER 2025



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EXECUTIVE SUMMARY

This study is in response to Item 444 (O) of Chapter 2 of the 2024 Acts of Assembly, Special Session 1, which states the following:

“O. The Virginia Department of Transportation, in coordination with the Central Virginia Planning District Commission, shall conduct a study to evaluate the costs to build a connector road from the former Central Virginia Training Center property to the Old Town Connector, Route 210, in Amherst County. The Department is authorized to utilize up to \$200,000 in Commonwealth Transportation Funds for the study and shall submit the results of the study to the Central Virginia Planning District Commission, the Governor, and the General Assembly on or before December 1, 2025.”

VA Route 210 (Old Town Connector) from VA Route 163 (Amherst Highway) to the US 29 interchange currently operates in a satisfactory manner but experiences some safety issues along the corridor. Potential development would likely result in operational challenges that would need to be addressed. The Virginia Department of Transportation (VDOT) has identified alternatives for the connector road to the Central Virginia Training Center (CVTC) site and has noted additional potential areas of impact. Funding must be identified to advance any improvements discussed in this study.

This study provides three alternatives for a new connector road between the CVTC and Route 210, including three preliminary alignment options and estimated cost ranges for each alternative. In addition, the study evaluates existing operational and safety conditions on Route 210 from Amherst Highway to the US 29 interchange, including crash analysis, traffic forecasting, and detailed operational analysis. In each scenario, a new signal would likely be required at the intersection of Route 210 and the proposed connector road.

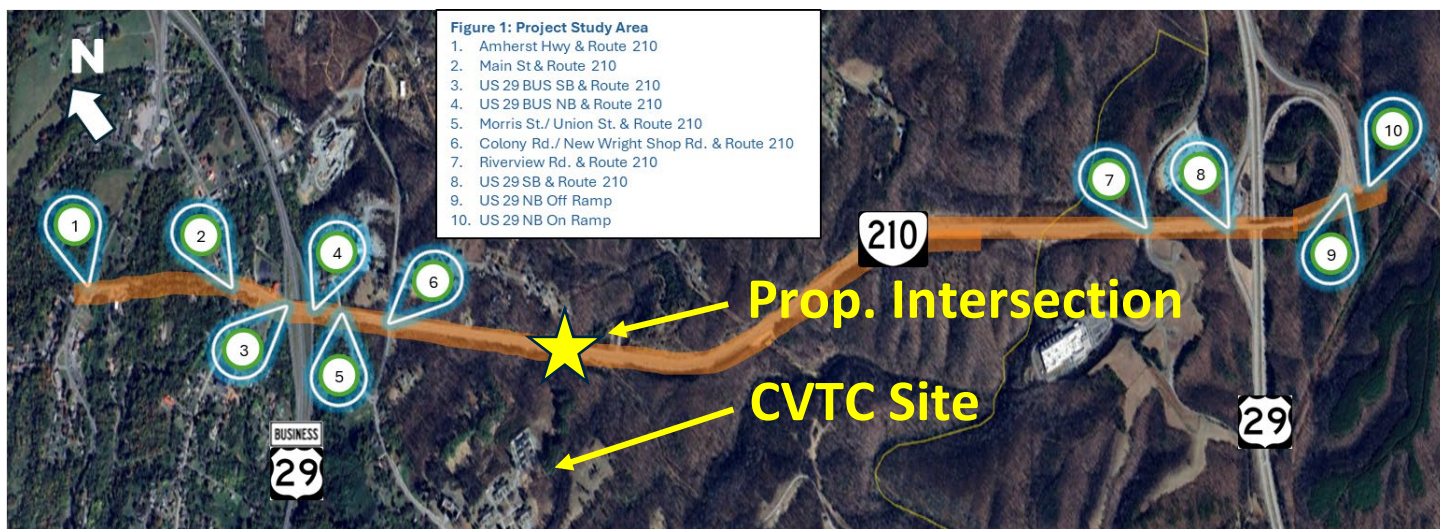


Figure 1. Project Study Area

The project study area (see **Figure 1**) consists of an approximately 3-mile section of Route 210 between Amherst Highway (western study limit) and the US 29 interchange (eastern study limit). Traveling east from Amherst Highway, the posted speed limit on Route 210 varies from 25 to 35 miles per hour (mph) between Amherst Highway and Colony Drive, at which point it increases to 55 mph and proceeds to the US 29 interchange. The study area consists of three (3) signalized intersections, four (4) unsignalized two-way-stop-control intersections, and ramps associated with the US-29 interchange. Along the corridor is a mix of residential and agricultural development land uses. There are also commercial and industrial developments located near the corridor.

Throughout the 3-mile section of Route 210 between Amherst Highway and the US 29 interchange, there were 65 total crashes (approximately 11 crashes per year) reported during the six-year analysis period, of which there were two (2) severe injury crashes, nine (9) visible injury crashes, and 54 property damage only crashes. No fatal crashes occurred within the six-year period. Of these 65 total crashes, 23 were deer-related. Excluding deer from crash type, rear-end and angle crashes accounted for over two-thirds of incidents, or 30 in total. The existing analyses indicate some delays at Colony Road / New Wright Shop Road and Route 210 but found no issues at any other intersection.

Traffic forecasting was conducted using a future year of 2050. Multiple sources were used to apply an overall background Average Annual Growth Rate of 1.3% to the corridor. This included historical data from surrounding roadways. No future roadway improvements are planned in the study area. Vehicle trips from the proposed CVTC redevelopment were calculated and applied to the Future Year (2050) traffic forecast. The 2050 No-Build Condition shows general growth along the corridor will create slightly worse operations for some signalized intersections like the southbound ramp at the US 29 BUS interchange.

A Build network was created to redirect generated trips to the new intersection of Route 210 and the connector road, as proposed in the most-recent CVTC redevelopment plan, to the east of Colony Road. The new intersection would likely need signalization to operate and would perform acceptably. Any potential traffic signal would be subject to satisfying *Manual on Uniform Traffic Control Devices* (MUTCD) traffic signal warrants and require an approved Signal Justification Report. Additionally, development will create operational pressures on signalized intersections across the corridor, particularly at the US 29 BUS interchange, requiring future coordination and optimization.

Three alternatives were developed for an entrance road connecting Route 210 and the CVTC site. One alternative ("Alternative A") is consistent with the redevelopment plan drafted by the Lynchburg Regional Business Alliance in April 2022, demolishing the five principal structures between Route 210 and Colony Road and providing a site for development along the entrance. A second alternative ("Alternative B") proposes demolishing the northernmost structure but maintaining the other four for further use. The third alternative ("Alternative C") provides a solution that maintains all five structures for further use. See **Figure 2** for an overhead comparison of the three alternatives.

Among Alternatives A, B, and C, each alternative provides a distinct utilization of existing structures and varying land use and transportation-related characteristics.

- **Alternative A** prioritizes new development with the demolition of all buildings, aligning with the original vision for the new development site laid out by the Lynchburg Regional Business Alliance. This alternative also accommodates the highest design speed (45 mph), providing the most efficient access into the new area.
- **Alternative B** offers a hybrid approach, removing the building closest to Route 210 and preserving the other four. By doing so, the entrance roadway is more easily constructed than if all buildings were preserved, as there is additional buffer from the adjacent stream and gentler fill slopes. The design speed dictated by the proposed curvature is 30 mph.
- **Alternative C** is the lowest cost solution as it avoids the demolition of existing structures and utilizes as much of the current site as possible. If future development trends favor retaining existing infrastructure while still gaining improved access over a no-build scenario, Alternative C presents a preservation-focused solution. The design speed dictated by the proposed curvature is 30 mph.

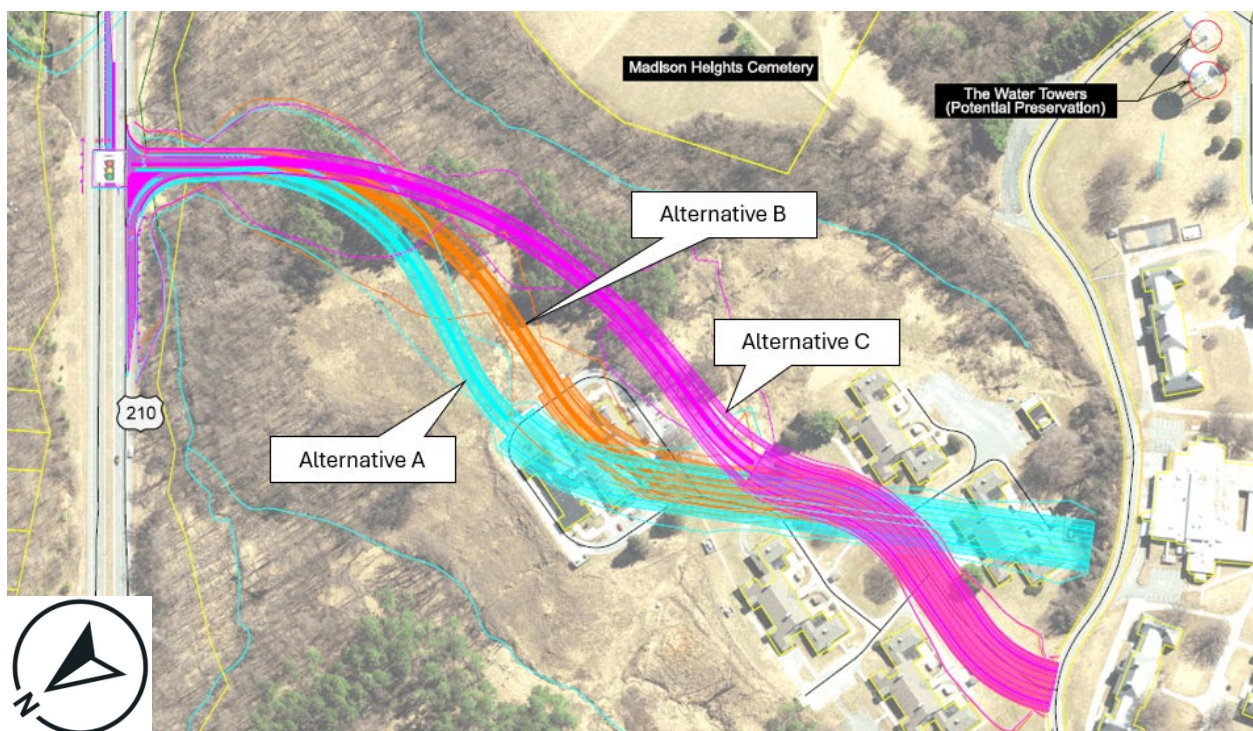


Figure 2. Comparison of Alternatives A, B, and C

The rationale for offering three alternatives is to demonstrate the flexibility of the entrance road in accommodating a variety of economic development scenarios. Any proposed improvements will require additional analyses and approvals, including approval from the Commonwealth Transportation Board for a new Limited Access break along Route 210 to accommodate the new entrance road.

The planning-level cost estimate ranges of these improvements were developed using VDOT's Cost Estimate Workbook. Cost estimates were based on conceptual designs in 2025 dollars. **Table 1** sets out the preliminary engineering (PE), right-of-way and utility relocation (RW), construction (CN), and total planning-level costs in 2025 dollars for each potential improvement alternative.

The estimated values shown are based on the limited knowledge currently available and are an anticipated planning level / order of magnitude range of what each alternative may cost in 2025 dollars.

Proposed Improvement	Preliminary Engineering (PE)	Right-of-way and Utility Relocation (RW)	Construction (CN)	Total
Alternative A	\$2M - \$3M	\$3M - \$4M	\$14M - \$20M	\$19M - \$27M
Alternative B	\$2M - \$3M	\$0.8M - \$1.2M	\$17M - \$24M	\$19.8M - \$28.2M
Alternative C	\$2M - \$3M	(None)	\$12M - \$17M	\$14M - \$20M

Table 1. Planning-Level Cost Estimate in 2025 Dollars

1 INTRODUCTION

1.1 Purpose / Background

VA Route 210 (also referred to as Old Town Connector) from VA Route 163 (Amherst Highway) to the US 29 interchange in Amherst County, Virginia is a modestly traveled corridor for local traffic and connector for US 29 and US 29 BUS. Portions of the corridor are limited access. This study focuses on a new connector road from Central Virginia Training Center (CVTC) to Route 210 within the limited access portion. As specified in Chapter 2, Item 444 (O) of the 2024 Acts of Assembly, Special Session I, “[VDOT], in coordination with the Central Virginia Planning District Commission, shall conduct a study to evaluate the costs to build a connector road from the former Central Virginia Training Center property to the Old Town Connector, Route 210, in Amherst County...” This report includes the crash analysis as well as the operational analysis for the entire corridor. This report also includes analysis and discussion of alternatives for the connector road and intersection with Route 210.

In cooperation and consultation with the Central Virginia Planning District Commission, VDOT has evaluated three potential alternatives for a new connector road between the CVTC and Route 210, including three preliminary alignment options and estimated cost ranges for each alternative. In addition, the study evaluates existing operational and safety conditions on Route 210 from Amherst Highway to the US 29 interchange, including crash analysis, traffic forecasting, and detailed operational analysis. While the existing Colony Road connection is intended to remain in each alternative, it was not considered for redevelopment as a main entrance as it is not in keeping with the General Assembly request nor the vision set forth in the Lynchburg Regional Business Alliance’s *Training Center Redevelopment Plan* (see **Appendix D**).

1.2 Study Area

The study section of Route 210 is located in Amherst County north of the City of Lynchburg (**Figure 3**). The study area consists of the entire corridor of Route 210, a 3 mile east-west roadway that stretches from Amherst Highway to the US 29 On-Ramp. The western limit of the corridor is the Amherst Highway and Route 210 intersection, and the eastern limit of the corridor is the US 29 off-ramp at the US 29 interchange. Within the study limits, Route 210 is a 2-lane undivided roadway from Amherst Highway to the US 29 BUS interchange and at the US 29 interchange. Between these segments, the study area is a Limited Access 4-lane divided roadway. The corridor is classified as a Minor Arterial. The posted speed limit on Route 210 varies between 25 and 35 mph on the western side of the study section, 55 mph in between both interchanges, and 35 mph on the eastern side of the study section. The land use within

the study area is mostly residential and agricultural across the corridor of Route 210 with some parts consisting of commercial and industrial development. Due to the Limited Access right of way designation, any proposed improvements tying into the corridor will require Commonwealth Transportation Board approval.

The annual average daily traffic volume (AADT) along Route 210 is approximately 4,500 vehicles per day west of the US BUS 29 interchange and increases to around 10,000 vehicles per day east of the interchange. The study area consists of four (4) signalized intersections, five (5) unsignalized two-way-stop-control (TWSC) intersections, and one unsignalized on-ramp at the US 29 interchange. The ten (10) study intersections along Route 210 from west to east are as follows:

1. Route 163 (Amherst Highway) & Route 210 (Signalized)
2. Main Street & Route 210 (Unsignalized)
3. US 29 BUS Southbound & Route 210 (Signalized)
4. US 29 BUS Northbound & Route 210 (Signalized)
5. Morris Street / Union Street & Route 210 (Unsignalized)
6. Colony Road / New Wright Shop Road (Signalized)
7. Riverview Road & Route 210 (Unsignalized)
8. US 29 Southbound & Route 210 (Unsignalized)
9. US 29 Northbound off ramp at Route 210 (Unsignalized)
10. US 29 Northbound on ramp at Route 210 (Unsignalized)

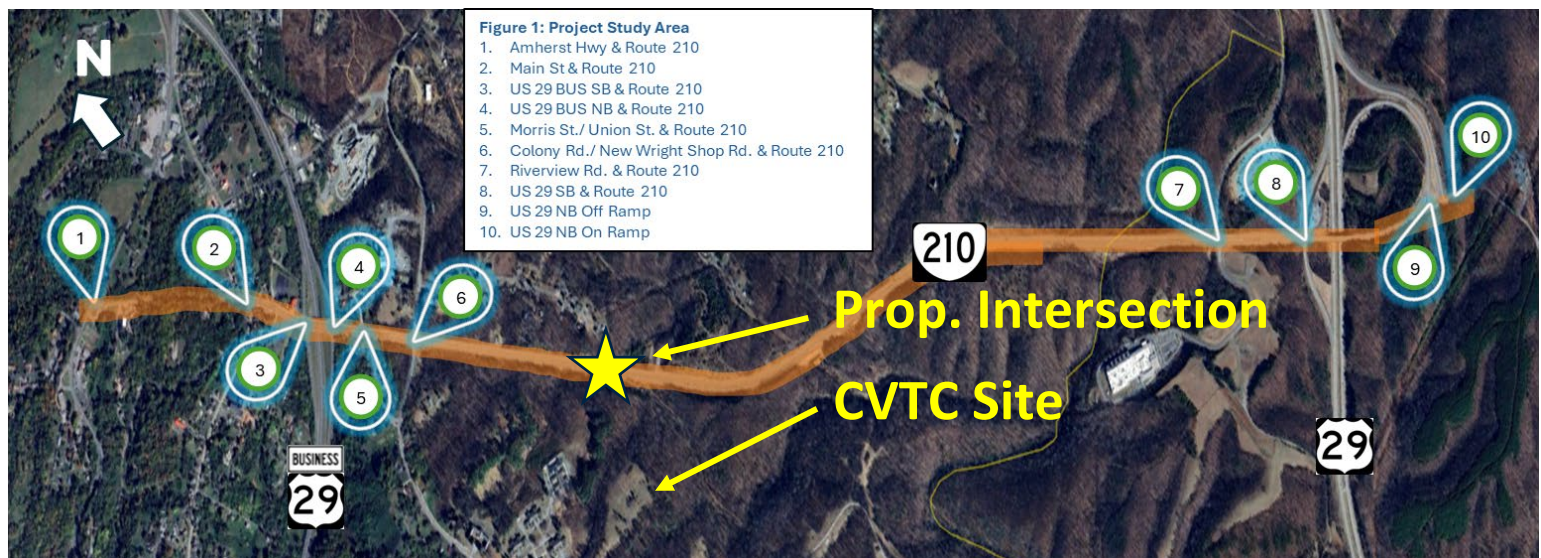


Figure 3: Project Study Area

2 EXISTING CONDITIONS

2.1 Safety

Crash data for the most recent six years (January 1, 2019, through December 31, 2024) was obtained from VDOT's Crash Analysis Tool. The crash data was evaluated to identify crash patterns and likely causes for crashes and to assess whether safety concerns exist. A summary of the crash data and analysis is presented below. Crash layouts for the study corridor are included in **Appendix A**.

2.1.1 Crashes by Year

A total of 65 crashes occurred along Route 210 between Amherst Highway and the US 29 interchange from January 1, 2019, through December 31, 2024, as shown in **Figure 4**. Overall, the general trend is an increase in incidents since 2021 with at least 13 crashes each year, compared to an average of fewer than 10 crashes per year from 2019 to 2021.

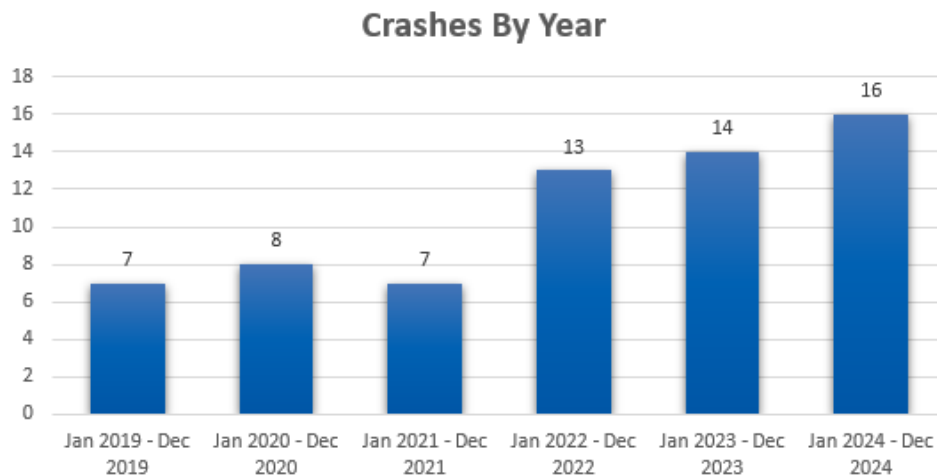


Figure 4: Route 210 Crashes by Year

2.1.2 Crashes by Location

Crash density heat maps and crash maps were generated for the study corridor for the six-year study period to determine which intersections and/or segments had the greatest density of crashes. **Figure 5** displays a crash heat map of the study area of Route 210. The crash data was further analyzed with deer incidents excluded to help identify areas of concern for vehicle-only incidents.

Based on the heat maps, the highest crash density was at the intersection of Route 210 and US 29 BUS Northbound. The next largest clusters of crashes occurred at the intersection of Colony Road / New

Wright Shop Road and Route 210 as well as US 29 Southbound and Route 210 on the eastern end of the corridor.

Figure 6 displays a crash heat map of the study area of Route 210, excluding deer crashes. As shown below, crashes are more focused at the study intersections with no deer collisions within the data. The largest clusters remain constant to the previous figure.

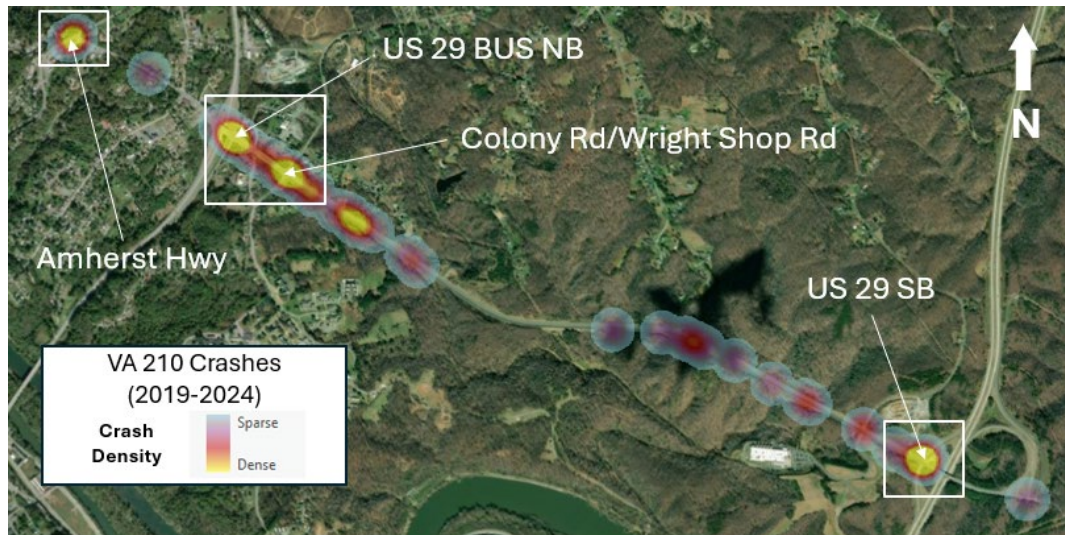


Figure 5: Crash Density Map (All Crashes)

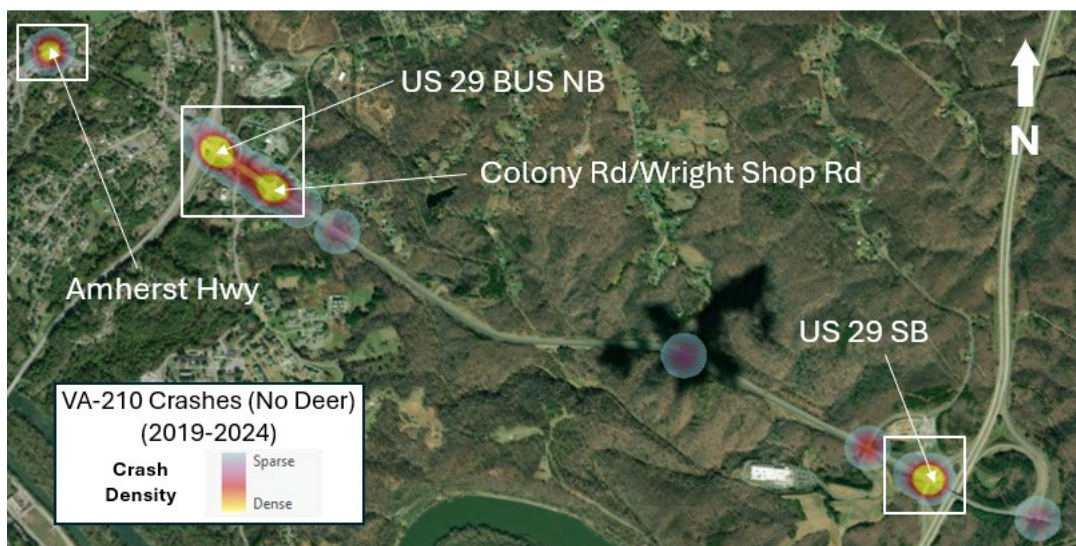


Figure 6: Crash Density Map for Route 210 (Deer Crashes Excluded)

2.1.3 Crashes by Injury Severity

As shown in **Table 2**, the highest percentage of crashes for the Amherst study corridor were Property Damage Only (83%, 54 total). Within the six-year period there were no fatal crashes along the study corridor. Only two (2) severe crashes were reported along the corridor, with one occurring at the intersection of Colony Road / New Wright Shop Road and Route 210, and the other at the eastern end of the corridor at Riverview Road and Route 210. The combined Fatal + Injury crash total represented 17% (11 total) of all crashes reported during the study period.

Table 2 also includes a summary of the crash severity excluding deer-related incidents. The highest percentage for all crashes without deer were Property Damage Only (76%) and Injury (19%) crashes. The combined Fatal + Injury crash total of 10 represented 24% of all crashes reported during the study period.

Table 2: Route 210 Crashes by Injury Severity

Crash Severity	All Crashes		Deer-Related Crashes Removed	
	Quantity	Percentage	Quantity	Percentage
A. Severe Injury	2	3%	2	5%
B. Visible Injury	9	14%	8	19%
K. Fatal Injury	0	0%	0	0%
PDO. Property Damage Only	54	83%	32	76%
Fatality + Injury (K + A + B)	11	17%	10	24%

2.1.4 Crashes by Collision Type

The number of crashes based on collision type was categorized for the study corridor. The most common collision type was deer collisions, accounting for 23 crashes (35%) during the six-year period. The next highest crash types were rear-end collisions with 16 crashes (25%) and angle collisions with 14 crashes (22%). Both severe injury crashes occurred at angle collisions. **Figure 7** summarizes the crashes by collision types along the study corridor.

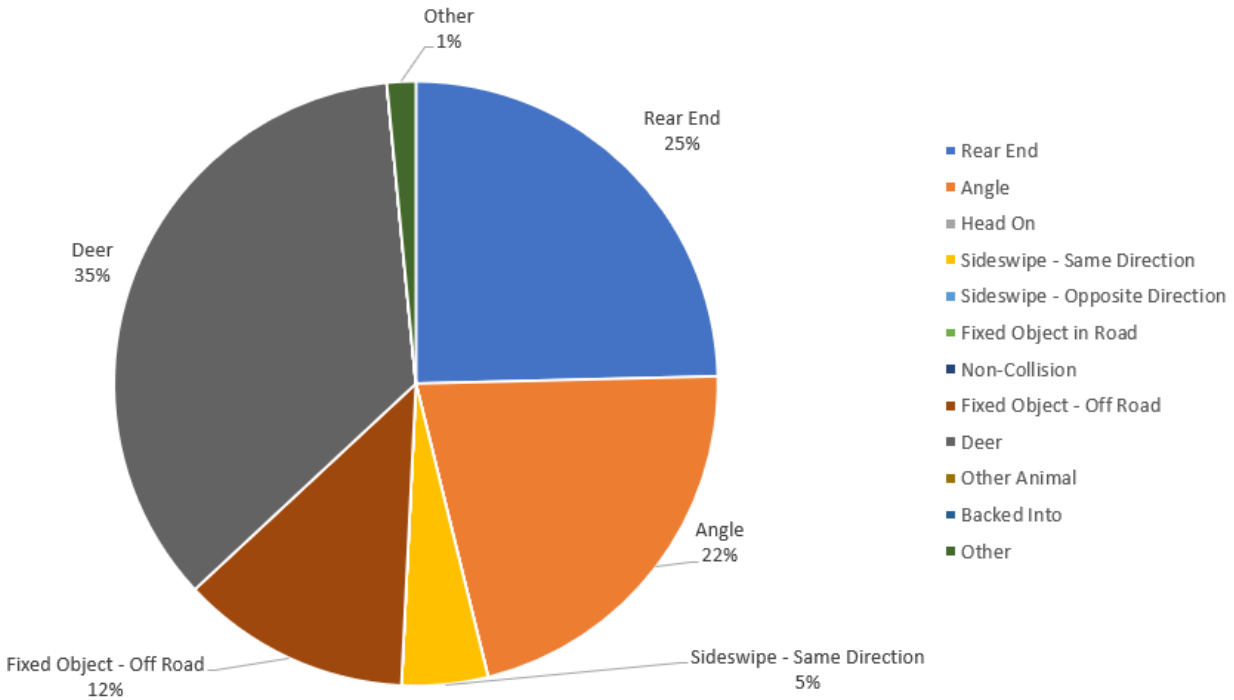


Figure 7: Route 210 Connector Crashes by Collision Type

2.1.5 Crashes by Driving Conditions

Crashes were also studied by the lighting conditions and surface conditions. Most crashes, 35 (54%), occurred during the daylight, while 20 crashes (31%) occurred at night. The remaining incidents occurred during dusk or dawn. Only 5 crashes (8%) occurred with wet or snowy surface conditions while 59 crashes (91%) occurred during dry conditions. One crash occurred during snowy surface conditions.

2.2 Traffic Operational Analysis

Traffic operational analyses for the study intersections along the Route 210 corridor were conducted using the *Synchro* (Version 11). The Existing (2024) *Synchro* model for Route 210 was developed using background aerial imagery to match the existing geometry and lane configuration along the study corridor, and basic input parameters (e.g., effective storage lengths, peak hour factors, link speeds, etc.) were coded in accordance with TOSAM guidelines. Signal timings were inputted based on the existing signal timing plans provided by VDOT.

The measures of effectiveness (MOEs) considered for the Route 210 corridor and intersection analyses included *Highway Capacity Manual* (HCM) control delay (seconds per vehicle) and equivalent level of service, which are used to quantify the operational performance of an intersection. **Table 3** below summarizes the delay associated with each Level of Service (LOS) category for both signalized and unsignalized intersections, respectively.

LOS	Control Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
A	≤10	≤10
B	>10 – 20	>10 – 15
C	>20 – 35	>15 – 25
D	>35 – 55	>25 – 35
E	>55 – 80	>35 – 50
F	>80	>50

Table 3: Signalized and Unsignalized Level of Service (LOS) Criteria

Source: Transportation Research Board, Highway Capacity Manual, 6th Edition

In general, LOS A through LOS C indicates satisfactory operations (for an overall intersection, approach, or individual movement) characterized by minor delays (or no delay), minimal queues which dissipate quickly, and stable traffic flow/maneuverability for vehicles. LOS D is considered the upper threshold for ‘acceptable’ operations on most rural facilities and corresponds to moderate delays and queuing associated with traffic volumes nearing capacity (though still below capacity). LOS E indicates an intersection, approach, or individual movement operating at capacity (or slightly over capacity) based on the associated volume demand and is considered to be acceptable only in high-density urban areas. LOS F indicates failing operations, often characterized by excessive delays and queuing, gridlock conditions, and unserved volume demand at an intersection.

Existing traffic volumes were obtained from previous data collection efforts in the field during November 2024 and December 2024. Volumes for Route 210 and Amherst Highway were taken from a previous study on September 13, 2023 (Wednesday). The AM peak hour for the study area was identified as 7:15 AM to 8:15 AM, and the PM peak hour was identified as 4:30 PM to 5:30 PM. The Existing Conditions (2024) volumes are shown in **Appendix B**.

The Existing (2024) peak hour delay analysis results for the signalized and unsignalized intersections along the corridor are summarized in **Table 4**. During peak hours, all Route 210 signalized intersections are expected to operate at LOS C or better, indicating that they are operating at a satisfactory level. Detailed intersection summary tables with queuing results are included in **Appendix B**. *Synchro* output reports are also included in **Appendix B**.

Study Intersection	AM		PM	
	HCM Delay (sec/veh)	LOS	HCM Delay (s/vehs)	LOS
Amherst Hwy at Route 210 (Signalized)	11.8	B	14.7	B
Main St at Route 210 (Southbound)*	12.6	B	14.6	B
SB Off-Ramp US BUS 29 at Route 210 (Signalized)	9.5	A	9.7	A
NB Off-Ramp US BUS 29 at Route 210 (Signalized)	10.8	B	12	B
Union St/Morris St at Route 210 (Northbound)*	16.1	C	20.9	C
Colony Rd/New Wright Shop Road at Route 210 (Signalized)	22	C	20	B
Riverview Rd at Route 210 (Southbound)*	15	C	13.8	B
US 29 SB Off Ramp at Route 210 (Southbound)*	11.8	B	10.1	B
US 29 NB Off-Ramp Loop at Route 210 (Southbound)*	9.1	A	8.8	A

* Unsignalized intersections report the approach with highest delay and LOS

Table 4: Existing Conditions Intersection Peak Hour Analysis Summary

3 TRAFFIC FORECASTING

Traffic forecasting was conducted with a targeted future year of 2050 for the Route 210 corridor. To develop an Annual Average Growth Rate, two different sources of data were reviewed, including historical growth trends and data from VDOT's Pathways for Planning and the VDOT Lynchburg Travel Demand Model (TDM) outputs. Using the compiled data, an overall growth rate was applied to the study corridor through the existing year volumes to obtain the future year volumes. The forecasting process adheres to the VDOT IIM-TMPD-7.2 (Traffic Forecasting, last revised July 1, 2025) and Forecasting Guidebook guidelines (Version 1.1, May 2024).

3.1 Future Year (2050) Scenarios

The Future Year for Amherst County's traffic forecasting is 2050. Although there are no planned roadway improvements (interchange and other safety-related improvements) within the study area, redevelopment at the CVTC expects to generate thousands of daily trips for the surrounding area. To simulate this potential redevelopment, a trip generation was conducted using the 2022 redevelopment plan from Lynchburg Regional Business Alliance and Amherst County representatives. The trip generation sheet is shown in **Appendix B** within the supplemented forecasting memo.

3.2 Travel Demand Model

The most recent Lynchburg Travel Demand Model (LTDM – Version 3) developed for the Central Virginia Transportation Planning Organization (CVTPO) was used to develop the forecasts for this study. The model was developed using *TransCAD Version 9 Build 32885* with a Base Year of 2022 and a Future Year of 2050. The model was reviewed to verify:

- Future Year (2050) background roadway improvement projects relevant to the study area were incorporated appropriately.
- Future Year (2050) TDM Transportation Analysis Zone (TAZ) results by comparing the number of projected households in the CVTC parcel with the redevelopment plan’s yield summary.

3.3 Growth Rate Development and Recommendation

Historical AADTs (2013-2023) were taken from VDOT’s Pathways for Planning website along with the current and future year forecasts. Along with this, daily volumes for the links (roadway segments) constituting the study corridor and relevant study intersections were extracted from the Lynchburg TDM for the model’s Base Year (2022) and Future Year (2050). Separate growth rates were calculated using the Historical AADTs from VDOT’s Pathways for Planning (P4P) and the Lynchburg TDM volume outputs using Compound Annual Growth Rate methodology.

To accompany the regional demand of the study area, US BUS 29 as well as US 29 highways were mainly used in the development of the corridor’s overall growth rate. As seen in **Table 5**, Growth rate estimates from the TDM were calculated to have a lower average than the corresponding growth rates from VDOT’s P4P website. Growth rate estimates from the TDM indicated that traffic along Route 210 is anticipated to grow at 1.1% overall, while P4P projects a growth rate of almost 1.5%. Based on the feedback from the stakeholders and general experience of the study area, the growth rate estimates from the TDM and P4P represent a feasible range for the surrounding area. Therefore, the final recommended growth rate was averaged from both sources to be 1.3%, as shown in **Table 5**.

	To	From	VDOT P4P	Lynchburg TDM
US 29	Route 210 Exit Ramp	US 29 James River Bridge	1.22%	0.90%
	US 29 MP 77	Route 210 Exit Ramp	2.68%	1.00%
US Bus 29	US BUS 29 End of On-Ramp	US Bus 29 Off-Ramp	0.50%	1.40%
AVERAGE			1.47%	1.10%
			1.30%	

Table 5: Growth Rate Comparison

3.4 Future Year Peak Hour Volume Estimates

The intersection approach volumes and turning movement percentages from Existing Year (2024) volumes were used to estimate Future Year (2050) turning movement volumes (TMVs) based on the growth rate methodology described above. Any discrepancies in the resulting future year volumes from conflicting growth rates were balanced using trends observed from the Lynchburg TDM and engineering volume. The Future Year (2050) No-Build without development volumes are shown in **Appendix B**.

To determine the operational impact of a new intersection to the east of Colony Road, No-Build and Build scenarios were analyzed. The No-Build scenario assumes all generated trips from the redevelopment utilize the existing Colony Road and Route 210 intersection. The Build scenario analyzed a new intersection to the east of Colony Road and assumes that all generated trips are using the new intersection to enter and exit the redevelopment. To determine the proportional split of the generated trips, the TDM's ramp volumes at US 29 and US 29 BUS were used.

Table 6 shows that the redevelopment will produce a significant number of entering and exiting vehicles during the AM and PM peak hours. These result in an increase in turning volumes to/from Route 210 associated with a redeveloped CVTC site. These volumes were incorporated into the Future Year (2050) No-Build volumes in **Appendix B** to produce the two sets of traffic volumes used for the future year analyses. The Future Year (2050) No Build condition and Future Year (2050) Build condition are shown in **Appendix B**, as well.

	AM	PM
Entering	623	834
Exiting	655	803
Total	1278	1637

Table 6: Trip Generation Totals from Potential Redevelopment

3.5 Heavy Vehicle Percentage and Design Factor

Because of the potential for redevelopment at the CVTC, traffic patterns are expected to change as well as the capacity. Since Heavy Vehicle (truck) traffic has a direct impact on the operational capacity of the roadway and physical pavement design, a new Heavy Vehicle percentage and design factor were calculated based on the trip generation methodology. The Heavy Vehicle Percentage was calculated using weighted volumes from the redevelopment plans and was found to be about 3% for the corridor, not expected to meaningfully diminish traffic operations or affect the pavement structure. The design factor was calculated as 0.15 to account for surrounding roadways as well as the TDMs projected AADTs.

4 FUTURE CONDITIONS

4.1 No Build

The Future Year (2050) No Build delay results for the signalized and unsignalized intersections along the corridor are summarized in **Table 7**. Traffic signal timings for the No-Build condition were optimized assuming a retiming effort would occur in the future based on continued growth. Signalized intersections are reported with the overall intersection delay and LOS while the unsignalized intersection report the approach with the highest delay for the peak hour. Detailed intersection summary tables with queuing results are included in **Appendix B**. *Synchro* output reports are also included in **Appendix B**.

The intersection of Route 210 and Amherst Highway is expected to operate at an LOS F in the PM peak hour and the intersection of Route 210 and Colony Road / New Wright Shop Road is expected to operate at a LOS F in both peak hours. The remaining intersections will likely operate as LOS D or better in each peak hour, although some approaches are anticipated to operate at LOS E and F. Notable results from the analysis are cited below.

4.1.1 Unsignalized

- Main Street and Route 210: General growth in the area is anticipated to create a 57 second delay (LOS F) for the southbound movement in the PM peak hour. This is due to the increase in through volumes reducing gaps for the side street.
- Union Street / Morris Street and Route 210: The northbound movement is anticipated to show 67 seconds of delay and 162 seconds of delay in the AM and PM peak hours respectively (LOS F) due to the increase in through volume along Route 210.

4.1.2 Signalized

- Amherst Highway and Route 210: The westbound movement is anticipated to have 123 seconds of delay (LOS F) in the PM peak hour. The northbound movement would have 102 seconds of delay (LOS F) for thru and right-turn movements in the PM Peak Hour. The intersection LOS for the PM peak hour 2050 would be F.
- SB Off Ramp US BUS 29 and Route 210: The westbound and eastbound approach are anticipated to show delays in excess of 40 seconds in the PM peak hour. The overall intersection operations would deteriorate to LOS D in the PM peak hour.
- NB Off Ramp US BUS 29 and Route 210: The northbound approach is anticipated to show 77 seconds of delay (LOS E) in the PM peak hour. Overall, the intersection would have a higher delay in the PM peak hour of 42.3 seconds (LOS D).
- Colony Road / New Wright Shop Road and Route 210: The intersection would lack capacity to process the projected development growth. All approaches in both the AM and PM peak hours would be

anticipated to operate at either LOS E or F. The overall delay for the intersection would be 158.5 seconds in the AM peak hour (LOS F) and 127 seconds in the PM peak hour (LOS F).

Study Intersection	AM		PM	
	HCM Delay (sec/veh)	LOS	HCM Delay (s/vehs)	LOS
Amherst Hwy at Route 210 (Signalized)	25.8	C	83.8	F
Main St at Route 210 (Southbound)*	27.4	D	56.5	F
SB Off-Ramp US BUS 29 at Route 210 (Signalized)	16.2	B	44.4	D
NB Off-Ramp US BUS 29 at Route 210 (Signalized)	17.7	B	42.3	D
Union St/Morris St at Route 210 (Northbound)*	67.2	F	162	F
Colony Rd/New Wright Shop Road at Route 210 (Signalized)	158.5	F	127	F
Riverview Rd at Route 210 (Southbound)*	27.8	D	33.3	D
US 29 SB Off Ramp at Route 210 (Southbound)*	29.7	D	15.1	C
US 29 NB Off-Ramp Loop at Route 210 (Southbound)*	10.3	B	9.5	A

* Unsignalized intersections report the approach with highest delay and LOS

Table 7: Future Year (2050) No Build Intersection Peak Hour Analysis Summary

4.2 Future Year (2050) Build

The Design Year (2050) Build delay analysis results for the signalized and unsignalized intersections along the corridor are summarized in **Table 8**. Traffic signal timings for the Build condition were optimized assuming a retiming effort would occur in the future based on continued growth and to account for the additional redevelopment oriented trips. Signalized intersections are reported with the overall intersection delay and LOS while the unsignalized intersection report the approach with the highest delay for the peak hour. Detailed intersection summary tables with queuing results are included in **Appendix B**. *Synchro* output reports are also included in **Appendix B**.

For this scenario, a new intersection was created to the east of Colony Road / New Wright Shop Road at Route 210 to accommodate generated trips from the redevelopment site. Although the new intersection will operate well with additional trips, nearby signalized intersections like the US 29 BUS interchange will experience operational breakdowns.

Given the proximity and impacts, an initial alternatives screening at the interchange with US 29 BUS was conducted using the *VDOT Junction Screening Tool* (VJuST), a utility which determines which innovative intersection solutions might be appropriate for a given location. The results of the Build analyses and VJuST screening indicate CVTC redevelopment may require increasing the operational capacity of the interchange to maintain satisfactory operations. Future detailed analyses could be necessary to determine the required improvements should redevelopment of the CVTC site move forward. Potential improvement needs would be dependent on what type of redevelopment occurs and the associated

travel demand. A summary of the VJuST outputs is included in **Appendix B**. Notable results from the analysis are cited below.

4.2.1 Unsignalized

- Main Street and Route 210: General growth in the area will create a 57 second delay (LOS F) for the southbound movement in the PM peak hour. This is due to the increase in through volumes reducing gaps for the side street.
- Union Street / Morris Street and Route 210: The northbound movement shows 67 seconds of delay and 162 seconds of delay in the AM and PM peak hours respectively (LOS F) due to the increase in through volume along Route 210.
- US 29 SB Off-Ramp and Route 210: The southbound movement shows a slight breakdown in the AM peak hour due to development in 2050 (29.7 seconds of delay, or LOS D).

4.2.2 Signalized

- Amherst Highway and Route 210: The westbound movement will have 123 seconds of delay (LOS F) in the PM peak hour. The northbound movement will have 102 seconds of delay (LOS F) for thru and right-turn movements in the PM Peak Hour. The intersection LOS for the PM peak hour 2050 is F.
- SB Off Ramp US BUS 29 and Route 210: The westbound and eastbound approach have delays in excess of 40 seconds in the PM peak hour. The overall intersection operations deteriorate to LOS D in the PM peak hour.
- NB Off Ramp US BUS 29 and Route 210: The northbound approach shows 77 seconds of delay (LOS E) in the PM peak hour. Overall, the intersection will have a higher delay in the PM peak hour of 42.3 seconds (LOS D).
- Colony Road / New Wright Shop Road and Route 210: The eastbound and westbound approaches operate at LOS C or better in both the AM and PM peak hours. The northbound and southbound approaches operate at LOS D, E or F in the AM and PM peak hours. Overall the intersection operates at LOS C in both AM and PM peak hours.
- No significant breakdowns were found at the New Development Intersection.

Study Intersection	AM		PM	
	HCM Delay (sec/veh)	LOS	HCM Delay (s/vehs)	LOS
Amherst Hwy at Route 210 (Signalized)	25.8	C	83.8	F
Main St at Route 210 (Southbound)*	27.4	D	56.5	F
SB Off-Ramp US BUS 29 at Route 210 (Signalized)	16.2	B	44.4	D
NB Off-Ramp US BUS 29 at Route 210 (Signalized)	17.7	B	42.3	D
Union St/Morris St at Route 210 (Northbound)*	67.2	F	162	F
Colony Rd/New Wright Shop Road at Route 210 (Signalized)	33.8	C	27.2	C
New Development Intersection (Signalized)	20	B	25.2	C
Riverview Rd at Route 210 (Southbound)*	27.8	D	33.3	D
US 29 SB Off Ramp at Route 210 (Southbound)*	29.7	D	15.1	C
US 29 NB Off-Ramp Loop at Route 210 (Southbound)*	10.2	B	9.5	A

* Unsignalized intersections report the approach with highest delay and LOS

Table 8: Future Year (2050) Build Intersection Peak Hour Analysis Summary

5 PROPOSED BUILD ALTERNATIVES

Three design alternatives are proposed, all focused on safe and efficient access between Route 210 and the CVTC. Each of the alternatives includes a signalized intersection at Route 210 and a tie-in to the existing Colony Road. The principal difference among the alternatives is the corridor alignment, each of which provides a unique vision of how the five existing structures northwest of Colony Road would be reutilized or demolished in accordance with the ultimate plan of development. See **Figure 8** for an overhead comparison of the three alternatives.

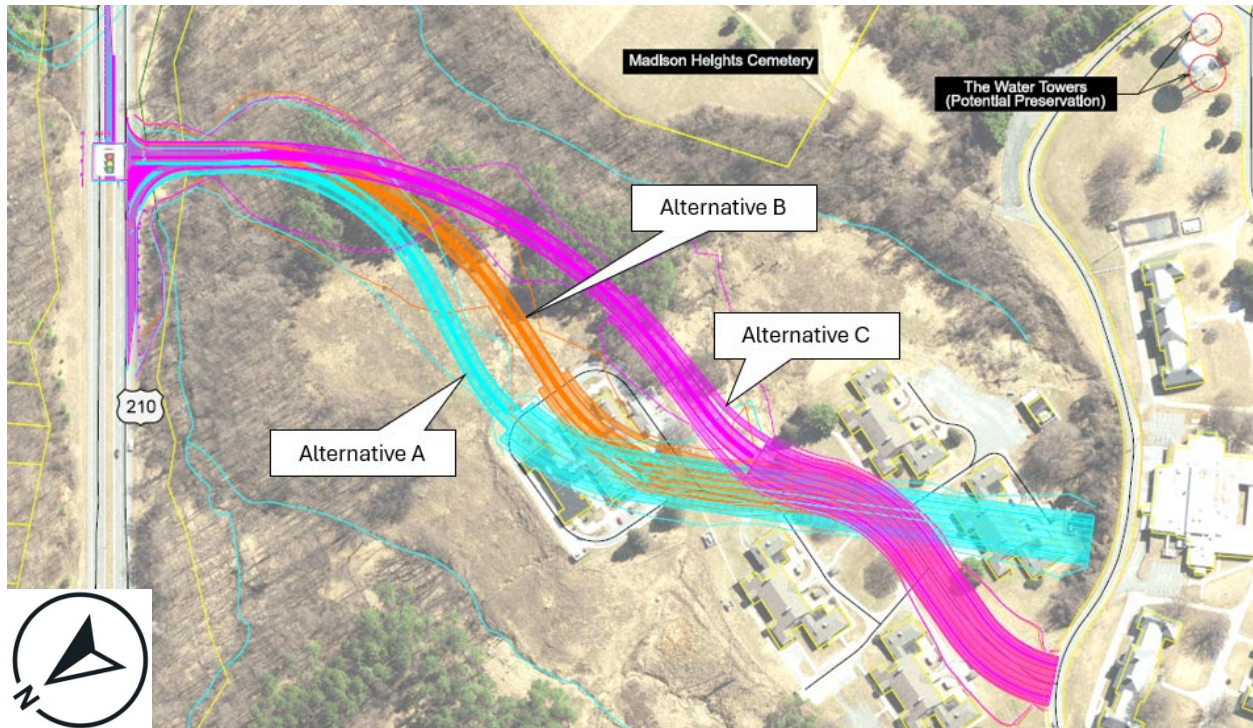


Figure 8. Comparison of Alternatives A, B, and C

The location of the proposed intersection with Route 210, which is consistent across all three alternatives, is approximately 2,300' east of the existing signalized intersection with Colony Road. This location was selected after a field visit indicated it as ideal: it meets minimum signalized intersection spacing requirements from the existing Colony Road signal; the natural contouring at this location allows for less overall earthwork than other points along Route 210; and there is an existing pipe structure that carries the roadside stream under the proposed roadway and towards Williams Run, providing a cost and environmental permitting benefit.

As the entrance road leaves Route 210 and approaches the CVTC, the typical section for all three alternatives includes one travel lane in each direction with a raised grass median in the center and curb and gutter along the outside travel way (see **Figure 9**). The median reduces in width at the intersection to accommodate both a dedicated and left turn lane and a left/right turn lane.

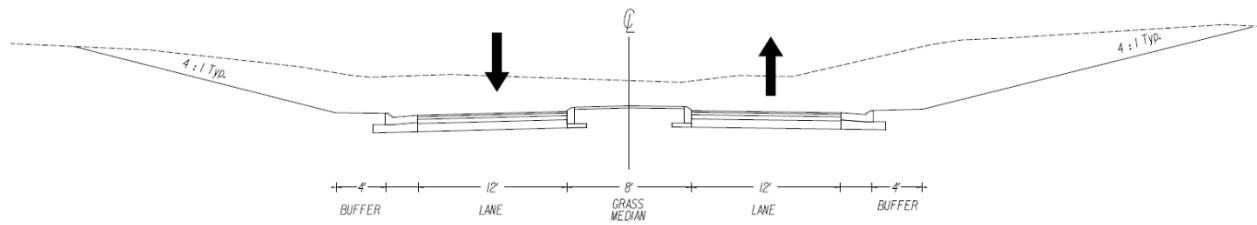


Figure 9. Entrance road typical section, from Route 210 to existing CVTC site.

As the entrance road reaches the existing site elevation and flattens in steepness, the typical section changes to accommodate two through lanes, a two-direction left turn lane, on-street parking, and 10' shared use paths behind the curb and gutter on each side (see **Figure 10**).

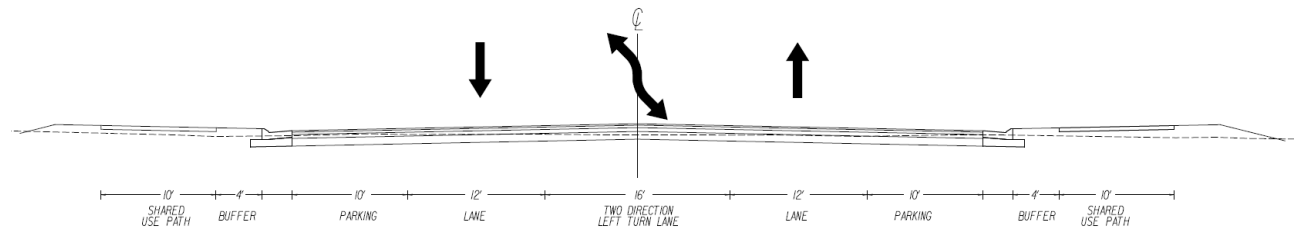


Figure 10. Entrance road typical section, from existing CVTC site to Colony Road.

With respect to drainage, the assumption is that all runoffs will be captured in a closed storm sewer system and treated in underground storage basins adjacent to Route 210. This method has been used in previous VDOT projects and has been found to be sufficient in avoiding the necessity of storm water ponds.

5.1 Alternative A

Alternative A's defining characteristic is the demolition of all five existing buildings northwest of Colony Road (except for the inn). Alternative A is designed to reflect the vision set forth in the *Training Center Redevelopment Plan*, a 2022 study commissioned by the Lynchburg Regional Business Alliance and shown in **Figure 11**. Alternative A seeks consistency with this vision while applying engineering standards and gauging its feasibility.

As shown in **Figure 12**, Alternative A's defining characteristic is the demolition of five existing buildings northwest of Colony Road. In doing so, the land adjacent to the entrance road can be developed to reflect the vision of the *Training Center Redevelopment Plan*. The proposed roadway exits the signalized intersection and ascends towards the site at a 10 percent grade for 900' before transitioning to a 2.5 percent grade and tying into Colony Road. A pair of 408'-radius horizontal curves meets design criteria for a 45-mph design speed. The corridor length between Route 210 and Colony Road is 2,105 feet.

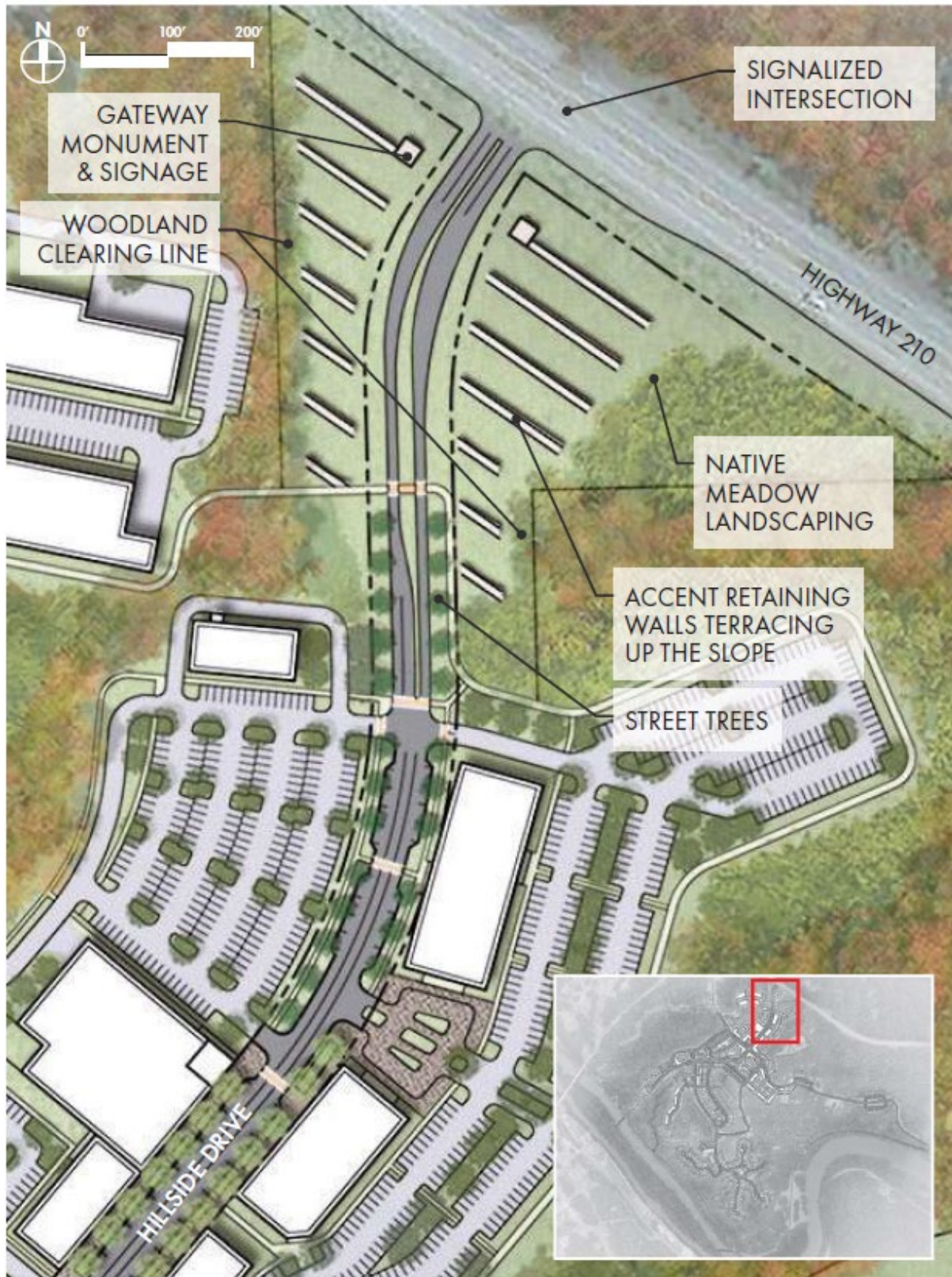


Figure 11. Entrance road as shown in the *Training Center Redevelopment Plan* (April 2022), p. 106.

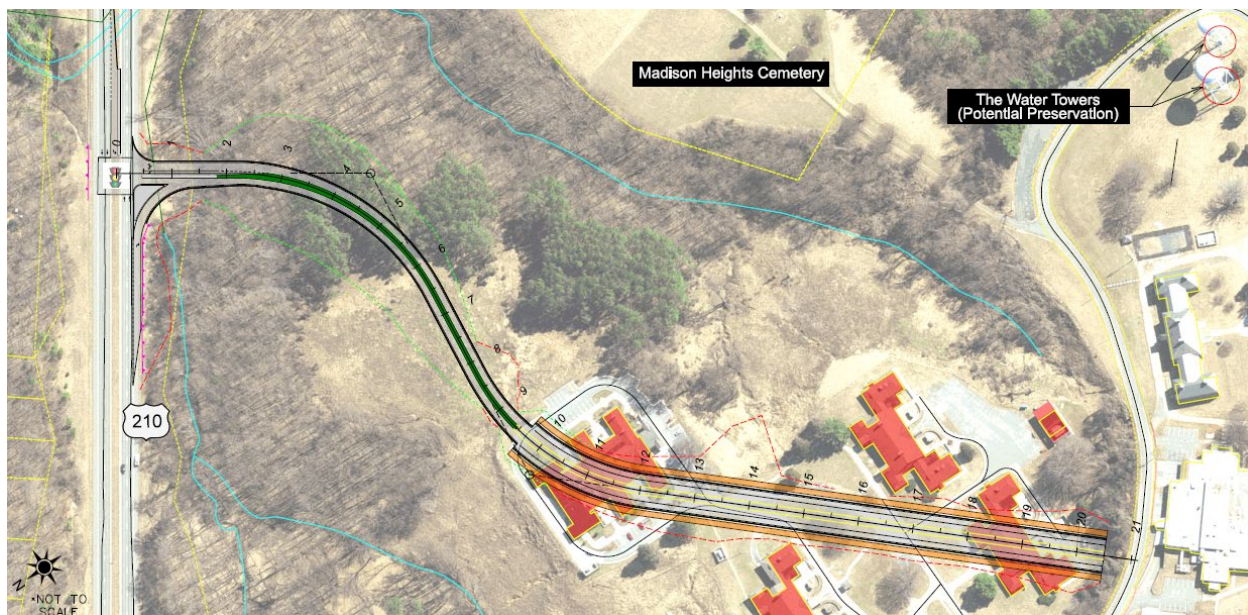


Figure 12. Alternative A

The estimated total project cost of Alternative A is approximately \$19M-\$27M, including the costs to demolish the five aforementioned structures and an approximate earthwork volume of 58,000 cubic yards. This estimate is based on the limited knowledge currently available and is an anticipated range of what this alternative may cost in 2025 dollars. A detailed design will be required for a more refined estimate.

See **Appendix C** for scroll plot of Alternative A.

5.2 Alternative B

Under Alternative B and as shown in **Figure 13**, of the five existing buildings located northwest of Colony Road (excluding the inn), the northernmost existing structure would be demolished, and the other four structures would be retained for further use. The Alternative B entrance road ascends from Route 210 for approximately 1,100' at an 8 percent grade, through the northernmost existing building, and then ties into the existing roadbed to maintain access to the other four remaining buildings. By demolishing the northernmost building, the entrance roadway would be more easily constructed than if all buildings were preserved, as there is additional buffer from the adjacent stream and gentler fill slopes. A series of four horizontal curves meet criteria for a 30-mph design speed. The corridor length between Route 210 and Colony Road is 2,105 feet.



Figure 13. Alternative B

The estimated total project cost of Alternative B is approximately \$19.8M-\$28.2M, including the cost to demolish one structure and an approximate earthwork volume of 87,000 cubic yards. This estimate is based on the limited knowledge currently available and is an anticipated range of what this alternative may cost in 2025 dollars.

See **Appendix C** for scroll plot of Alternative B.

5.3 Alternative C

Under Alternative C and as shown in **Figure 14**, all five existing structures located northwest of Colony Road would be retained. The Alternative C entrance road ascends from Route 210 for approximately 400' at an 8 percent grade, then flattens slightly to a 6 percent grade before reaching the elevation of the five existing structures, which would be available for renovation and reuse. As the alignment winds through the existing structures, it is comprised of a series of curves which meet criteria for a 30-mph design speed. The corridor length between Route 210 and Colony Road is 2,085 feet.

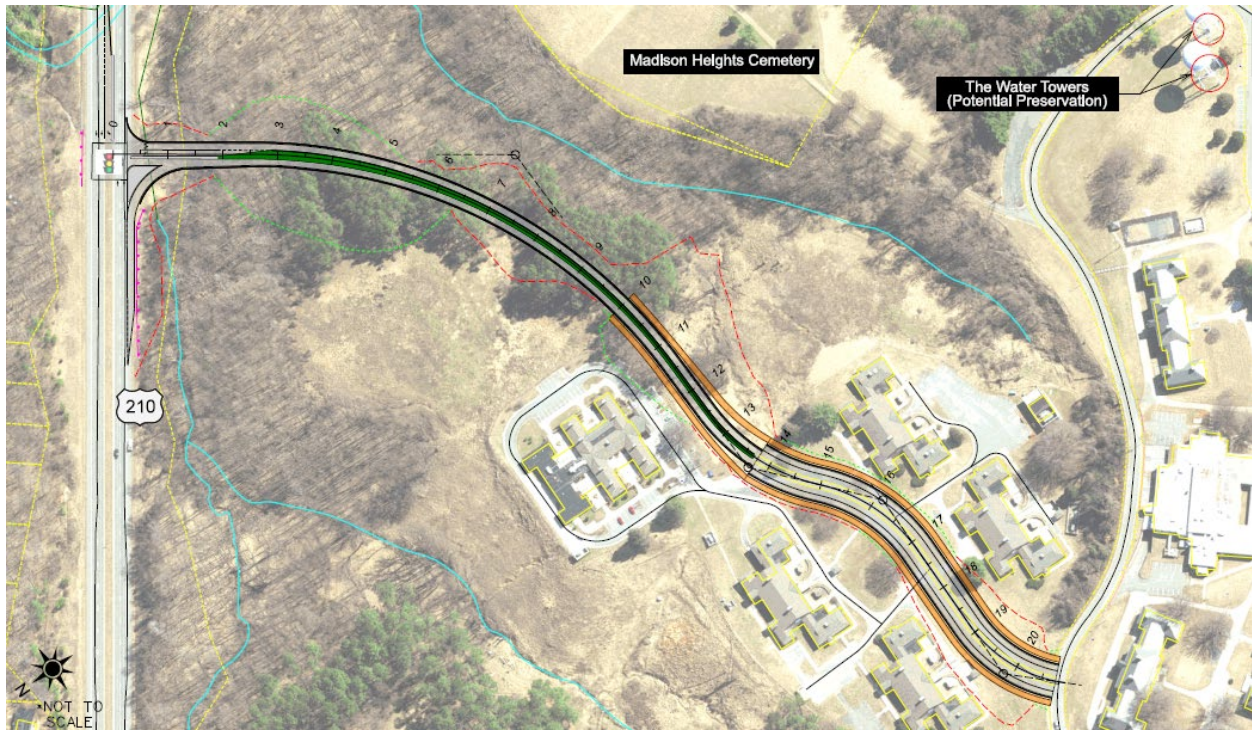


Figure 14. Alternative C

The estimated total project cost of Alternative C is approximately \$14M-\$20M, including an approximate earthwork volume of 47,000 cubic yards. This estimate is based on the limited knowledge currently available and is an anticipated range of what this alternative may cost in 2025 dollars.

See **Appendix C** for scroll plot of Alternative C.

6 CONCLUSIONS

The purpose of this study was to evaluate the costs to build a connector road from the CVTC to Route 210. Three alternatives are proposed with estimated cost ranges for each. In addition, the study evaluates existing operational and safety conditions on Route 210 from Amherst Highway to the US 29 interchange, including crash analysis, traffic forecasting, and detailed operational analysis.

As a result, Route 210 and Colony Road / New Wright Shop Road will experience a degradation of operations due to potential development at the CVTC. A new traditional, signalized T intersection to the east of Colony Road to distribute the traffic demand from the redevelopment is recommended. The new intersection would operate at an acceptable level of service and limit impacts on the operations at Colony Road / New Wright Shop Road. Route 210 at Amherst Highway, as well as the US 29 BUS interchange, are expected to experience operational breakdowns as a result of the additional trips associated with the CVTC.

If redevelopment occurs at the CVTC, the interchange with US 29 BUS may require an increase to operational capacity to maintain satisfactory operations. Ultimately, the potential improvement needs at the interchange would be highly dependent on what redevelopment occurs and the associated travel demand at the CVTC.

Of Alternatives A, B, and C, the selected development alternative for the Amherst County Connector should balance desires for the new roadway and vision for the utilization of existing structures. Each alternative offers varying land use and transportation-related characteristics.

- **Alternative A** prioritizes new development with the demolition of all buildings, aligning with the original vision for the new development site laid out by the Lynchburg Regional Business Alliance. This alternative also accommodates the highest design speed (45 mph), providing the most efficient access into the new area.
- **Alternative B** offers a hybrid approach, removing the building closest to Route 210 and preserving the other four. By doing so, the entrance roadway is more easily constructed than if all buildings were preserved, as there is additional buffer from the adjacent stream and gentler fill slopes. The design speed dictated by the proposed curvature is 30 mph.
- **Alternative C** is the lowest cost solution as it avoids the demolition of existing structures and utilizes as much of the current site as possible. If future development trends favor retaining existing infrastructure while still gaining improved access over a no-build scenario, Alternative C presents a preservation-focused solution. The design speed dictated by the proposed curvature is 30 mph.

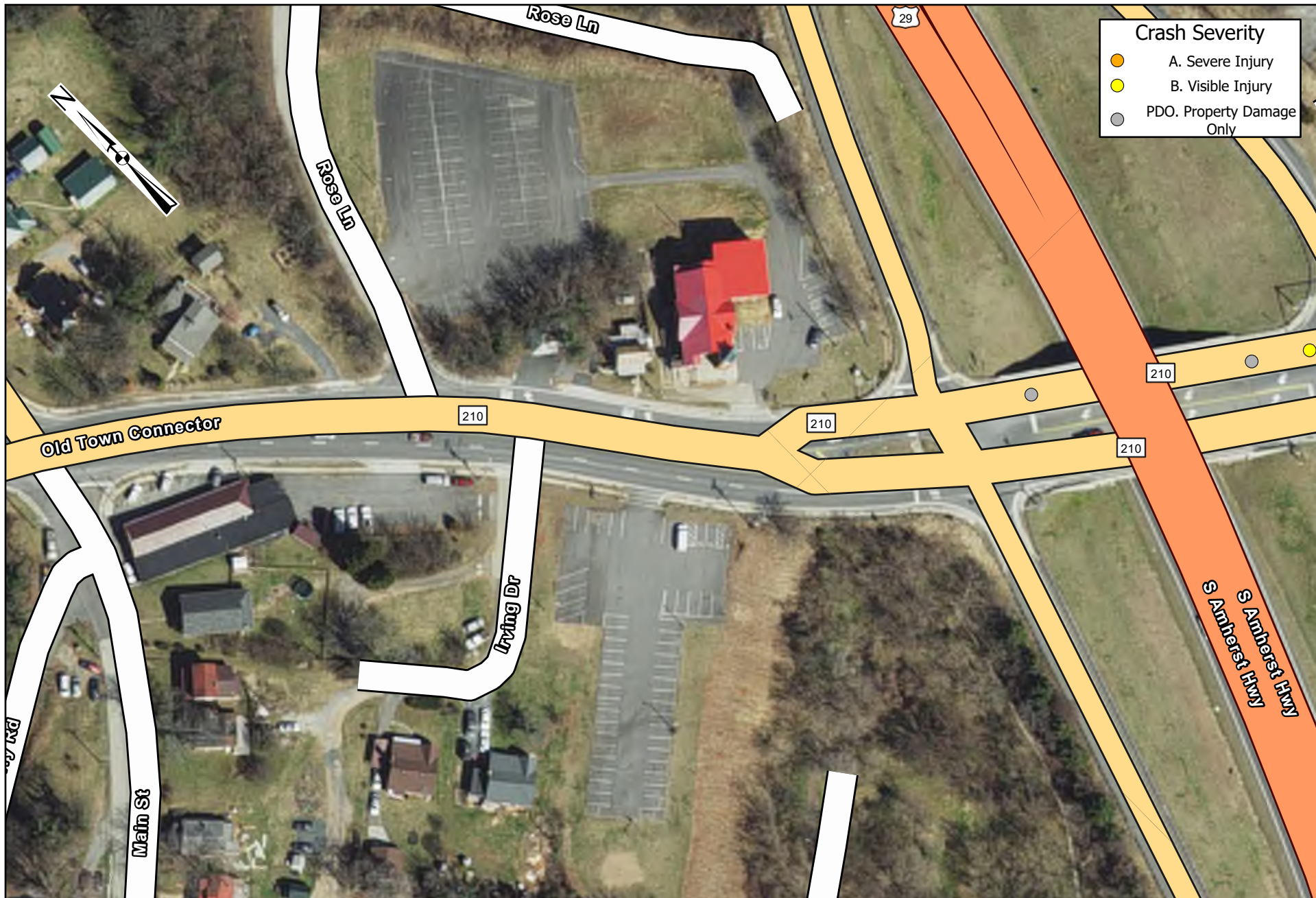
6.1 Preliminary Cost Estimate

The planning-level cost of the three alternatives was estimated using VDOT's Project Estimating tools. Cost estimates were based on conceptual designs. **Table 9** sets out the preliminary engineering (PE), right-of-way (RW), construction (CN), and total planning-level cost in 2025 dollars for each alternative. **The estimated values shown are based on the limited knowledge currently available and are an anticipated planning level / order of magnitude range of what each alternative may cost in 2025 dollars.**

Proposed Improvement	Preliminary Engineering (PE)	Right-of-way and Utility Relocation (RW)	Construction (CN)	Total
Alternative A	\$2M - \$3M	\$3M - \$4M	\$14M - \$20M	\$19M - \$27M
Alternative B	\$2M - \$3M	\$0.8M - \$1.2M	\$17M - \$24M	\$19.8M - \$28.2M
Alternative C	\$2M - \$3M	(None)	\$12M - \$17M	\$14M - \$20M

Table 9. Planning-Level Cost Estimate in 2025 Dollars

APPENDIX A – AMHERST CO. CRASH LAYOUTS



Sheet #:	Scale:	Task Description:	
2	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



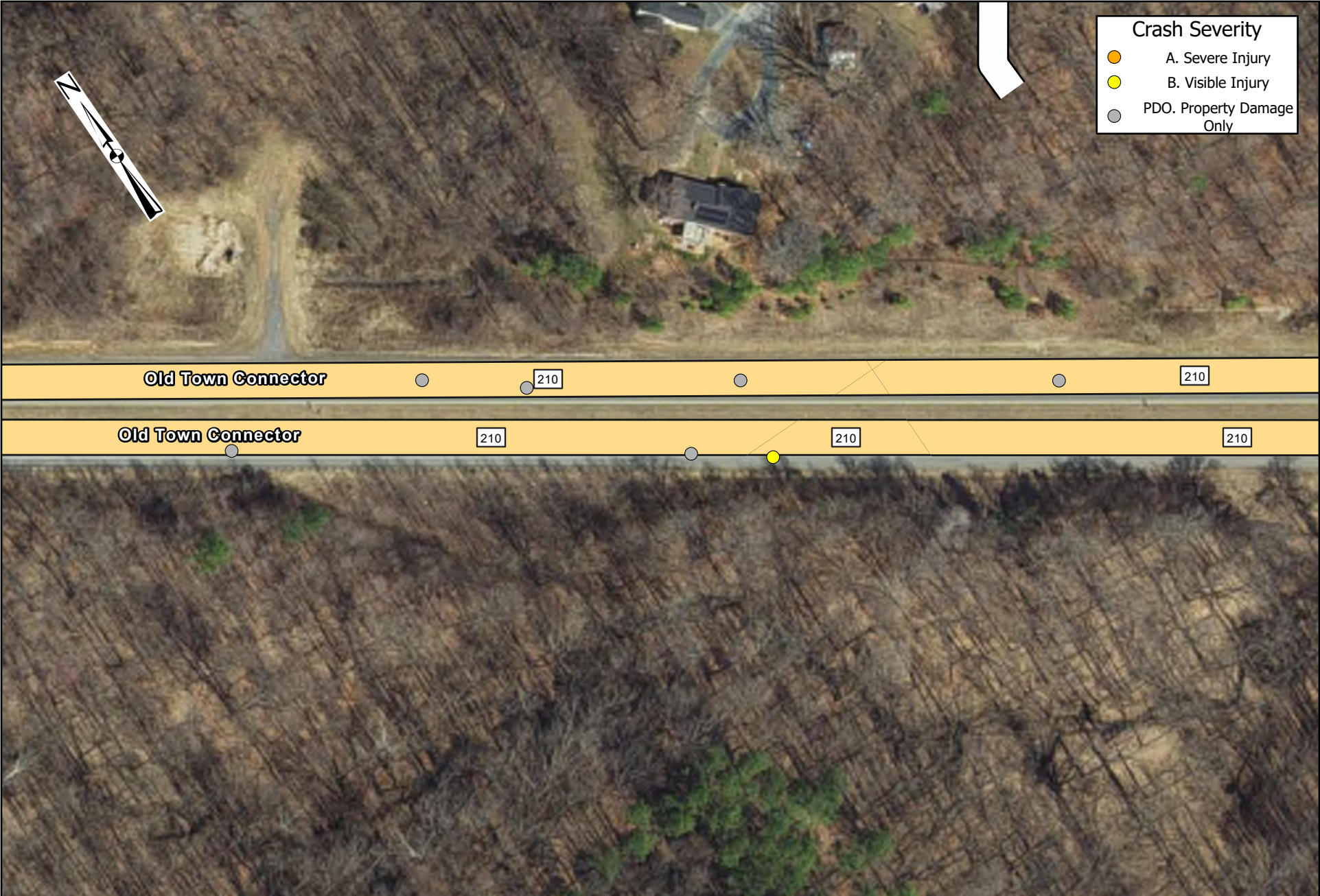
Sheet #:	Scale:	Task Description:	
3	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



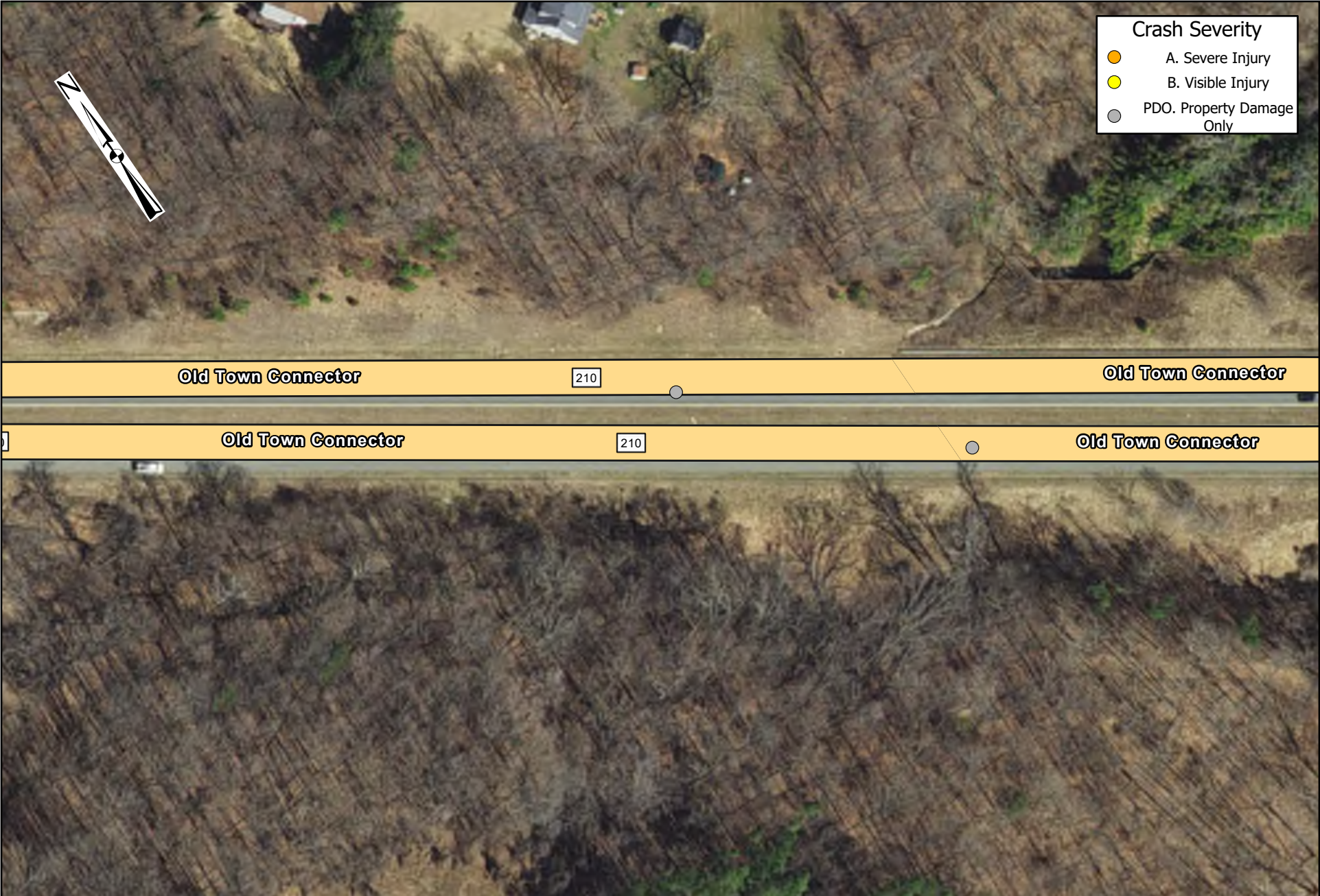
Crash Severity

- A. Severe Injury
- B. Visible Injury
- PDO. Property Damage Only

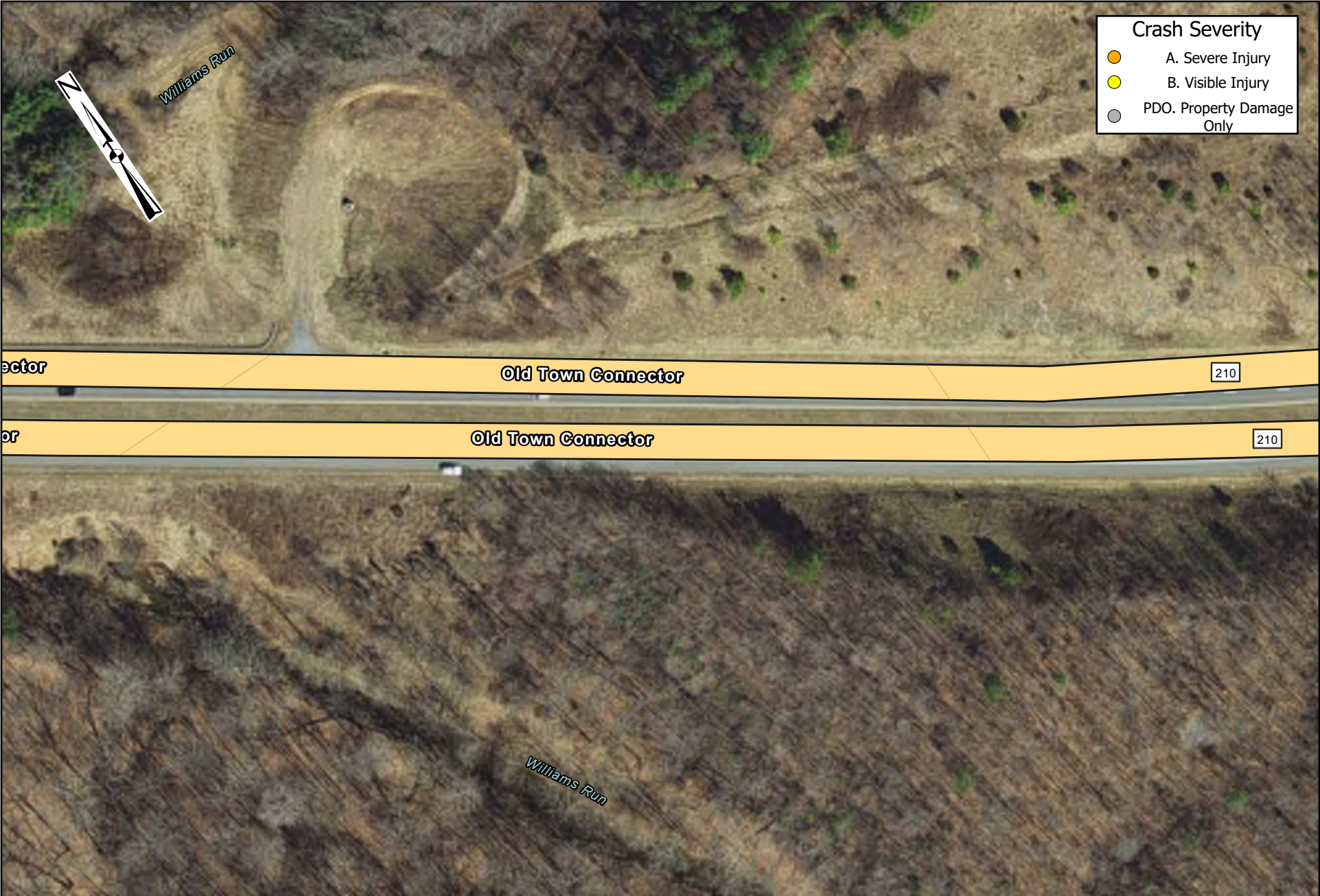
Sheet #:	Scale:	Task Description:	
4	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
5	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	




Sheet #:	Scale:	Task Description:	
6	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
7	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
8	0 100 200  US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
9	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



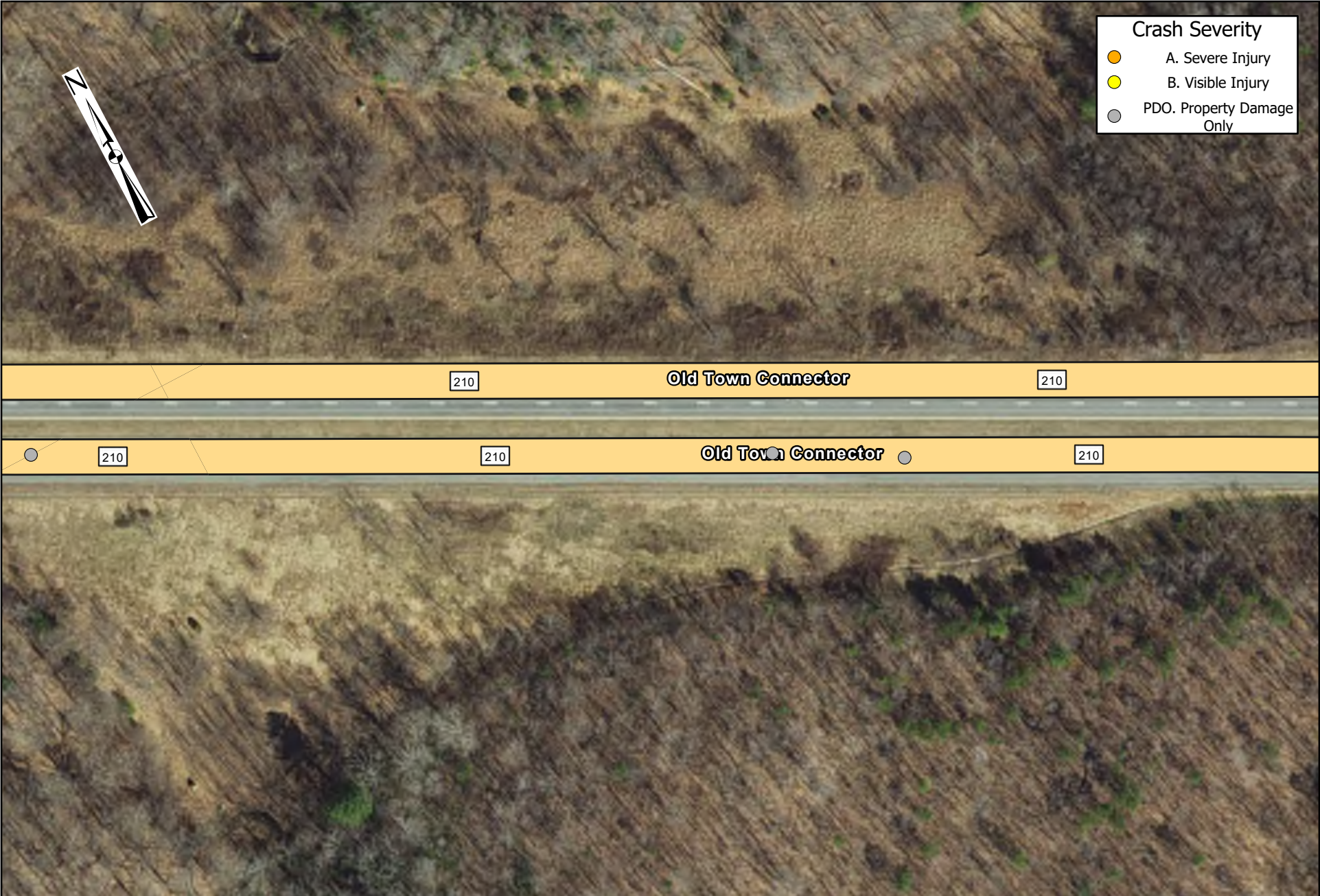
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10	0100200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
11	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
12	0100200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
13	0100200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
14	0 100 200 US Feet	Route 210 - Crash Locations and Severity Amherst County, VA	



Sheet #:	Scale:	Task Description:	
15	0 100 200 US Feet	Route 210 - Crash Locations and Severity	
		Amherst County, VA	



Sheet #:

16

Scale:

0 200 400
US Feet

Task Description:
Route 210 - Crash Locations and Severity
Amherst County, VA

APPENDIX B – TRAFFIC ANALYSIS DOCUMENTATION

EXISTING CONDITIONS TRAFFIC VOLUMES



<div>1</div> <div>Amhert Hwy & Route 210</div> <div><div><div><div>364(273)</div><div>25(40)</div></div><div><div>12(16)</div><div>193(136)</div></div></div><div><div>204(471)</div><div>125(221)</div></div></div>	<div>2</div> <div>Main St & Route 210</div> <div><div><div><div>1(0)</div><div>4(8)</div><div>3(8)</div></div><div><div>14(13)</div><div>200(144)</div><div>36(46)</div></div></div><div><div>0(2)</div><div>143(238)</div><div>7(21)</div></div><div><div>4(8)</div><div>21(26)</div><div>35(41)</div></div></div>	<div>3</div> <div>US 29 BUS SB & Route 210</div> <div><div><div><div>12(13)</div><div>35(68)</div></div><div><div>238(190)</div><div>348(208)</div></div></div><div><div>140(243)</div><div>41(44)</div></div></div>	<div>4</div> <div>US 29 BUS NB & Route 210</div> <div><div><div><div>84(81)</div><div>552(350)</div></div><div><div>11(10)</div><div>164(301)</div></div></div><div><div>34(48)</div><div>2(0)</div><div>158(319)</div></div></div>	<div>5</div> <div>Morris St. / Union St. & Route 210</div> <div><div><div><div>9(10)</div><div>0(0)</div><div>0(4)</div></div><div><div>2(2)</div><div>626(420)</div><div>0(1)</div></div></div><div><div>6(7)</div><div>315(612)</div><div>1(1)</div></div><div><div>1(1)</div><div>0(0)</div><div>0(0)</div></div></div>
<div>6</div> <div>Colony Rd. / New Wright Shop Rd. & Route 210</div> <div><div><div><div>197(108)</div><div>0(5)</div><div>22(19)</div></div><div><div>4(23)</div><div>420(285)</div><div>14(1)</div></div></div><div><div>59(221)</div><div>242(375)</div><div>14(20)</div></div><div><div>11(30)</div><div>1(4)</div><div>3(14)</div></div></div>	<div>7</div> <div>Riverview Rd & Route 210</div> <div><div><div><div>8(6)</div><div>0(0)</div><div>16(23)</div></div><div><div>19(23)</div><div>426(297)</div><div>14(7)</div></div></div><div><div>4(5)</div><div>255(394)</div><div>8(9)</div></div><div><div>4(7)</div><div>0(2)</div><div>6(5)</div></div></div>	<div>8</div> <div>US 29 SB & Route 210</div> <div><div><div><div>268(198)</div><div>2(1)</div><div>1(0)</div></div><div><div>191(129)</div><div>0(1)</div></div></div><div><div>0(1)</div><div>166(239)</div><div>111(182)</div></div><div><div>0(1)</div><div>0(1)</div></div></div>	<div>9</div> <div>US 29 NB Off Ramp</div> <div><div><div><div>191(128)</div><div>0(0)</div></div><div><div>0(2)</div></div></div><div><div>167(240)</div></div></div>	<div>10</div> <div>US 29 NB On Ramp</div> <div><div><div><div>2(1)</div><div>0(2)</div></div><div><div>164(236)</div><div>3(4)</div></div></div></div>



Amherst County Connector Study
2024 Peak Hour Traffic Volumes

AM(PM)

Date:
08/2025

EXISTING CONDITIONS RESULTS TABLES

SYNCHRO CAPACITY ANALYSIS - INTERSECTION LEVEL OF SERVICE SUMMARY
2024Existing Volumes [No Build]
Amherst County Connector Road Study - Lynchburg, Virginia

Intersection Number and Description		Type of Control	Lane Group	Eastbound					Westbound					Northbound					Southbound					Overall																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Approach									20.4	C	†	34.1	C	†	†	13.0	B	†	15.2	B	†	†	6.2	A	†	4.2	A	†	†	B	B																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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			Left	0.0	A	†	7.5	A	†	†	7.6	A	18	7.9	A	18	136.0	11.0	B	51	12.3	B	51	†	12.6	B	31	14.6	B	31	†	Delay	Delay																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
			Through								†	†	†	†	†	†	†															2.2	2.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
			Right								†	†	†	†	†	†	†															†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†












HCM 2000 Results
NOTE: Lane configurations with a shared through lane shown as "through" lane group. Lane configurations with shared left-right lane shown as "left" lane group.
† SYNCHRO does not provide level of service or delay for movements with no conflicting volumes.

EXISTING CONDITIONS *SYNCHRO* REPORTS

Lanes, Volumes, Timings

4: Amherst Hwy & Route 210

09/09/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	193	12	204	125	25	364
Future Volume (vph)	193	12	204	125	25	364
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	3%		0%			0%
Storage Length (ft)	0	50		0	124	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.949			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1726	1360	1744	0	1736	1863
Flt Permitted	0.950				0.487	
Satd. Flow (perm)	1726	1360	1744	0	890	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		7	27			
Link Speed (mph)	35		35			35
Link Distance (ft)	1859		865			1227
Travel Time (s)	36.2		16.9			23.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	17%	3%	4%	4%	2%
Adj. Flow (vph)	210	13	222	136	27	396
Shared Lane Traffic (%)						
Lane Group Flow (vph)	210	13	358	0	27	396
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA		D.P+P	NA

Lanes, Volumes, Timings

4: Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	4	4	6		5	2
Permitted Phases					6	
Detector Phase	4	4	6		5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0
Minimum Split (s)	12.7	12.7	17.7		12.7	17.7
Total Split (s)	45.7	45.7	55.7		30.7	55.7
Total Split (%)	34.6%	34.6%	42.2%		23.2%	42.2%
Maximum Green (s)	40.0	40.0	50.0		25.0	50.0
Yellow Time (s)	3.0	3.0	3.9		3.9	3.9
All-Red Time (s)	2.7	2.7	1.8		1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	7.0		3.0	7.0
Minimum Gap (s)	2.5	2.5	2.5		0.2	2.5
Time Before Reduce (s)	8.0	8.0	8.0		0.0	8.0
Time To Reduce (s)	10.0	10.0	10.0		0.0	10.0
Recall Mode	None	None	Min		None	Min
Act Effect Green (s)	13.4	13.4	21.6		23.7	25.5
Actuated g/C Ratio	0.26	0.26	0.42		0.46	0.50
v/c Ratio	0.46	0.04	0.48		0.05	0.43
Control Delay	21.9	14.1	14.5		7.0	9.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.9	14.1	14.5		7.0	9.7
LOS	C	B	B		A	A
Approach Delay	21.4		14.5			9.6
Approach LOS	C		B			A
Queue Length 50th (ft)	43	1	53		4	65
Queue Length 95th (ft)	138	14	184		14	142
Internal Link Dist (ft)	1779		785			1147
Turn Bay Length (ft)		50			124	
Base Capacity (vph)	1407	1110	1565		985	1863
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	0.15	0.01	0.23		0.03	0.21

Intersection Summary

Area Type: Other

Cycle Length: 132.1

Actuated Cycle Length: 51.1

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 41.0%

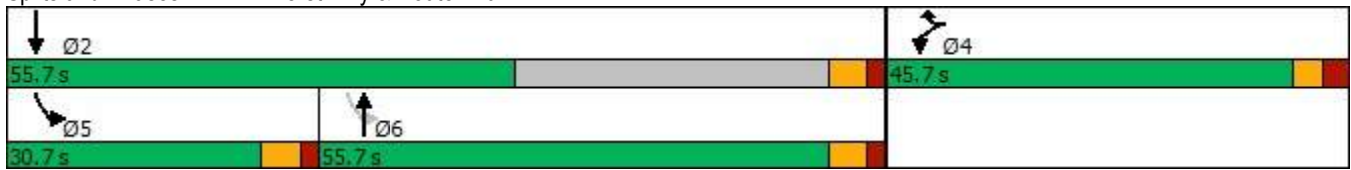
ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings 4: Amherst Hwy & Route 210

09/09/2025

Splits and Phases: 4: Amherst Hwy & Route 210








HCM 6th Signalized Intersection Summary

4: Amherst Hwy & Route 210

09/09/2025




















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	193	12	204	125	25	364
Future Volume (veh/h)	193	12	204	125	25	364
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	1803	1595	1856	1841	1841	1870
Adj Flow Rate, veh/h	210	13	222	136	27	396
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	17	3	4	4	2
Cap, veh/h	284	224	421	258	481	1063
Arrive On Green	0.17	0.17	0.39	0.39	0.04	0.57
Sat Flow, veh/h	1717	1352	1077	660	1753	1870
Grp Volume(v), veh/h	210	13	0	358	27	396
Grp Sat Flow(s),veh/h/ln	1717	1352	0	1737	1753	1870
Q Serve(g_s), s	5.0	0.3	0.0	6.8	0.4	5.0
Cycle Q Clear(g_c), s	5.0	0.3	0.0	6.8	0.4	5.0
Prop In Lane	1.00	1.00		0.38	1.00	
Lane Grp Cap(c), veh/h	284	224	0	678	481	1063
V/C Ratio(X)	0.74	0.06	0.00	0.53	0.06	0.37
Avail Cap(c_a), veh/h	1602	1262	0	2026	1425	2182
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	15.1	0.0	10.0	7.5	5.1
Incr Delay (d2), s/veh	3.8	0.1	0.0	2.9	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.3	0.0	2.4	0.1	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.8	15.2	0.0	13.0	7.5	6.1
LnGrp LOS	C	B	A	B	A	A
Approach Vol, veh/h	223		358			423
Approach Delay, s/veh	20.4		13.0			6.2
Approach LOS	C		B			A
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	30.1		12.8		7.6	22.4
Change Period (Y+Rc), s	* 5.7		* 5.7		* 5.7	* 5.7
Max Green Setting (Gmax), s	* 50		* 40		* 25	* 50
Max Q Clear Time (g_c+I1), s	7.0		7.0		2.4	8.8
Green Ext Time (p_c), s	8.9		0.6		0.0	8.0
Intersection Summary						
HCM 6th Ctrl Delay			11.8			
HCM 6th LOS			B			
Notes						

Lanes, Volumes, Timings






2: Main St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	143	7	36	200	14	4	21	35	3	4	1
Future Volume (vph)	0	143	7	36	200	14	4	21	35	3	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			1%	
Storage Length (ft)	0		0	136		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.990			0.921			0.983	
Flt Protected				0.950				0.997			0.982	
Satd. Flow (prot)	0	1746	0	1805	1797	0	0	1745	0	0	1825	0
Flt Permitted				0.950				0.997			0.982	
Satd. Flow (perm)	0	1746	0	1805	1797	0	0	1745	0	0	1825	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1859			310			644			686	
Travel Time (s)		50.7			8.5			17.6			18.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	4%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	0	154	8	39	215	15	4	23	38	3	4	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	162	0	39	230	0	0	65	0	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.03	1.05	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	32.9%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
2: Main St & Route 210

















09/09/2025

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	143	7	36	200	14	4	21	35	3	4	1
Future Vol, veh/h	0	143	7	36	200	14	4	21	35	3	4	1
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	-	-	-	136	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	4	-	-	0	-	-	0	-	-	1	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	4	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	0	154	8	39	215	15	4	23	38	3	4	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	230	0	0	162	0	0	461	466	158	490	463	223
Stage 1	-	-	-	-	-	-	158	158	-	301	301	-
Stage 2	-	-	-	-	-	-	303	308	-	189	162	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.3	6.7	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.3	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1350	-	-	1429	-	-	514	497	893	479	486	816
Stage 1	-	-	-	-	-	-	849	771	-	701	657	-
Stage 2	-	-	-	-	-	-	711	664	-	809	761	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1350	-	-	1429	-	-	499	484	893	433	473	816
Mov Cap-2 Maneuver	-	-	-	-	-	-	499	484	-	433	473	-
Stage 1	-	-	-	-	-	-	849	771	-	701	639	-
Stage 2	-	-	-	-	-	-	686	646	-	752	761	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.1			11			12.6		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	662	1350	-	-	1429	-	-	482				
HCM Lane V/C Ratio	0.097	-	-	-	0.027	-	-	0.018				
HCM Control Delay (s)	11	0	-	-	7.6	-	-	12.6				
HCM Lane LOS	B	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1				

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	140	41	348	238	0	0	0	0	35	0	12
Future Volume (vph)	0	140	41	348	238	0	0	0	0	35	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Storage Length (ft)	0		0	210		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966									0.966	
Flt Protected				0.950							0.964	
Satd. Flow (prot)	0	3389	0	1752	3539	0	0	0	0	0	1652	0
Flt Permitted				0.625							0.964	
Satd. Flow (perm)	0	3389	0	1153	3539	0	0	0	0	0	1652	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41									118	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		398			329			900			621	
Travel Time (s)		10.9			9.0			17.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	6%	3%	2%	0%	0%	0%	0%	8%	0%	0%
Adj. Flow (vph)	0	156	46	387	264	0	0	0	0	39	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	202	0	387	264	0	0	0	0	0	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA		D,P+P	NA					Perm	NA	

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29













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Lane Group	Ø5	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Grade (%)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0		8.0	10.0					8.0	8.0	
Minimum Split (s)		15.6		13.6	15.6					13.8	13.8	
Total Split (s)		55.6		25.6	55.6					35.8	35.8	
Total Split (%)		43.6%		20.1%	43.6%					28.1%	28.1%	
Maximum Green (s)		50.0		20.0	50.0					30.0	30.0	
Yellow Time (s)		3.4		3.4	3.4					3.6	3.6	
All-Red Time (s)		2.2		2.2	2.2					2.2	2.2	
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	
Total Lost Time (s)		5.6		5.6	5.6						5.8	
Lead/Lag		Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Vehicle Extension (s)		5.0		2.5	5.0					3.0	3.0	
Minimum Gap (s)		4.0		2.0	4.0					2.5	2.5	
Time Before Reduce (s)		8.0		8.0	8.0					8.0	8.0	
Time To Reduce (s)		10.0		10.0	10.0					10.0	10.0	
Recall Mode		Min		None	Min					None	None	
Act Effect Green (s)		13.8		24.9	28.8						9.0	
Actuated g/C Ratio		0.27		0.48	0.56						0.17	
v/c Ratio		0.22		0.56	0.13						0.14	
Control Delay		12.1		10.1	3.9						0.7	
Queue Delay		0.0		0.0	0.0						0.0	
Total Delay		12.1		10.1	3.9						0.7	
LOS		B		B	A						A	
Approach Delay		12.1			7.6						0.7	
Approach LOS		B			A						A	
Queue Length 50th (ft)		18		30	8						0	
Queue Length 95th (ft)		43		68	19						2	
Internal Link Dist (ft)		318			249			820			541	
Turn Bay Length (ft)				210								
Base Capacity (vph)		3271		922	3316						1051	
Starvation Cap Reductn		0		0	0						0	
Spillback Cap Reductn		0		0	0						0	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.06		0.42	0.08						0.05	

Intersection Summary

Area Type: Other

Cycle Length: 127.4

Actuated Cycle Length: 51.7

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 8.2

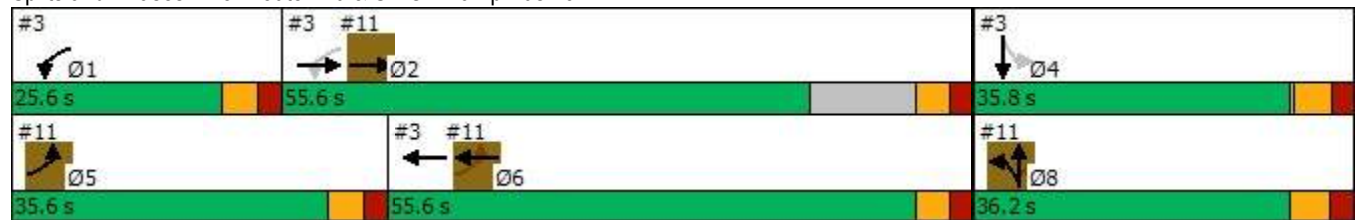
Intersection LOS: A

Intersection Capacity Utilization 48.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Route 210 & SB Off-Ramp Bus 29



Lanes, Volumes, Timings
3: Route 210 & SB Off-Ramp Bus 29

















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Lane Group	Ø5	Ø8
Protected Phases	5	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.8	8.0
Minimum Split (s)	13.6	14.2
Total Split (s)	35.6	36.2
Total Split (%)	28%	28%
Maximum Green (s)	30.0	30.0
Yellow Time (s)	3.4	3.8
All-Red Time (s)	2.2	2.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

3: Route 210 & SB Off-Ramp Bus 29




















09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	140	41	348	238	0	0	0	0	35	0	12
Future Volume (vph)	0	140	41	348	238	0	0	0	0	35	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Total Lost time (s)		5.6		5.6	5.6						5.8	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Frt		0.97		1.00	1.00						0.97	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3388		1752	3539						1653	
Flt Permitted		1.00		0.62	1.00						0.96	
Satd. Flow (perm)		3388		1153	3539						1653	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	156	46	387	264	0	0	0	0	39	0	13
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	175	0	387	264	0	0	0	0	0	8	0
Heavy Vehicles (%)	0%	2%	6%	3%	2%	0%	0%	0%	0%	8%	0%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Actuated Green, G (s)		18.7		29.9	28.8						9.1	
Effective Green, g (s)		18.7		29.9	28.8						9.1	
Actuated g/C Ratio		0.33		0.53	0.51						0.16	
Clearance Time (s)		5.6		5.6	5.6						5.8	
Vehicle Extension (s)		5.0		2.5	5.0						3.0	
Lane Grp Cap (vph)		1131		735	1820						268	
v/s Ratio Prot		0.05		c0.11	0.07							
v/s Ratio Perm				c0.18							0.01	
v/c Ratio		0.15		0.53	0.15						0.03	
Uniform Delay, d1		13.1		7.8	7.1						19.7	
Progression Factor		1.00		1.18	0.59						1.00	
Incremental Delay, d2		0.1		0.5	0.1						0.0	
Delay (s)		13.2		9.7	4.3						19.8	
Level of Service		B		A	A						B	
Approach Delay (s)		13.2			7.5			0.0			19.8	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM 2000 Control Delay			9.5			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			56.0			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			48.4%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

11: NB Off Ramp Bus 29 & Route 210













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	11	164	0	0	552	84	34	2	158	0	0	0
Future Volume (vph)	11	164	0	0	552	84	34	2	158	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Storage Length (ft)	0		0	0		0	135		0	0		0
Storage Lanes	1		0	0		0	1		1	0		0
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.980				0.850			
Flt Protected	0.950							0.955				
Satd. Flow (prot)	1805	3471	0	0	3430	0	0	1665	1478	0	0	0
Flt Permitted	0.364							0.955				
Satd. Flow (perm)	692	3471	0	0	3430	0	0	1665	1478	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					16				176			
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		329			350			921			690	
Travel Time (s)		9.0			9.5			14.0			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	0%	3%	4%	6%	0%	6%	0%	0%	0%
Adj. Flow (vph)	12	182	0	0	613	93	38	2	176	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	182	0	0	706	0	0	40	176	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	D.P+P	NA			NA		Split	NA	Perm			

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Grade (%)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	7.8	10.0			10.0		8.0	8.0	8.0			
Minimum Split (s)	13.6	15.6			15.6		14.2	14.2	14.2			
Total Split (s)	35.6	55.6			55.6		36.2	36.2	36.2			
Total Split (%)	27.9%	43.6%			43.6%		28.4%	28.4%	28.4%			
Maximum Green (s)	30.0	50.0			50.0		30.0	30.0	30.0			
Yellow Time (s)	3.4	3.4			3.4		3.8	3.8	3.8			
All-Red Time (s)	2.2	2.2			2.2		2.4	2.4	2.4			
Lost Time Adjust (s)	0.0	0.0			0.0			0.0	0.0			
Total Lost Time (s)	5.6	5.6			5.6			6.2	6.2			
Lead/Lag	Lead	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	2.5	5.0			5.0		3.0	3.0	3.0			
Minimum Gap (s)	2.0	4.0			4.0		2.5	2.5	2.5			
Time Before Reduce (s)	8.0	8.0			8.0		8.0	8.0	8.0			
Time To Reduce (s)	10.0	10.0			10.0		10.0	10.0	10.0			
Recall Mode	None	Min			Min		None	None	None			
Act Effct Green (s)	30.0	13.8			28.8			8.7	8.7			
Actuated g/C Ratio	0.58	0.27			0.56			0.17	0.17			
v/c Ratio	0.02	0.20			0.37			0.14	0.44			
Control Delay	3.2	9.2			7.6			23.1	9.0			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	3.2	9.2			7.6			23.1	9.0			
LOS	A	A			A			C	A			
Approach Delay		8.8			7.6			11.6				
Approach LOS		A			A			B				
Queue Length 50th (ft)	1	11			43			9	0			
Queue Length 95th (ft)	4	20			135			42	50			
Internal Link Dist (ft)		249			270			841			610	
Turn Bay Length (ft)												
Base Capacity (vph)	1122	3349			3215			1000	958			
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	0.01	0.05			0.22			0.04	0.18			

Intersection Summary

Area Type: Other

Cycle Length: 127.4

Actuated Cycle Length: 51.7

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 8.6

Intersection LOS: A

Intersection Capacity Utilization 48.4%

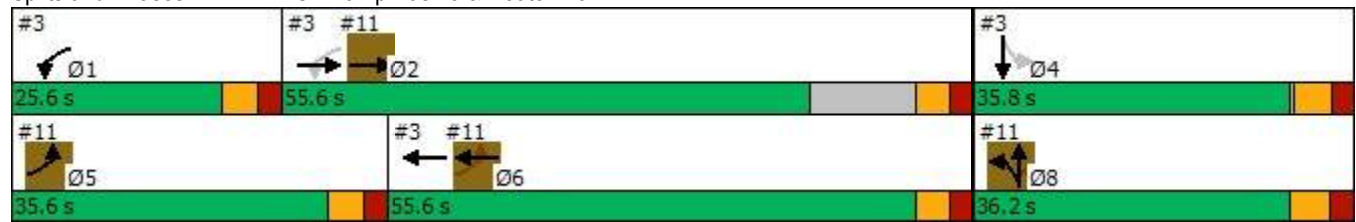
ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings 11: NB Off Ramp Bus 29 & Route 210

09/09/2025

Splits and Phases: 11: NB Off Ramp Bus 29 & Route 210






















Lane Group	Ø1	Ø4
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	13.8
Total Split (s)	25.6	35.8
Total Split (%)	20%	28%
Maximum Green (s)	20.0	30.0
Yellow Time (s)	3.4	3.6
All-Red Time (s)	2.2	2.2
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis



















11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	11	164	0	0	552	84	34	2	158	0	0	0
Future Volume (vph)	11	164	0	0	552	84	34	2	158	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Total Lost time (s)	5.6	5.6			5.6			6.2	6.2			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.98			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1805	3471			3431			1665	1478			
Flt Permitted	0.36	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	691	3471			3431			1665	1478			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	182	0	0	613	93	38	2	176	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	149	0	0	0
Lane Group Flow (vph)	12	182	0	0	698	0	0	40	27	0	0	0
Heavy Vehicles (%)	0%	4%	0%	0%	3%	4%	6%	0%	6%	0%	0%	0%
Turn Type	D.P+P	NA			NA		Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Actuated Green, G (s)	29.9	18.7			28.8			8.7	8.7			
Effective Green, g (s)	29.9	18.7			28.8			8.7	8.7			
Actuated g/C Ratio	0.53	0.33			0.51			0.16	0.16			
Clearance Time (s)	5.6	5.6			5.6			6.2	6.2			
Vehicle Extension (s)	2.5	5.0			5.0			3.0	3.0			
Lane Grp Cap (vph)	390	1159			1764			258	229			
v/s Ratio Prot	c0.00	0.05			c0.20			c0.02				
v/s Ratio Perm	0.02								0.02			
v/c Ratio	0.03	0.16			0.40			0.16	0.12			
Uniform Delay, d1	6.1	13.1			8.3			20.5	20.4			
Progression Factor	0.77	0.60			1.00			1.00	1.00			
Incremental Delay, d2	0.0	0.1			0.3			0.3	0.2			
Delay (s)	4.8	8.0			8.6			20.8	20.6			
Level of Service	A	A			A			C	C			
Approach Delay (s)		7.8			8.6			20.6			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM 2000 Control Delay		10.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		56.0			Sum of lost time (s)			17.4				
Intersection Capacity Utilization		48.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												







Lanes, Volumes, Timings
14: Union St/Morris St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	315	1	0	626	2	1	0	0	0	0	9
Future Volume (vph)	6	315	1	0	626	2	1	0	0	0	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	152		0	136		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt											0.865	
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1805	3472	0	1900	3505	0	0	1805	0	0	1644	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1805	3472	0	1900	3505	0	0	1805	0	0	1644	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		350			629			414			423	
Travel Time (s)		9.5			17.2			11.3			11.5	
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
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	7	342	1	0	680	2	1	0	0	0	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	343	0	0	682	0	0	1	0	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 27.4%	ICU Level of Service A											
Analysis Period (min) 15												

HCM 6th TWSC
14: Union St/Morris St & Route 210





















09/09/2025

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	315	1	0	626	2	1	0	0	0	0	9
Future Vol, veh/h	6	315	1	0	626	2	1	0	0	0	0	9
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	152	-	-	136	-	-	-	-	-	-	-	-
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, %	0	4	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	7	342	1	0	680	2	1	0	0	0	0	10
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	682	0	0	343	0	0	697	1039	172	866	1038	341
Stage 1	-	-	-	-	-	-	357	357	-	681	681	-
Stage 2	-	-	-	-	-	-	340	682	-	185	357	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	920	-	-	1227	-	-	331	232	848	250	233	661
Stage 1	-	-	-	-	-	-	639	632	-	411	453	-
Stage 2	-	-	-	-	-	-	654	453	-	805	632	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	920	-	-	1227	-	-	324	230	848	249	231	661
Mov Cap-2 Maneuver	-	-	-	-	-	-	324	230	-	249	231	-
Stage 1	-	-	-	-	-	-	634	627	-	408	453	-
Stage 2	-	-	-	-	-	-	644	453	-	799	627	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0			16.1			10.5		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	324	920	-	-	1227	-	-	661				
HCM Lane V/C Ratio	0.003	0.007	-	-	-	-	-	0.015				
HCM Control Delay (s)	16.1	8.9	-	-	0	-	-	10.5				
HCM Lane LOS	C	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	242	14	14	420	4	11	1	3	22	0	197
Future Volume (vph)	59	242	14	14	420	4	11	1	3	22	0	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			4%			3%			3%	
Storage Length (ft)	324		0	332		0	0		415	0		174
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.999				0.850			0.850
Flt Protected	0.950			0.950				0.956			0.950	
Satd. Flow (prot)	1726	3368	0	1769	3425	0	0	1789	1591	0	1631	1544
Flt Permitted	0.496			0.587				0.956			0.950	
Satd. Flow (perm)	901	3368	0	1093	3425	0	0	1789	1591	0	1631	1544
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			1				176			205
Link Speed (mph)		25			55			35			45	
Link Distance (ft)		629			10026			1162			925	
Travel Time (s)		17.2			124.3			22.6			14.0	
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
Heavy Vehicles (%)	3%	5%	0%	0%	3%	25%	0%	0%	0%	9%	0%	3%
Adj. Flow (vph)	61	252	15	15	438	4	11	1	3	23	0	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	267	0	15	442	0	0	12	3	0	23	205
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	D.P+P	NA		D.P+P	NA		Split	NA	Perm	Split	NA	Perm

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases	2			6					4			8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	13.1	15.1		13.1	15.1		12.5	12.5	12.5	14.0	14.0	14.0
Total Split (s)	22.1	42.1		17.1	42.1		26.5	26.5	26.5	28.0	28.0	28.0
Total Split (%)	18.6%	35.5%		14.4%	35.5%		22.3%	22.3%	22.3%	23.6%	23.6%	23.6%
Maximum Green (s)	15.0	35.0		10.0	35.0		20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	4.7	4.7		4.7	4.7		4.0	4.0	4.0	5.1	5.1	5.1
All-Red Time (s)	2.4	2.4		2.4	2.4		2.5	2.5	2.5	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	7.1	7.1		7.1	7.1			6.5	6.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.5	6.0		1.5	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	2.5	5.0		2.5	5.0		3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	5.0	10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Act Effect Green (s)	21.3	23.3		24.1	18.1			6.7	6.7		7.6	7.6
Actuated g/C Ratio	0.42	0.46		0.47	0.36			0.13	0.13		0.15	0.15
v/c Ratio	0.13	0.17		0.02	0.36			0.05	0.01		0.09	0.51
Control Delay	8.7	10.6		8.1	15.7			27.4	0.0		25.4	9.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	8.7	10.6		8.1	15.7			27.4	0.0		25.4	9.8
LOS	A	B		A	B			C	A		C	A
Approach Delay		10.2			15.5			21.9			11.4	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)	7	15		2	52			3	0		6	0
Queue Length 95th (ft)	35	78		13	131			21	0		30	56
Internal Link Dist (ft)		549			9946			1082			845	
Turn Bay Length (ft)	324			332					415			174
Base Capacity (vph)	719	2735		674	2542			764	780		696	777
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	0.08	0.10		0.02	0.17			0.02	0.00		0.03	0.26

Intersection Summary

Area Type: Other

Cycle Length: 118.7

Actuated Cycle Length: 50.8

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 13.0

Intersection LOS: B

Intersection Capacity Utilization 46.9%

ICU Level of Service A







Analysis Period (min) 15

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025





















Splits and Phases: 17: Colony Rd/New Wright Shop Rd & Route 210

 Ø1 22.1 s	 Ø2 42.1 s	 Ø4 26.5 s	 Ø8 28 s
 Ø5 17.1 s	 Ø6 42.1 s		

HCM 6th Signalized Intersection Summary





















17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	242	14	14	420	4	11	1	3	22	0	197
Future Volume (veh/h)	59	242	14	14	420	4	11	1	3	22	0	197
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	1803	1773	1847	1806	1761	1435	1847	1847	1847	1714	1847	1803
Adj Flow Rate, veh/h	61	252	15	15	438	4	11	1	3	23	0	205
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, %	3	5	0	0	3	25	0	0	0	9	0	3
Cap, veh/h	360	938	56	410	841	8	36	3	35	296	0	257
Arrive On Green	0.06	0.29	0.29	0.02	0.25	0.25	0.02	0.02	0.02	0.17	0.00	0.17
Sat Flow, veh/h	1717	3231	191	1720	3398	31	1619	147	1565	1759	0	1528
Grp Volume(v), veh/h	61	131	136	15	216	226	12	0	3	23	0	205
Grp Sat Flow(s),veh/h/ln	1717	1684	1738	1720	1673	1756	1766	0	1565	1759	0	1528
Q Serve(g_s), s	1.5	3.4	3.5	0.3	6.4	6.4	0.4	0.0	0.1	0.6	0.0	7.4
Cycle Q Clear(g_c), s	1.5	3.4	3.5	0.3	6.4	6.4	0.4	0.0	0.1	0.6	0.0	7.4
Prop In Lane	1.00		0.11	1.00		0.02	0.92		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	360	489	504	410	414	435	39	0	35	296	0	257
V/C Ratio(X)	0.17	0.27	0.27	0.04	0.52	0.52	0.31	0.00	0.09	0.08	0.00	0.80
Avail Cap(c_a), veh/h	695	1021	1054	669	1014	1064	612	0	542	609	0	529
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	0.00	1.00
Uniform Delay (d), s/veh	14.5	15.8	15.8	13.9	18.8	18.8	27.8	0.0	27.6	20.2	0.0	23.1
Incr Delay (d2), s/veh	0.1	1.1	1.0	0.0	3.6	3.5	4.3	0.0	1.1	0.1	0.0	5.6
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(50%),veh/ln	0.5	1.4	1.4	0.1	2.4	2.5	0.2	0.0	0.0	0.2	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.6	16.8	16.8	13.9	22.4	22.2	32.1	0.0	28.7	20.3	0.0	28.7
LnGrp LOS	B	B	B	B	C	C	C	A	C	C	A	C
Approach Vol, veh/h	328			457			15			228		
Approach Delay, s/veh	16.4			22.0			31.4			27.8		
Approach LOS	B			C			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.8	21.4		7.8	8.4	23.9		17.7				
Change Period (Y+Rc), s	7.1	7.1		6.5	7.1	7.1		8.0				
Max Green Setting (Gmax), s	15.0	35.0		20.0	10.0	35.0		20.0				
Max Q Clear Time (g_c+I1), s	3.5	8.4		2.4	2.3	5.5		9.4				
Green Ext Time (p_c), s	0.0	5.9		0.0	0.0	4.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay	21.7											
HCM 6th LOS	C											








Lanes, Volumes, Timings
20: Riverview Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	255	8	14	426	19	4	0	6	16	0	8
Future Volume (vph)	4	255	8	14	426	19	4	0	6	16	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			-10%			1%	
Storage Length (ft)	308		0	307		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.994				0.850		0.955	
Flt Protected	0.950			0.950				0.950			0.968	
Satd. Flow (prot)	1437	3473	0	1805	3404	0	0	1895	1696	0	1608	0
Flt Permitted	0.950			0.950				0.950			0.968	
Satd. Flow (perm)	1437	3473	0	1805	3404	0	0	1895	1696	0	1608	0
Link Speed (mph)		55			55			25			45	
Link Distance (ft)		10026			1037			1200			891	
Travel Time (s)		124.3			12.9			32.7			13.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	25%	3%	0%	0%	4%	37%	0%	0%	0%	13%	0%	0%
Adj. Flow (vph)	4	280	9	15	468	21	4	0	7	18	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	289	0	15	489	0	0	4	7	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	0.94	0.94	0.94	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.1%						ICU Level of Service A					
Analysis Period (min)	15											


















HCM 6th TWSC
20: Riverview Rd & Route 210

09/09/2025

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	4	255	8	14	426	19	4	0	6	16	0	8
Future Vol, veh/h	4	255	8	14	426	19	4	0	6	16	0	8
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	308	-	-	307	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	0	-	-	-10	-	-	1	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	25	3	0	0	4	37	0	0	0	13	0	0
Mvmt Flow	4	280	9	15	468	21	4	0	7	18	0	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	489	0	0	289	0	0	557	812	145	657	806	245
Stage 1	-	-	-	-	-	-	293	293	-	509	509	-
Stage 2	-	-	-	-	-	-	264	519	-	148	297	-
Critical Hdwy	4.6	-	-	4.1	-	-	5.5	4.5	5.9	7.96	6.7	7
Critical Hdwy Stg 1	-	-	-	-	-	-	4.5	3.5	-	6.96	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	4.5	3.5	-	6.96	5.7	-
Follow-up Hdwy	2.45	-	-	2.2	-	-	3.5	4	3.3	3.63	4	3.3
Pot Cap-1 Maneuver	925	-	-	1284	-	-	569	495	919	317	304	756
Stage 1	-	-	-	-	-	-	820	793	-	474	526	-
Stage 2	-	-	-	-	-	-	838	715	-	802	660	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	925	-	-	1284	-	-	555	487	919	311	299	756
Mov Cap-2 Maneuver	-	-	-	-	-	-	555	487	-	311	299	-
Stage 1	-	-	-	-	-	-	817	790	-	472	520	-
Stage 2	-	-	-	-	-	-	819	706	-	793	657	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			9.9			15		
HCM LOS							A			C		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	555		919	925	-	-	1284	-	-	387		
HCM Lane V/C Ratio	0.008		0.007	0.005	-	-	0.012	-	-	0.068		
HCM Control Delay (s)	11.5		8.9	8.9	-	-	7.8	-	-	15		
HCM Lane LOS	B		A	A	-	-	A	-	-	C		
HCM 95th %tile Q(veh)	0		0	0	-	-	0	-	-	0.2		

Lanes, Volumes, Timings
23: Route 210 & US 29 SB Off-Ramp

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	166	111	0	191	0	0	0	0	1	2	268
Future Volume (vph)	0	166	111	0	191	0	0	0	0	1	2	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.866	
Flt Protected												
Satd. Flow (prot)	0	1827	1568	0	1810	0	0	0	0	0	1613	0
Flt Permitted												
Satd. Flow (perm)	0	1827	1568	0	1810	0	0	0	0	0	1613	0
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		1037			1089			1017			621	
Travel Time (s)		12.9			13.5			15.4			9.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	4%	3%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	0	182	122	0	210	0	0	0	0	1	2	295
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	182	122	0	210	0	0	0	0	0	298	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	43.7%						ICU Level of Service A					
Analysis Period (min)	15											

HCM 6th TWSC
23: Route 210 & US 29 SB Off-Ramp

09/09/2025

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↖						↕	
Traffic Vol, veh/h	0	166	111	0	191	0	0	0	0	1	2	268
Future Vol, veh/h	0	166	111	0	191	0	0	0	0	1	2	268
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	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	6	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	4	3	0	5	0	0	0	0	0	0	2
Mvmt Flow	0	182	122	0	210	0	0	0	0	1	2	295
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	-	0	0	304	0	0				453	514	210
Stage 1	-	-	-	-	-	-				210	210	-
Stage 2	-	-	-	-	-	-				243	304	-
Critical Hdwy	-	-	-	4.1	-	-				6.4	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.4	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.4	5.5	-
Follow-up Hdwy	-	-	-	2.2	-	-				3.5	4	3.318
Pot Cap-1 Maneuver	0	-	-	1268	-	0				568	467	830
Stage 1	0	-	-	-	-	0				830	732	-
Stage 2	0	-	-	-	-	0				802	667	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1268	-	-				568	0	830
Mov Cap-2 Maneuver	-	-	-	-	-	-				568	0	-
Stage 1	-	-	-	-	-	-				830	0	-
Stage 2	-	-	-	-	-	-				802	0	-
Approach	EB			WB			SB					
HCM Control Delay, s	0			0			11.8					
HCM LOS							B					
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1							
Capacity (veh/h)	-	-	1268	-	829							
HCM Lane V/C Ratio	-	-	-	-	0.359							
HCM Control Delay (s)	-	-	0	-	11.8							
HCM Lane LOS	-	-	A	-	B							
HCM 95th %tile Q(veh)	-	-	0	-	1.6							

Lanes, Volumes, Timings
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↘
Traffic Volume (vph)	0	167	0	0	0	191
Future Volume (vph)	0	167	0	0	0	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		2%	-1%		3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	1791	1909	0	1872	1515
Flt Permitted						
Satd. Flow (perm)	0	1791	1909	0	1872	1515
Link Speed (mph)		55	55		45	
Link Distance (ft)		413	211		859	
Travel Time (s)		5.1	2.6		13.0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%
Adj. Flow (vph)	0	174	0	0	0	199
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	174	0	0	0	199
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	0.99	0.99	1.02	1.02
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 15.2% ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC
26: Route 210 & US 29 NB Off-Ramp Loop












09/09/2025

Intersection						
Int Delay, s/veh	4.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	167	0	0	0	191
Future Vol, veh/h	0	167	0	0	0	191
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	2	-1	-	3	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	5	0	0	0	5
Mvmt Flow	0	174	0	0	0	199
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	175	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	174	-
Critical Hdwy	-	-	-	-	7	6.55
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.345
Pot Cap-1 Maneuver	0	-	-	0	796	1075
Stage 1	0	-	-	0	1027	-
Stage 2	0	-	-	0	837	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	796	1075
Mov Cap-2 Maneuver	-	-	-	-	796	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	837	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.1		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	-	1075		
HCM Lane V/C Ratio	-	-	-	0.185		
HCM Control Delay (s)	-	-	0	9.1		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	-	0.7		

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	136	16	471	221	40	273
Future Volume (vph)	136	16	471	221	40	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	3%		0%			0%
Storage Length (ft)	0	50		0	124	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.957			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1710	1591	1778	0	1752	1863
Flt Permitted	0.950				0.247	
Satd. Flow (perm)	1710	1591	1778	0	456	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		13	21			
Link Speed (mph)	35		35			35
Link Distance (ft)	1859		865			1227
Travel Time (s)	36.2		16.9			23.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	1%	5%	3%	2%
Adj. Flow (vph)	148	17	512	240	43	297
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	17	752	0	43	297
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA		D.P+P	NA

Lanes, Volumes, Timings
4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	4	4	6		5	2
Permitted Phases					6	
Detector Phase	4	4	6		5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0
Minimum Split (s)	12.7	12.7	17.7		12.7	17.7
Total Split (s)	45.7	45.7	55.7		30.7	55.7
Total Split (%)	34.6%	34.6%	42.2%		23.2%	42.2%
Maximum Green (s)	40.0	40.0	50.0		25.0	50.0
Yellow Time (s)	3.0	3.0	3.9		3.9	3.9
All-Red Time (s)	2.7	2.7	1.8		1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	7.0		3.0	7.0
Minimum Gap (s)	2.5	2.5	2.5		0.2	2.5
Time Before Reduce (s)	8.0	8.0	8.0		0.0	8.0
Time To Reduce (s)	10.0	10.0	10.0		0.0	10.0
Recall Mode	None	None	Min		None	Min
Act Effect Green (s)	12.8	12.8	53.3		57.3	60.6
Actuated g/C Ratio	0.15	0.15	0.63		0.67	0.71
v/c Ratio	0.57	0.07	0.67		0.10	0.22
Control Delay	42.8	18.8	15.9		4.9	5.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	42.8	18.8	15.9		4.9	5.0
LOS	D	B	B		A	A
Approach Delay	40.4		15.9			5.0
Approach LOS	D		B			A
Queue Length 50th (ft)	77	2	270		6	44
Queue Length 95th (ft)	136	19	473		17	88
Internal Link Dist (ft)	1779		785			1147
Turn Bay Length (ft)		50			124	
Base Capacity (vph)	810	761	1124		709	1739
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	0.18	0.02	0.67		0.06	0.17

Intersection Summary

Area Type: Other
Cycle Length: 132.1
Actuated Cycle Length: 84.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 16.1
Intersection Capacity Utilization 55.3%
Analysis Period (min) 15

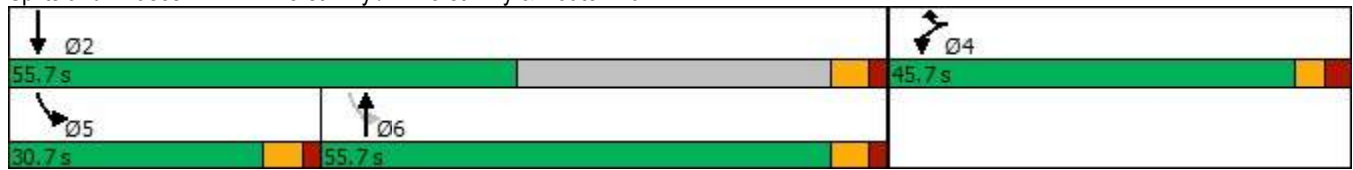
Intersection LOS: B
ICU Level of Service B

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025

Splits and Phases: 4: Amherst Hwy /Amherst Hwy & Route 210








HCM 6th Signalized Intersection Summary

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025




















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	136	16	471	221	40	273
Future Volume (veh/h)	136	16	471	221	40	273
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	1788	1847	1885	1826	1856	1870
Adj Flow Rate, veh/h	148	17	512	240	43	297
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	1	5	3	2
Cap, veh/h	196	180	698	327	395	1340
Arrive On Green	0.12	0.12	0.58	0.58	0.06	0.72
Sat Flow, veh/h	1703	1565	1214	569	1767	1870
Grp Volume(v), veh/h	148	17	0	752	43	297
Grp Sat Flow(s),veh/h/ln	1703	1565	0	1783	1767	1870
Q Serve(g_s), s	5.7	0.7	0.0	21.0	0.6	3.6
Cycle Q Clear(g_c), s	5.7	0.7	0.0	21.0	0.6	3.6
Prop In Lane	1.00	1.00		0.32	1.00	
Lane Grp Cap(c), veh/h	196	180	0	1026	395	1340
V/C Ratio(X)	0.75	0.09	0.00	0.73	0.11	0.22
Avail Cap(c_a), veh/h	1005	924	0	1315	945	1380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	26.8	0.0	10.6	8.2	3.2
Incr Delay (d2), s/veh	5.8	0.2	0.0	4.6	0.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.6	0.0	7.7	0.2	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.9	27.1	0.0	15.2	8.3	3.6
LnGrp LOS	C	C	A	B	A	A
Approach Vol, veh/h	165		752			340
Approach Delay, s/veh	34.1		15.2			4.2
Approach LOS	C		B			A
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	54.3		13.5		9.6	44.7
Change Period (Y+Rc), s	* 5.7		* 5.7		* 5.7	* 5.7
Max Green Setting (Gmax), s	* 50		* 40		* 25	* 50
Max Q Clear Time (g_c+I1), s	5.6		7.7		2.6	23.0
Green Ext Time (p_c), s	6.3		0.5		0.1	16.0
Intersection Summary						
HCM 6th Ctrl Delay			14.7			
HCM 6th LOS			B			
Notes						

Lanes, Volumes, Timings






2: Main St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	238	21	46	144	13	8	26	41	8	8	0
Future Volume (vph)	2	238	21	46	144	13	8	26	41	8	8	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			1%	
Storage Length (ft)	0		0	136		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.988			0.927				
Flt Protected				0.950				0.994			0.976	
Satd. Flow (prot)	0	1761	0	1805	1827	0	0	1727	0	0	1845	0
Flt Permitted				0.950				0.994			0.976	
Satd. Flow (perm)	0	1761	0	1805	1827	0	0	1727	0	0	1845	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1859			310			644			686	
Travel Time (s)		50.7			8.5			17.6			18.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	0%	0%	3%	0%	0%	4%	0%	0%	0%	0%
Adj. Flow (vph)	2	256	23	49	155	14	9	28	44	9	9	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	281	0	49	169	0	0	81	0	0	18	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.03	1.03	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	36.6%				ICU Level of Service A							
Analysis Period (min)	15											

HCM 6th TWSC
2: Main St & Route 210

















09/09/2025

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	238	21	46	144	13	8	26	41	8	8	0
Future Vol, veh/h	2	238	21	46	144	13	8	26	41	8	8	0
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	-	-	-	136	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	4	-	-	0	-	-	0	-	-	1	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	5	0	0	3	0	0	4	0	0	0	0
Mvmt Flow	2	256	23	49	155	14	9	28	44	9	9	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	169	0	0	279	0	0	537	539	268	568	543	162
Stage 1	-	-	-	-	-	-	272	272	-	260	260	-
Stage 2	-	-	-	-	-	-	265	267	-	308	283	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.54	6.2	7.3	6.7	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.3	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.036	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1421	-	-	1295	-	-	458	446	776	423	436	884
Stage 1	-	-	-	-	-	-	738	681	-	739	687	-
Stage 2	-	-	-	-	-	-	745	684	-	694	670	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1421	-	-	1295	-	-	437	428	776	368	419	884
Mov Cap-2 Maneuver	-	-	-	-	-	-	437	428	-	368	419	-
Stage 1	-	-	-	-	-	-	737	680	-	738	661	-
Stage 2	-	-	-	-	-	-	707	658	-	626	669	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.8			12.4			14.6		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	569	1421	-	-	1295	-	-	392				
HCM Lane V/C Ratio	0.142	0.002	-	-	0.038	-	-	0.044				
HCM Control Delay (s)	12.4	7.5	0	-	7.9	-	-	14.6				
HCM Lane LOS	B	A	A	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1				

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	243	44	208	190	0	0	0	0	68	0	13
Future Volume (vph)	0	243	44	208	190	0	0	0	0	68	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Storage Length (ft)	0		0	210		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977									0.979	
Flt Protected				0.950							0.959	
Satd. Flow (prot)	0	3401	0	1752	3505	0	0	0	0	0	1722	0
Flt Permitted				0.558							0.959	
Satd. Flow (perm)	0	3401	0	1029	3505	0	0	0	0	0	1722	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22									76	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		398			329			900			621	
Travel Time (s)		10.9			9.0			17.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	2%	3%	3%	0%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	0	270	49	231	211	0	0	0	0	76	0	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	319	0	231	211	0	0	0	0	0	90	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA		D.P+P	NA					Perm		NA

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29













09/09/2025

Lane Group	Ø5	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Grade (%)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0		8.0	10.0					8.0	8.0	
Minimum Split (s)		15.6		13.6	15.6					13.8	13.8	
Total Split (s)		55.6		25.6	55.6					35.8	35.8	
Total Split (%)		47.4%		21.8%	47.4%					30.5%	30.5%	
Maximum Green (s)		50.0		20.0	50.0					30.0	30.0	
Yellow Time (s)		3.4		3.4	3.4					3.6	3.6	
All-Red Time (s)		2.2		2.2	2.2					2.2	2.2	
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	
Total Lost Time (s)		5.6		5.6	5.6						5.8	
Lead/Lag		Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Vehicle Extension (s)		5.0		2.5	5.0					3.0	3.0	
Minimum Gap (s)		4.0		2.0	4.0					2.5	2.5	
Time Before Reduce (s)		8.0		8.0	8.0					8.0	8.0	
Time To Reduce (s)		10.0		10.0	10.0					10.0	10.0	
Recall Mode		Min		None	Min					None	None	
Act Effect Green (s)		15.7		24.7	28.6						9.1	
Actuated g/C Ratio		0.31		0.49	0.57						0.18	
v/c Ratio		0.30		0.37	0.11						0.24	
Control Delay		13.4		7.4	4.4						9.5	
Queue Delay		0.0		0.0	0.0						0.0	
Total Delay		13.4		7.4	4.4						9.5	
LOS		B		A	A						A	
Approach Delay		13.4			5.9						9.5	
Approach LOS		B			A						A	
Queue Length 50th (ft)		32		13	6						3	
Queue Length 95th (ft)		71		40	21						36	
Internal Link Dist (ft)		318			249			820			541	
Turn Bay Length (ft)				210								
Base Capacity (vph)		3218		909	3316						1084	
Starvation Cap Reductn		0		0	0						0	
Spillback Cap Reductn		0		0	0						0	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.10		0.25	0.06						0.08	

Intersection Summary

Area Type: Other

Cycle Length: 117.4

Actuated Cycle Length: 50.6

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 9.1

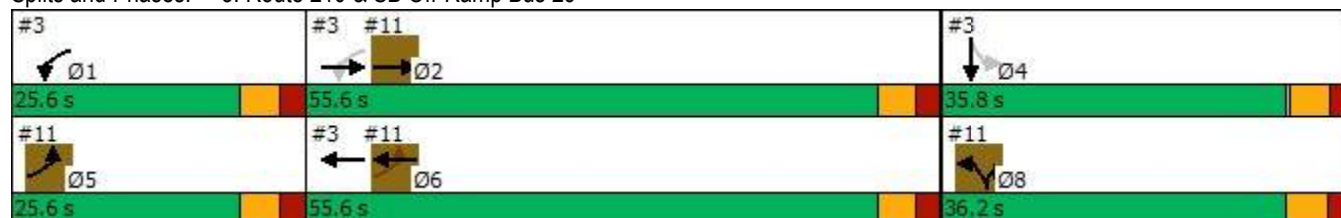
Intersection LOS: A

Intersection Capacity Utilization 40.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Route 210 & SB Off-Ramp Bus 29



Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

















09/09/2025

Lane Group	Ø5	Ø8
Protected Phases	5	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	13.6	14.2
Total Split (s)	25.6	36.2
Total Split (%)	22%	31%
Maximum Green (s)	20.0	30.0
Yellow Time (s)	3.4	3.8
All-Red Time (s)	2.2	2.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

3: Route 210 & SB Off-Ramp Bus 29




















09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	243	44	208	190	0	0	0	0	68	0	13
Future Volume (vph)	0	243	44	208	190	0	0	0	0	68	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Total Lost time (s)		5.6		5.6	5.6						5.8	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Flt		0.98		1.00	1.00						0.98	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3401		1752	3505						1723	
Flt Permitted		1.00		0.56	1.00						0.96	
Satd. Flow (perm)		3401		1030	3505						1723	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	270	49	231	211	0	0	0	0	76	0	14
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	64	0
Lane Group Flow (vph)	0	305	0	231	211	0	0	0	0	0	26	0
Heavy Vehicles (%)	0%	4%	2%	3%	3%	0%	0%	0%	0%	3%	0%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Actuated Green, G (s)		20.6		29.6	28.7						8.6	
Effective Green, g (s)		20.6		29.6	28.7						8.6	
Actuated g/C Ratio		0.37		0.54	0.52						0.16	
Clearance Time (s)		5.6		5.6	5.6						5.8	
Vehicle Extension (s)		5.0		2.5	5.0						3.0	
Lane Grp Cap (vph)		1269		670	1822						268	
v/s Ratio Prot		0.09		0.06	0.06							
v/s Ratio Perm				0.13							0.01	
v/c Ratio		0.24		0.34	0.12						0.10	
Uniform Delay, d1		11.9		6.8	6.8						20.0	
Progression Factor		1.00		1.07	0.65						1.00	
Incremental Delay, d2		0.2		0.2	0.1						0.2	
Delay (s)		12.1		7.5	4.5						20.1	
Level of Service		B		A	A						C	
Approach Delay (s)		12.1			6.1			0.0			20.1	
Approach LOS		B			A			A			C	
Intersection Summary												
HCM 2000 Control Delay			9.8			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			55.2			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			40.7%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

11: NB Off Ramp Bus 29 & Route 210

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	10	301	0	0	350	81	48	0	319	0	0	0
Future Volume (vph)	10	301	0	0	350	81	48	0	319	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Storage Length (ft)	0		0	0		0	135		0	0		0
Storage Lanes	1		0	0		0	1		1	0		0
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1805	3505	0	0	3366	0	1717	0	1551	0	0	0
Flt Permitted	0.478						0.950					
Satd. Flow (perm)	908	3505	0	0	3366	0	1717	0	1551	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					30				354			
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		329			350			921			690	
Travel Time (s)		9.0			9.5			14.0			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	5%	1%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	11	334	0	0	389	90	53	0	354	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	334	0	0	479	0	53	0	354	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1		1			
Detector Template	Left	Thru			Thru		Left		Right			
Leading Detector (ft)	20	100			100		20		20			
Trailing Detector (ft)	0	0			0		0		0			
Detector 1 Position(ft)	0	0			0		0		0			
Detector 1 Size(ft)	20	6			6		20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	D.P+P	NA			NA		Prot		Prot			

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Grade (%)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		

Lanes, Volumes, Timings

11: NB Off Ramp Bus 29 & Route 210

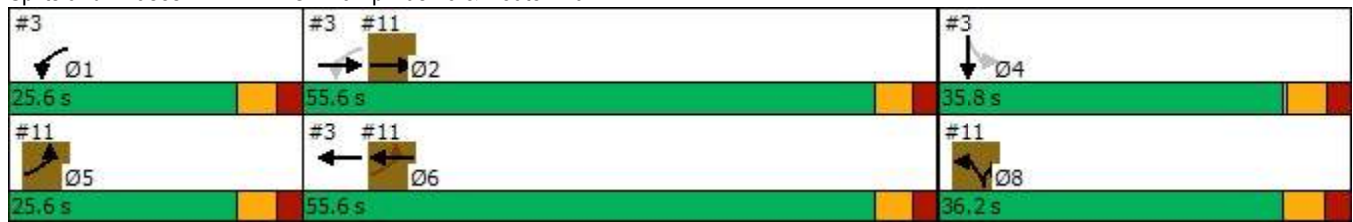
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2			6		8		8			
Permitted Phases	6											
Detector Phase	5	2			6		8		8			
Switch Phase												
Minimum Initial (s)	5.0	10.0			10.0		5.0		5.0			
Minimum Split (s)	13.6	15.6			15.6		14.2		14.2			
Total Split (s)	25.6	55.6			55.6		36.2		36.2			
Total Split (%)	21.8%	47.4%			47.4%		30.8%		30.8%			
Maximum Green (s)	20.0	50.0			50.0		30.0		30.0			
Yellow Time (s)	3.4	3.4			3.4		3.8		3.8			
All-Red Time (s)	2.2	2.2			2.2		2.4		2.4			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	5.6	5.6			5.6		6.2		6.2			
Lead/Lag	Lead	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	2.5	5.0			5.0		3.0		3.0			
Minimum Gap (s)	2.0	4.0			4.0		2.5		2.5			
Time Before Reduce (s)	8.0	8.0			8.0		8.0		8.0			
Time To Reduce (s)	10.0	10.0			10.0		10.0		10.0			
Recall Mode	None	Min			Min		None		None			
Act Effct Green (s)	29.5	15.7			28.6		8.2		8.2			
Actuated g/C Ratio	0.58	0.31			0.57		0.16		0.16			
v/c Ratio	0.02	0.31			0.25		0.19		0.65			
Control Delay	3.6	8.9			6.7		21.6		9.3			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	3.6	8.9			6.7		21.6		9.3			
LOS	A	A			A		C		A			
Approach Delay		8.8			6.7			10.9				
Approach LOS		A			A			B				
Queue Length 50th (ft)	1	18			25		13		0			
Queue Length 95th (ft)	5	36			86		43		61			
Internal Link Dist (ft)		249			270			841			610	
Turn Bay Length (ft)							135					
Base Capacity (vph)	907	3316			3186		1037		1077			
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	0.01	0.10			0.15		0.05		0.33			
Intersection Summary												
Area Type: Other												
Cycle Length: 117.4												
Actuated Cycle Length: 50.6												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.65												
Intersection Signal Delay: 8.7												
Intersection LOS: A												
Intersection Capacity Utilization 40.7%												
ICU Level of Service A												
Analysis Period (min) 15												

Lanes, Volumes, Timings 11: NB Off Ramp Bus 29 & Route 210

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Splits and Phases: 11: NB Off Ramp Bus 29 & Route 210



Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210


















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Lane Group	Ø1	Ø4
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	13.8
Total Split (s)	25.6	35.8
Total Split (%)	22%	30%
Maximum Green (s)	20.0	30.0
Yellow Time (s)	3.4	3.6
All-Red Time (s)	2.2	2.2
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis



















11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	301	0	0	350	81	48	0	319	0	0	0
Future Volume (vph)	10	301	0	0	350	81	48	0	319	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Total Lost time (s)	5.6	5.6			5.6		6.2		6.2			
Lane Util. Factor	1.00	0.95			0.95		1.00		1.00			
Frt	1.00	1.00			0.97		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1805	3505			3365		1717		1551			
Flt Permitted	0.48	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	909	3505			3365		1717		1551			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	334	0	0	389	90	53	0	354	0	0	0
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	301	0	0	0
Lane Group Flow (vph)	11	334	0	0	465	0	53	0	53	0	0	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	1%	2%	0%	1%	0%	0%	0%
Turn Type	D.P+P	NA			NA		Prot		Prot			
Protected Phases	5	2			6		8		8			
Permitted Phases	6											
Actuated Green, G (s)	29.6	20.6			28.7		8.2		8.2			
Effective Green, g (s)	29.6	20.6			28.7		8.2		8.2			
Actuated g/C Ratio	0.54	0.37			0.52		0.15		0.15			
Clearance Time (s)	5.6	5.6			5.6		6.2		6.2			
Vehicle Extension (s)	2.5	5.0			5.0		3.0		3.0			
Lane Grp Cap (vph)	502	1308			1749		255		230			
v/s Ratio Prot	c0.00	0.10			c0.14		0.03		c0.03			
v/s Ratio Perm	0.01											
v/c Ratio	0.02	0.26			0.27		0.21		0.23			
Uniform Delay, d1	6.0	12.0			7.4		20.6		20.7			
Progression Factor	0.77	0.60			1.00		1.00		1.00			
Incremental Delay, d2	0.0	0.2			0.2		0.4		0.5			
Delay (s)	4.6	7.4			7.6		21.1		21.2			
Level of Service	A	A			A		C		C			
Approach Delay (s)		7.3			7.6			21.2			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM 2000 Control Delay		12.0			HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio		0.25										
Actuated Cycle Length (s)		55.2			Sum of lost time (s)				17.4			
Intersection Capacity Utilization		40.7%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												







Lanes, Volumes, Timings
14: Union St/Morris St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	612	1	1	420	2	1	0	0	4	0	10
Future Volume (vph)	7	612	1	1	420	2	1	0	0	4	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	152		0	136		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999						0.901	
Flt Protected	0.950			0.950				0.950			0.987	
Satd. Flow (prot)	1805	3539	0	1805	3435	0	0	1805	0	0	1690	0
Flt Permitted	0.950			0.950				0.950			0.987	
Satd. Flow (perm)	1805	3539	0	1805	3435	0	0	1805	0	0	1690	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		350			629			414			423	
Travel Time (s)		9.5			17.2			11.3			11.5	
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
Heavy Vehicles (%)	0%	2%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	665	1	1	457	2	1	0	0	4	0	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	666	0	1	459	0	0	1	0	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	26.9%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
14: Union St/Morris St & Route 210

09/09/2025

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	612	1	1	420	2	1	0	0	4	0	10
Future Vol, veh/h	7	612	1	1	420	2	1	0	0	4	0	10
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	152	-	-	136	-	-	-	-	-	-	-	-
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, %	0	2	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	8	665	1	1	457	2	1	0	0	4	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	459	0	0	666	0	0	913	1143	333	809	1142	230
Stage 1	-	-	-	-	-	-	682	682	-	460	460	-
Stage 2	-	-	-	-	-	-	231	461	-	349	682	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1113	-	-	933	-	-	232	202	669	275	202	779
Stage 1	-	-	-	-	-	-	411	453	-	556	569	-
Stage 2	-	-	-	-	-	-	757	569	-	646	453	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1113	-	-	933	-	-	227	200	669	273	200	779
Mov Cap-2 Maneuver	-	-	-	-	-	-	227	200	-	273	200	-
Stage 1	-	-	-	-	-	-	408	450	-	552	568	-
Stage 2	-	-	-	-	-	-	746	568	-	641	450	-





















Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			20.9			12.3		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	227	1113	-	-	933	-	-	509
HCM Lane V/C Ratio	0.005	0.007	-	-	0.001	-	-	0.03
HCM Control Delay (s)	20.9	8.3	-	-	8.9	-	-	12.3
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

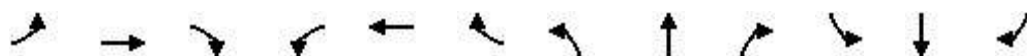
09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	221	375	20	1	285	23	30	4	14	19	5	108
Future Volume (vph)	221	375	20	1	285	23	30	4	14	19	5	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			4%			3%			3%	
Storage Length (ft)	324		0	332		0	0		415	0		174
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.989				0.850			0.850
Flt Protected	0.950			0.950				0.958			0.962	
Satd. Flow (prot)	1778	3398	0	1769	3404	0	0	1746	1591	0	1800	1575
Flt Permitted	0.557			0.510				0.958			0.962	
Satd. Flow (perm)	1042	3398	0	950	3404	0	0	1746	1591	0	1800	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			7				176			163
Link Speed (mph)		25			55			35			45	
Link Distance (ft)		629			10026			1162			925	
Travel Time (s)		17.2			124.3			22.6			14.0	
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
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	230	391	21	1	297	24	31	4	15	20	5	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	230	412	0	1	321	0	0	35	15	0	25	113
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	D.P+P	NA		D.P+P	NA		Split	NA	Perm	Split	NA	Perm

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases	2			6					4			8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	13.1	15.1		13.1	15.1		12.5	12.5	12.5	14.0	14.0	14.0
Total Split (s)	22.1	42.1		17.1	42.1		26.5	26.5	26.5	28.0	28.0	28.0
Total Split (%)	18.6%	35.5%		14.4%	35.5%		22.3%	22.3%	22.3%	23.6%	23.6%	23.6%
Maximum Green (s)	15.0	35.0		10.0	35.0		20.0	20.0	20.0	20.0	20.0	20.0
Yellow Time (s)	4.7	4.7		4.7	4.7		4.0	4.0	4.0	5.1	5.1	5.1
All-Red Time (s)	2.4	2.4		2.4	2.4		2.5	2.5	2.5	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	7.1	7.1		7.1	7.1			6.5	6.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.5	6.0		1.5	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	2.5	5.0		2.5	5.0		3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	5.0	10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Act Effect Green (s)	24.5	33.2		31.4	15.1			7.6	7.6		7.3	7.3
Actuated g/C Ratio	0.42	0.57		0.54	0.26			0.13	0.13		0.12	0.12
v/c Ratio	0.42	0.21		0.00	0.36			0.15	0.04		0.11	0.33
Control Delay	12.9	12.1		10.0	22.1			31.1	0.2		31.3	5.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	12.9	12.1		10.0	22.1			31.1	0.2		31.3	5.2
LOS	B	B		A	C			C	A		C	A
Approach Delay		12.3			22.0			21.8			9.9	
Approach LOS		B			C			C			A	
Queue Length 50th (ft)	53	48		0	57			13	0		9	0
Queue Length 95th (ft)	103	114		3	104			42	0		34	21
Internal Link Dist (ft)		549			9946			1082			845	
Turn Bay Length (ft)	324			332					415			174
Base Capacity (vph)	762	2411		677	2199			670	719		691	705
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	0.17		0.00	0.15			0.05	0.02		0.04	0.16

Intersection Summary

Area Type: Other

Cycle Length: 118.7

Actuated Cycle Length: 58.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 15.2

Intersection LOS: B

Intersection Capacity Utilization 47.3%

ICU Level of Service A







Analysis Period (min) 15

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025





















Splits and Phases: 17: Colony Rd/New Wright Shop Rd & Route 210

 Ø1 22.1 s	 Ø2 42.1 s	 Ø4 26.5 s	 Ø8 28 s
 Ø5 17.1 s	 Ø6 42.1 s		

HCM 6th Signalized Intersection Summary




















17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	375	20	1	285	23	30	4	14	19	5	108
Future Volume (veh/h)	221	375	20	1	285	23	30	4	14	19	5	108
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	1847	1788	1847	1806	1761	1806	1803	1847	1847	1847	1847	1832
Adj Flow Rate, veh/h	230	391	21	1	297	24	31	4	15	20	5	112
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, %	0	4	0	0	3	0	3	0	0	0	0	1
Cap, veh/h	482	1078	58	355	613	49	91	12	91	140	35	153
Arrive On Green	0.13	0.33	0.33	0.00	0.20	0.20	0.06	0.06	0.06	0.10	0.10	0.10
Sat Flow, veh/h	1759	3279	176	1720	3137	252	1567	202	1565	1421	355	1553
Grp Volume(v), veh/h	230	202	210	1	158	163	35	0	15	25	0	112
Grp Sat Flow(s),veh/h/ln	1759	1698	1756	1720	1673	1716	1769	0	1565	1776	0	1553
Q Serve(g_s), s	5.6	5.1	5.1	0.0	4.7	4.7	1.1	0.0	0.5	0.7	0.0	3.9
Cycle Q Clear(g_c), s	5.6	5.1	5.1	0.0	4.7	4.7	1.1	0.0	0.5	0.7	0.0	3.9
Prop In Lane	1.00		0.10	1.00		0.15	0.89		1.00	0.80		1.00
Lane Grp Cap(c), veh/h	482	558	577	355	327	335	102	0	91	175	0	153
V/C Ratio(X)	0.48	0.36	0.36	0.00	0.48	0.49	0.34	0.00	0.17	0.14	0.00	0.73
Avail Cap(c_a), veh/h	716	1063	1099	660	1047	1074	633	0	560	635	0	555
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	0.00	1.00
Uniform Delay (d), s/veh	14.7	14.3	14.3	12.8	20.0	20.0	25.3	0.0	25.1	23.1	0.0	24.5
Incr Delay (d2), s/veh	0.3	1.4	1.4	0.0	4.0	3.9	2.0	0.0	0.8	0.4	0.0	6.6
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(50%),veh/ln	2.1	2.0	2.1	0.0	1.8	1.9	0.5	0.0	0.2	0.3	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.9	15.7	15.7	12.8	23.9	23.9	27.3	0.0	25.9	23.4	0.0	31.1
LnGrp LOS	B	B	B	B	C	C	C	A	C	C	A	C
Approach Vol, veh/h	642				322				50			
Approach Delay, s/veh	15.4				23.9				26.9			
Approach LOS	B				C				C			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.6	18.0		9.7	7.2	25.5		13.5				
Change Period (Y+Rc), s	7.1	7.1		6.5	7.1	7.1		8.0				
Max Green Setting (Gmax), s	15.0	35.0		20.0	10.0	35.0		20.0				
Max Q Clear Time (g_c+I1), s	7.6	6.7		3.1	2.0	7.1		5.9				
Green Ext Time (p_c), s	0.1	4.2		0.1	0.0	6.4		0.3				
Intersection Summary												
HCM 6th Ctrl Delay	20.0											
HCM 6th LOS	C											








Lanes, Volumes, Timings
20: Riverview Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	394	9	7	297	23	7	2	5	23	0	5
Future Volume (vph)	5	394	9	7	297	23	7	2	5	23	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			-10%			1%	
Storage Length (ft)	308		0	307		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.989				0.850		0.977	
Flt Protected	0.950			0.950				0.963			0.960	
Satd. Flow (prot)	1796	3512	0	1805	3390	0	0	1745	1696	0	1716	0
Flt Permitted	0.950			0.950				0.963			0.960	
Satd. Flow (perm)	1796	3512	0	1805	3390	0	0	1745	1696	0	1716	0
Link Speed (mph)		55			55			25			45	
Link Distance (ft)		10026			1037			1200			891	
Travel Time (s)		124.3			12.9			32.7			13.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	0%	0%	4%	22%	13%	0%	0%	4%	0%	0%
Adj. Flow (vph)	5	406	9	7	306	24	7	2	5	24	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	415	0	7	330	0	0	9	5	0	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	0.94	0.94	0.94	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.8%						ICU Level of Service A					
Analysis Period (min)	15											

HCM 6th TWSC
20: Riverview Rd & Route 210

09/09/2025

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	5	394	9	7	297	23	7	2	5	23	0	5
Future Vol, veh/h	5	394	9	7	297	23	7	2	5	23	0	5
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	308	-	-	307	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	0	-	-	-10	-	-	1	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	0	0	4	22	13	0	0	4	0	0
Mvmt Flow	5	406	9	7	306	24	7	2	5	24	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	330	0	0	415	0	0	588	765	208	546	757	165
Stage 1	-	-	-	-	-	-	421	421	-	332	332	-
Stage 2	-	-	-	-	-	-	167	344	-	214	425	-
Critical Hdwy	4.1	-	-	4.1	-	-	5.76	4.5	5.9	7.78	6.7	7
Critical Hdwy Stg 1	-	-	-	-	-	-	4.76	3.5	-	6.78	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	4.76	3.5	-	6.78	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.63	4	3.3	3.54	4	3.3
Pot Cap-1 Maneuver	1241	-	-	1155	-	-	513	513	852	404	325	853
Stage 1	-	-	-	-	-	-	698	748	-	638	636	-
Stage 2	-	-	-	-	-	-	864	775	-	754	576	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1241	-	-	1155	-	-	506	508	852	397	322	853
Mov Cap-2 Maneuver	-	-	-	-	-	-	506	508	-	397	322	-
Stage 1	-	-	-	-	-	-	695	745	-	635	632	-
Stage 2	-	-	-	-	-	-	854	770	-	744	574	-

















Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			11.2			13.8		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	506	852	1241	-	-	1155	-	-	439
HCM Lane V/C Ratio	0.018	0.006	0.004	-	-	0.006	-	-	0.066
HCM Control Delay (s)	12.2	9.3	7.9	-	-	8.1	-	-	13.8
HCM Lane LOS	B	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings

23: US 29 SB On-Ramp/US 29 SB Off-Ramp & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	239	182	1	129	0	0	0	0	0	1	198
Future Volume (vph)	1	239	182	1	129	0	0	0	0	0	1	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.866	
Flt Protected												
Satd. Flow (prot)	0	1863	1583	0	1832	0	0	0	0	0	1567	0
Flt Permitted												
Satd. Flow (perm)	0	1863	1583	0	1832	0	0	0	0	0	1567	0
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		1037			1107			1017			759	
Travel Time (s)		12.9			13.7			15.4			11.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	2%	100%	3%	0%	0%	0%	0%	0%	0%	5%
Adj. Flow (vph)	1	246	188	1	133	0	0	0	0	0	1	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	247	188	0	134	0	0	0	0	0	205	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.4%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection

Int Delay, s/veh 2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑		↑						↑	
Traffic Vol, veh/h	1	239	182	1	129	0	0	0	0	0	1	198
Future Vol, veh/h	1	239	182	1	129	0	0	0	0	0	1	198
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	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	6	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	2	100	3	0	0	0	0	0	0	5
Mvmt Flow	1	246	188	1	133	0	0	0	0	0	1	204

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	133	0	0	434	0	0	477	571	133
Stage 1	-	-	-	-	-	-	135	135	-
Stage 2	-	-	-	-	-	-	342	436	-
Critical Hdwy	4.1	-	-	5.1	-	-	6.4	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.5	-
Follow-up Hdwy	2.2	-	-	3.1	-	-	3.5	4	3.345
Pot Cap-1 Maneuver	1464	-	-	753	-	0	551	434	908
Stage 1	-	-	-	-	-	0	896	789	-
Stage 2	-	-	-	-	-	0	724	583	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1464	-	-	753	-	-	550	0	908
Mov Cap-2 Maneuver	-	-	-	-	-	-	550	0	-
Stage 1	-	-	-	-	-	-	895	0	-
Stage 2	-	-	-	-	-	-	723	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.1	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	1464	-	-	753	-	908
HCM Lane V/C Ratio	0.001	-	-	0.001	-	0.226
HCM Control Delay (s)	7.5	-	-	9.8	0	10.1
HCM Lane LOS	A	-	-	A	A	B
HCM 95th %tile Q(veh)	0	-	-	0	-	0.9

Lanes, Volumes, Timings
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↗	↗
Traffic Volume (vph)	0	240	2	0	0	128
Future Volume (vph)	0	240	2	0	0	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		2%	-1%		3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	1844	1273	0	1872	1544
Flt Permitted						
Satd. Flow (perm)	0	1844	1273	0	1872	1544
Link Speed (mph)		55	55		45	
Link Distance (ft)		399	211		874	
Travel Time (s)		4.9	2.6		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	50%	0%	0%	3%
Adj. Flow (vph)	0	261	2	0	0	139
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	261	2	0	0	139
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	0.99	0.99	1.02	1.02
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	17.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM 6th TWSC
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	240	2	0	0	128
Future Vol, veh/h	0	240	2	0	0	128
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	2	-1	-	3	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	50	0	0	3
Mvmt Flow	0	261	2	0	0	139
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	263	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	261	-
Critical Hdwy	-	-	-	-	7	6.53
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.327
Pot Cap-1 Maneuver	0	-	-	0	699	1079
Stage 1	0	-	-	0	1026	-
Stage 2	0	-	-	0	754	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	699	1079
Mov Cap-2 Maneuver	-	-	-	-	699	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	754	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		8.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	-	1079		
HCM Lane V/C Ratio	-	-	-	0.129		
HCM Control Delay (s)	-	-	0	8.8		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	-	0.4		

FORECASTING MEMO

MEMORANDUM

To: Rick Youngblood (VDOT)

From: Anthony Donald, PE (RK&K, LLP)
Logan Geske, EIT (RK&K, LLP)

Re: Amherst County Connector Road Study
Traffic Forecast

Date: June 30, 2025

1 INTRODUCTION AND PROJECT PURPOSE

RK&K, LLP has been tasked by VDOT's Transportation and Mobility Planning Division (TMPD) to perform a comprehensive study of the Central Virginia Training Center (CVTC) and Route 210 corridor in Amherst County. This study includes the evaluation of the Route 210 corridor from its intersection with South Amherst Highway to the on ramp of US 29 NB for a new connection from CVTC to Route 210.

Under Existing Conditions, the study corridor is identified to have limited access and safety issues and is anticipated to experience growth due to a potential redevelopment at the CVTC site. Specifically, as the region continues to grow and with the anticipated increase in capacity, Route 210 is expected to see an increase in traffic volumes, especially residential traffic. The purpose of this study is to evaluate the existing operational and safety conditions of the Route 210 corridor, forecast future demand and evaluate improvement alternatives including a new intersection for the incoming redevelopment.

The study area consists of the Route 210 corridor from the South Amherst Highway intersection to the US 29 interchange, with nine intersections outlined for analysis. These include Route 210 and South Amherst Hwy, US BUS 29 Interchange and Route 210, Route 210 and Morris St with Union St, Route 210 and Colony Road with New Wright Shop Rd, Route 210 and Riverview Road, US 29 SB and Route 210, as well as US 29 NB on and off ramps. The land use within the study area is mostly residential and agricultural across the corridor of Route 210 with some parts of commercial and industrial. For the purposes of this study, Route 210 is assumed to be oriented in the east-west direction. The Central Virginia Training Center is located about 0.5 miles from the Route 210 corridor and is only accessible through Colony Rd off its study intersection. CVTC is currently used for law enforcement training with five active buildings. The study area is illustrated in **Figure 1**.

This memorandum presents a forecast for future (2050) traffic volumes conditions based on potential CVTC redevelopment plans, and the recommended growth rate in the area.

2 DATA COLLECTION

As part of the data collection efforts, 9 weekday turning movement counts (6:00 AM – 6:00 PM) and 2 speed tube counts (24-hour) were collected on three different dates: November 19, 2024 (Tuesday), December 12, 2024 (Thursday), and January 14, 2025 (Tuesday). Turning movement counts for Route 210 and South Amherst Highway were taken from a previous study on September 13, 2023 (Wednesday). The turning movement counts included passenger cars, heavy vehicles (trucks), pedestrians, and bicycles, while the tube counts included only passenger cars and trucks. **Table 1** provides a summary of the traffic count collection efforts for the project.

Historic AADTs and growth rates from 2013 to 2023 were obtained from VDOT's Pathways for Planning website. Daily volumes from Lynchburg's Travel Demand Model were also gathered for 2022 and 2050 projections..

2.1 Existing (2024) Condition Traffic Volumes

Existing (2024) Conditions traffic volumes were obtained from previously collected turning movement counts and are presented in **Table 1**. The AM peak hour for the study area was identified as 7:15 AM to 8:15 AM, while the PM peak hour was identified as 4:30 PM to 5:30 PM. Existing Year (2024) AM and PM balanced peak hour volumes are presented in **Figure 2**.

3 FUTURE YEAR (2050) VOLUME DEVELOPMENT

The Future Year (2050) Volume Development methodology reviewed three (3) different sources of data to develop growth rates, which include historical growth trends and data from VDOT's Pathways for Planning, as well as the VDOT Lynchburg TDM outputs. The most recent Lynchburg TDM was reviewed to verify the following:

- Coding of Traffic Analysis Zones (TAZ)
- Future Year (2050) background roadway improvement projects relevant to the study area were incorporated adequately.
- Validate the Future Year (2050) TDM TAZ results by comparing the number of projected households in the CVTC parcel with the redevelopment plan's yield summary.

The growth rates for the study segments were determined by evaluating the data compiled from the above sources. The resulting growth rates were then applied to the Existing Year (2024) volumes to obtain the Future Year (2050) volumes. The forecasting process adheres to the IIM-TMPD-7.0 and the VDOT's Forecasting Guidebook guidelines (Version 1.1, May 2024). It must be noted that the growth rates were presented to the study team in March 2025 and were approved.

3.1 Future Year (2050) Scenarios

Consistent with the framework document, the Future Year for the current study is 2050. It is anticipated that the potential Future Year improvements (interchange and other safety-related improvements) associated with the current study are not expected to significantly alter traffic volumes or travel patterns within the study area. However, redevelopment is a possibility for the CVTC site and will generate hundreds of trips for the surrounding area. The trip generation sheet is shown in **Appendix A**. And, a new intersection may be needed to accompany the sudden rise in trips. Growth rates for Future (2050) years under No-Build and Build conditions are still assumed to be the same.

3.2 Background Improvement Projects

For this project, no background improvement projects were identified within the area of the study corridor. As a result, no improvement projects were included in the evaluation of existing conditions.

3.3 Travel Demand Model

The most recent Lynchburg Travel Demand Model (LTDM – version 3) developed for the Central VA Transportation Planning Organization (CVTPO) was used to develop the forecasts for this study. The model was developed using TransCAD Version 9 Build 32885 with a Base Year of 2022 and a Future Year of 2050. The model was reviewed to verify:

- Future Year (2050) background roadway improvement projects relevant to the study area were incorporated appropriately.
- Validate the Future Year (2050) TDM TAZ results by comparing the number of projected households in the CVTC parcel with the redevelopment plan's yield summary.

3.4 Growth Rate Development and Recommendations

Historical AADTs (2013 – 2023) were obtained from VDOT's Pathways for Planning website along with the base year and Future Year forecasts. Similarly, daily volumes for the links (roadway segments) constituting the study corridor and relevant study intersections were extracted from the Lynchburg TDM for the model's Base Year (2022) and Future Year (2050).

Table 2 presents an overview of historic AADT data and the corresponding growth rates (2013 to 2023) from the VDOT Pathways for Planning for roadways within the study area. AADT from the years 2020 were excluded from growth rate calculations considering the impact of COVID-19 on the travel demand patterns..

Table 3 presents traffic forecasts for the Base Year (2022) and the Future Year (2050) from the Lynchburg TDM data along with the corresponding growth rates, estimated using compound annual growth rate (CAGR) methodology, for the various roadway segments in the study area.

Separate growth rates were calculated using the Historical AADTs from VDOT's Pathways for Planning and the Lynchburg TDM volume outputs using CAGR methodology.

To accompany the regional demand of the study area, US BUS 29 as well as US 29 highways were mainly used in the development of the corridor's overall growth rate. As seen in **Table 4**, Growth rate estimates from the TDM were calculated to have a lower average than the corresponding growth rates from VDOT's Pathways for Planning website. Growth rate estimates from the TDM indicated that traffic along Route 210 is anticipated to grow at 1.1% overall, while P4P projects a growth rate of almost 1.5%. Based on the feedback from the stakeholders and general experience of the study area, the growth rate estimates from the TDM and P4P represent a feasible range for the surrounding area. Therefore, the final recommended growth rate was averaged from both sources to be 1.3%. It must be noted that the growth rates were presented to the study team in March 2024 and were approved.

Recommended growth rate for the study corridor in the study area are also shown in **Table 4**. The final growth rate was presented to the stakeholders and approved in March 2025.

3.5 Future Year Peak Hour Volume Estimates

The intersection approach volumes and turning movement percentages from Existing Year (2024) peak hour volumes were used to estimate Future Year (2050) turning movement volumes (TMVs) based on the growth rate methodology described above. Any imbalances in the resultant Future Year (2050) volume estimates arising from the differential growth rates along a corridor were balanced using trends observed from the Lynchburg TDM and engineering judgment.

Along with this, trips generated from the potential redevelopment will create higher overall turning movement counts across the corridor. This is presented in two different scenarios. The first one includes using the existing intersection of Colony Rd and Route 210 as the access point for a new redevelopment site. This is shown in **Figure 3**. Scenario two creates a new intersection west of Colony Road with the assumption of all generated trips using this intersection to enter and exit the redevelopment site. This is presented in **Figure 4**. The proportional

split of the generated trips was derived from the TDM's ramp volumes at US 29 and US BUS 29. This is further shown in **Table 5**.

3.6 Future (2050) AADT Estimates

Existing (2024) and Future (2050) condition AADT estimates were developed by applying the recommended growth rate to 2022 historical AADT volumes. Future conditions (2050) forecast AADTs are shown in **Table 6**.

3.7 Design Factor and Heavy Vehicle Percentage

Due to a potential future year redevelopment at the CVTC, traffic patterns are expected to change as well as the capacity. Therefore, a new design factor and truck percentage were calculated based on the trip generation methodology. The HV% was calculated using weighted volumes from the redevelopment plans and was found to be about 3% for the corridor. The design factor was calculated as 0.15 to account for surrounding roadways as well as the TDM's projected AADTs.

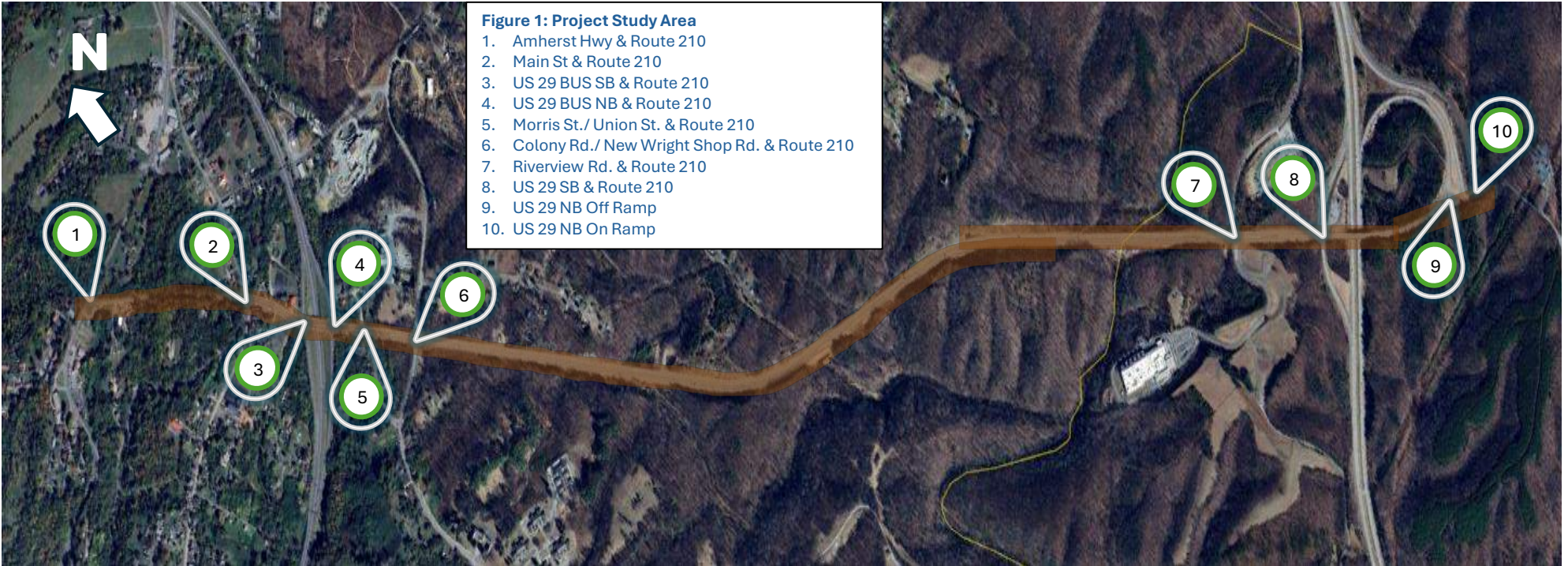
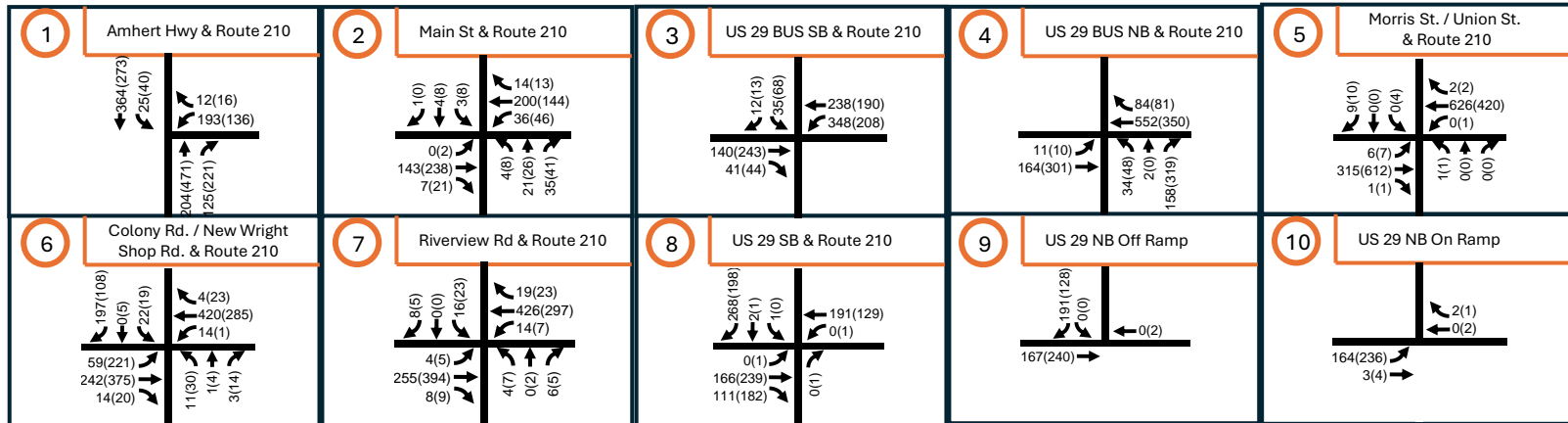


Table 1: Traffic Volume Counts

Location	Count Date
12-Hour Turning Movement Counts	
1. Amherst Hwy at Route 210**	09/13/2023
2. Main St at Route 210	11/19/2024
3. US 29 BUS SB at Route 210*	12/12/2024
4. US 29 BUS NB at Route 210	11/19/2024
5. Morris St-Union St at Route 210*	01/14/2025
6. Colony Rd-New Wright Shop Rd at Route 210	11/19/2024
7. Riverview Rd at Route 210	11/19/2024
8. US 29 SB at Route 210	11/19/2024
9. US 29 NB Off Ramp at Route 210	11/19/2024
10. US 29 NB On Ramp at Route 210	11/19/2023
24-Hour Road Tube Counts	
1. Route 210 EB – 0.67 mi East of Colony Rd-New Wright Shop Rd	11/19/2024
2. Route 210 WB – 0.67 mi East of Colony Rd-New Wright Shop Rd	11/19/2024

*Intersection was recounted at a future date

**Intersection was approved by stakeholders in January 2025; used previous studies' numbers



AM(PM)

Figure 2: Amherst County Connector Study
2024 Balanced Traffic Volumes

Date:
06/2025

Table 2: Historical AADTs and Growth Rates

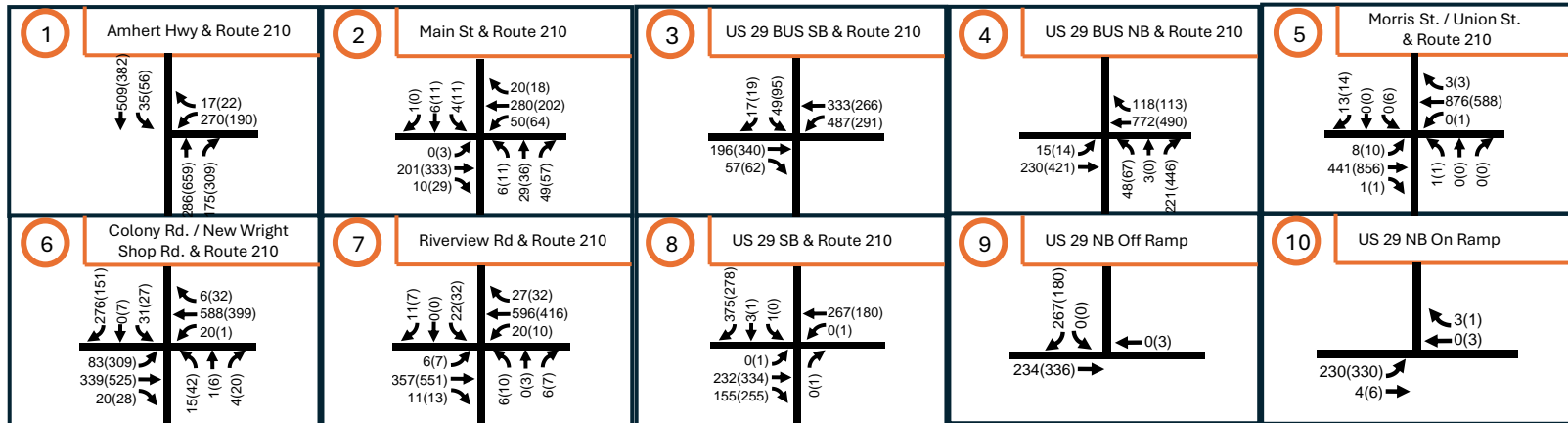
Road	To	From	AADT											Historic AADT CAGR		
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2013-2018	2018-2023	2013-2023
Route 210	US BUS 29 NB Ramps	South Amherst Hwy and Route 210	3687	3739	3893	4444	4470	4415	4613	4238	4457	4334	4479	3.9%	0.3%	2.1%
	Route 210 and Colony Rd	US BUS 29 NB Ramps	10813	10966	11416	11194	11261	11126	11466	10534	11078	10545	10899	0.6%	-0.4%	0.1%
	US 29 NB On-Ramp	Colony Rd and Route 210	6047	6132	6384	6434	6472	6231	7359	6761	7110	9696	9711	0.6%	11.2%	6.1%
US 29	Route 210 Exit Ramp	US 29 James River Bridge	15657	16044	16924	17682	18222	18281	20914	17298	19874	18513	19639	3.4%	1.5%	2.5%
	US 29 MP 77	Route 210 Exit Ramp	15719	16108	16991	18720	19291	19354	21660	17915	20583	19582	20773	4.6%	1.5%	3.2%
US Bus 29	US BUS 29 End of On-Ramp	US Bus 29 Off-Ramp	28903	29290	29667	30181	30496	30873	25623	23502	24813	24518	25454	1.4%	-3.5%	-1.2%
S Amherst Hwy	S Amherst Hwy and Route 210	S Amherst Hwy and Early Drive	8469	8589	8941	9740	9798	9432	8244	7574	7965	8457	8741	2.3%	-1.5%	0.3%
Route 460	US 29 On-Ramp	US 29 Off-Ramp	24681	25011	25334	27084	27367	27706	26901	24675	26050	26588	27603	2.5%	-0.1%	1.2%

Table 3: CVTPO Lynchburg TDM Volume Outputs and Growth Rates

Road	To	From	AADT		Growth Rate
			2022	2050	2022-2050
Route 210	West of Main St	South Amherst Hwy	2625	6030	4.6%
	West of US 29 BUS SB Ramp	East of Main St	4014	7537	3.1%
	West of US 29 NB Off Ramp	East of US 29 BUS SB	9812	19809	3.6%
	Colony Rd	East of US 29 BUS NB Off Ramp	15937	32792	3.8%
	Riverview Rd	Colony Rd	5785	7682	1.2%
	US 29 SB Ramp	Riverview Rd	5789	7686	1.2%
	US 29 Loop Ramp	US 29 SB Ramp	2161	2879	1.2%
	NB US 29	Loop Ramp	1786	2233	0.9%
	US 29 NB Ramp	NB US 29	575	595	0.1%
Main Street	Route 210	South of Route 210 (Lynchs Ferry Rd)	1688	1758	0.1%
US 29 BUS SB Ramp	Route 210	North of Route 210	1391	3601	5.7%
	Route 210	South of Route 210	5802	9979	2.6%
US 29 BUS NB Ramp	Route 210	North of Route 210	1304	3684	6.5%
	Route 210	South of Route 210	5764	10269	2.8%
Colony Rd	Route 210	Old Colony Road	3654	21448	17.4%
New Wright Shop Road	Route 210	North of Route 210	7678	8119	0.2%
Riverview Rd	Route 210	North of Route 210	4	5	0.9%
Loop Ramp US 29	Route 210	US 29 EB Loop	483	757	2.0%
US 29 SB Off Ramp	Route 210	North of Route 210	3472	4208	0.8%
	Route 210	South of Route 210	595	1022	2.6%
US 29 NB Ramp	Route 210	North of Route 210	1299	1714	1.1%
US BUS 29	North of US BUS 29 Interchange	US BUS 29 NB On Ramp	11010	17256	2.0%
	US BUS 29 NB On Ramp	US BUS 29 NB Off Ramp	9706	13572	1.4%
	South of US BUS 29 Interchange	US BUS 29 NB On Ramp	15470	23841	1.9%
US 29	North of US 29 NB On Ramp	US 29 NB On Ramp	9294	11893	1.0%
	US 29 NB On Ramp	US 29 SB Off Ramp	7996	10179	1.0%
	US 29 SB Off Ramp	US 29 Loop Ramp	7996	10179	1.0%
	US 29 Loop Ramp	Route 210	8479	10936	1.0%
	Route 210	South of US 29 On Ramp	8479	10936	1.0%

Table 4: Growth Rate Summary and Recommended Growth Rate

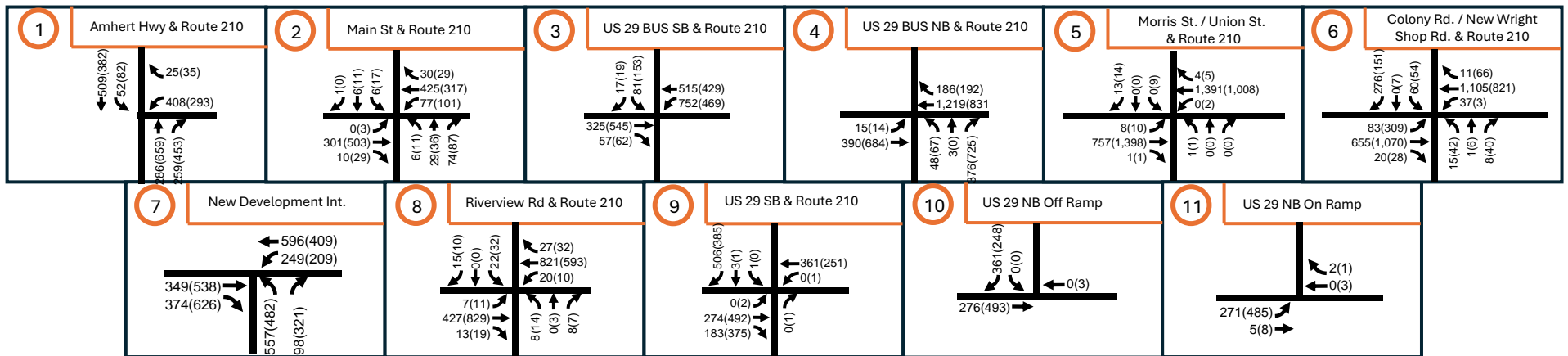
Road	To	From	VDOT P4P	Lynchburg TDM
US 29	Route 210 Exit Ramp	US 29 James River Bridge	1.22%	0.90%
	US 29 MP 77	Route 210 Exit Ramp	2.68%	1.00%
US Bus 29	US BUS 29 End of On-Ramp	US Bus 29 Off-Ramp	0.50%	1.40%
AVERAGE			1.47%	1.10%
			1.30%	



AM(PM)

Figure 3: Amherst County Connector Study
2050 No-Build Balanced Traffic Volumes

Date:
06/2025



AM(PM)

Figure 4: Amherst County Connector Study
2050 Build Development Balanced Traffic Volumes (New Intersection)

Date:
06/2025

Table 5: Trip Generation Directional Splits

Direction	Peak Hour	Ramp	Volume	Split %	ROUNDED %
Entering	AM	US 29 BUS	1370	60.5	60%
		US 29	893	39.5	40%
	PM	US 29 BUS	3871	77.2	75%
		US 29	1141	22.8	25%
Exiting	AM	US 29 BUS	2989	74.6	75%
		US 29	1017	25.4	25%
	PM	US 29 BUS	2278	89.9	85%*
		US 29	255	10.1	15%*

*Values were slightly changed from split to offset low exiting trips at US 29

Table 6: Existing Year (2024) and Future Year (2050) AADTs

Road	To	From	AADT	
			2024	2050
Route 210	US BUS 29 NB Ramps	South Amherst Hwy and Route 210	4537	6051
	Route 210 and Colony Rd	US BUS 29 NB Ramps	11041	14725
	US 29 NB On-Ramp	Colony Rd and Route 210	9837	13120
US 29	Route 210 Exit Ramp	US 29 James River Bridge	19894	26532
	US 29 MP 77	Route 210 Exit Ramp	21043	28064
US Bus 29	US BUS 29 End of On-Ramp	US Bus 29 Off-Ramp	25785	34388
S Amherst Hwy	S Amherst Hwy and Route 210	S Amherst Hwy and Early Drive	8855	11809
Route 460	US 29 On-Ramp	US 29 Off-Ramp	27962	37292

APPENDIX A: Trip Generation Sheet
Available via Digital File

AM Adjacent									PM Adjacent				New AM Trips				New PM Trips		
UNITS	IV	LUC	Avg Rate	Entering	Exiting	Entering Trips	Exiting Trips	PM Adjacent	Entering	Exiting	Entering Trips	Exiting Trips	Commerical (x1000 sf GLA)	Mixed-Use PUD	Residential (Dwelling Units)		Commerical (x1000 sf GLA)	Mixed-Use PUD	Residential (Dwelling Units)
BLOCK ONE																			
Industrial/Tech	SF per 1000	20.1	110	0.74	88%	12%	13	2	0.65	14%	86%	2	11	15	-	-	13	-	-
Industrial/Tech	SF per 1000	21.6	110	0.74	88%	12%	14	2	0.65	14%	86%	2	12	16	-	-	14	-	-
Industrial/Tech	SF per 1000	20.1	110	0.74	88%	12%	13	2	0.65	14%	86%	2	11	15	-	-	13	-	-
Industrial/Tech	SF per 1000	21.6	110	0.74	88%	12%	14	2	0.65	14%	86%	2	12	16	-	-	14	-	-
BLOCK TWO																			
Retail	SF per 1000	7.5	822	2.36	60%	40%	10.70	7	6.59	50%	50%	25	25	18	-	-	49	-	-
Grocery Store	SF per 1000	36.65	850	2.86	59%	41%	62	43	8.95	50%	50%	164	164	105	-	-	328	-	-
BLOCK THREE																			
Office	SF per 1000	50	710	1.52	88%	12%	67	9	1.44	17%	83%	12	60	76	-	-	72	-	-
Office	SF per 1000	59.4	710	1.52	88%	12%	79	11	1.44	17%	83%	15	75	90	-	-	89	-	-
BLOCK FOUR																			
Retail	SF per 1000	10.5	822	2.36	60%	40%	14.87	10	6.59	50%	50%	35	35	25	-	-	69	-	-
Mixed Use													-	75	-		-	178	-
Retail	SF per 1000	23.1	822	2.36	60%	40%	32.71	22	6.59	50%	50%	76	76	-	-	-	-	-	-
Residential	DU	50	220	0.4	24%	76%	5	15	0.51	63%	37%	16	9	-	-	-	-	-	-
BLOCK FIVE																			
Retail	SF per 1000	10.5	822	2.36	60%	40%	14.87	10	6.59	50%	50%	35	35	25	-	-	69	-	-
Senior Housing	DU	75	252	0.2	34%	66%	5	10	0.25	56%	44%	11	8	-	-	15	-	-	19
Mixed Use													-	86	-		-	205	-
Retail	SF per 1000	26.66	822	2.36	60%	40%	37.75	25	6.59	50%	50%	88	88	-	-	-	-	-	-
Residential	DU	57	220	0.4	24%	76%	5	17	0.51	63%	37%	18	11	-	-	-	-	-	-
BLOCK SIX																			
Hotel	DU	77	310	0.46	56%	44%	20	16	0.59	51%	49%	23	22	-	-	35	-	-	45
BLOCK SEVEN																			
Mixed Use													-	66	-		-	159	-
Retail	SF per 1000	20.65	822	2.36	60%	40%	29.24	19	6.59	50%	50%	68	68	-	-	-	-	-	-
Residential	DU	44	220	0.4	24%	76%	4	13	0.51	63%	37%	14	8	-	-	-	-	-	-
Cottage Home Lots	DU	35	210	0.7	25%	75%	6	18	0.94	63%	37%	21	12	-	-	25	-	-	33
Townhomes	DU	24	215	0.48	25%	75%	3	9	0.57	59%	41%	8	6	-	-	12	-	-	14
BLOCK EIGHT																			
Mixed Use													-	55	-		-	132	-
Retail	SF per 1000	17.15	822	2.36	60%	40%	24.28	16	6.59	50%	50%	57	57	-	-	-	-	-	-
Residential	DU	37	220	0.4	24%	76%	4	11	0.51	63%	37%	12	7	-	-	-	-	-	-
Missing Middle	DU	9	220	0.4	24%	76%	1	3	0.51	63%	37%	3	2	-	-	4	-	-	5
Missing Middle	DU	15	220	0.4	24%	76%	1	5	0.51	63%	37%	5	3	-	-	6	-	-	8
Missing Middle	DU	12	220	0.4	24%	76%	1	4	0.51	63%	37%	4	2	-	-	5	-	-	6
Townhomes	DU	16	220	0.48	25%	75%	2	6	0.57	59%	41%	5	4	-	-	8	-	-	9
BLOCK NINE																			
Missing Middle	DU	12	220	0.4	24%	76%	1	4	0.51	63%	37%	4	2	-	-	5	-	-	6
Missing Middle	DU	15	220	0.4	24%	76%	1	5	0.51	63%	37%	5	3	-	-	6	-	-	8
Missing Middle	DU	12	220	0.4	24%	76%	1	4	0.51	63%	37%	4	2	-	-	5	-	-	6
Missing Middle	DU	12	220	0.4	24%	76%	1	4	0.51	63%	37%	4	2	-	-	5	-	-	6
Missing Middle	DU	14	220	0.4	24%	76%	1	4	0.51	63%	37%	4	3	-	-	6	-	-	7
Missing Middle	DU	9	220	0.4	24%	76%	1	3	0.51	63%	37%	3	2	-	-	4	-	-	5
BLOCK TEN																			
Apartments	DU	92	221	0.37	23%	77%	8	26	0.39	61%	39%	22	14	-	-	34	-	-	36
Apartments	DU	75	221	0.37	23%	77%	6	21	0.39	61%	39%	18	11	-	-	28	-	-	29
Apartments	DU	56	221	0.37	23%	77%	5	16	0.39	61%	39%	13	9	-	-	21	-	-	22
Apartments	DU	56	221	0.37	23%	77%	5	16	0.39	61%	39%	13	9	-	-	21	-	-	22
Apartments	DU	61	221	0.37	23%	77%	5	17	0.39	61%	39%	15	9	-	-	23	-	-	24
Apartments	DU	75	221	0.37	23%	77%	6	21	0.39	61%	39%	18	11	-	-	28	-	-	29
BLOCK ELEVEN																			
Church Trail-3?	SF per 1000	8	560	0.32	62%	38%	2	1	0.49	44%	56%	2	2	3	-	-	4	-	-
BLOCK TWELVE																			
Village Home Lots	DU	26	210	0.7	25%	75%	5	14	0.94	63%	37%	15	9	-	-	18	-	-	24
BLOCK THIRTEEN																			
Townhomes	DU	32	215	0.48	25%	75%	4	12	0.57	59%	41%	11	7	-	-	15	-	-	18
BLOCK FOURTEEN																			
Townhomes	DU	25	215	0.48	25%	75%	3	9	0.57	59%	41%	8	6	-	-	12	-	-	14

BLOCK FIFTEEN																			
Apartments	DU	81	221	0.37	23%	77%	7	23	0.39	61%	39%	19	12	-	-	30	-	-	32
Townhomes	DU	12	215	0.48	25%	75%	1	4	0.57	59%	41%	4	3	-	-	6	-	-	7
BLOCK SIXTEEN																			
Retail/Event	SF per 1000	15	495	1.91	66%	34%	19	10	2.5	47%	53%	18	20	29	-	-	38	-	-
Destination Restaurant	SF per 1000	15.5	932	9.57	55%	45%	82	67	9.05	61%	39%	86	55	148	-	-	140	-	-
Funicular Station	Parking Spaces	25	90	0.56	78%	22%	11	3	0.49	26%	74%	3	9	14			12		
BLOCK SEVENTEEN																			
Apartments	DU	90	221	0.37	23%	77%	8	26	0.39	61%	39%	21	14	-	-	33	-	-	35
Townhomes	DU	19	215	0.48	25%	75%	2	7	0.57	59%	41%	6	4	-	-	9	-	-	11
BLOCK EIGHTEEN																			
Podium Apartments	DU	51	221	0.37	23%	77%	4	15	0.39	61%	39%	12	8	-	-	19	-	-	20
Podium Apartments	DU	51	221	0.37	23%	77%	4	15	0.39	61%	39%	12	8	-	-	19	-	-	20
Podium Apartments	DU	51	221	0.37	23%	77%	4	15	0.39	59%	41%	12	8	-	-	19	-	-	20
Podium Apartments	DU	51	221	0.37	23%	77%	4	15	0.39	59%	41%	12	8	-	-	19	-	-	20
BLOCK NINETEEN																			
Village Home Lots	DU	39	210	0.7	25%	75%	7	20	0.94	63%	37%	23	14	-	-	27	-	-	37
BLOCK TWENTY																			
Cottage Home Lots	DU	6	210	0.7	25%	75%	1	3	0.94	63%	37%	4	2	-	-	4	-	-	6
Estate Home Lots	DU	79	210	0.7	25%	75%	14	41	0.94	63%	37%	47	27	-	-	55	-	-	74

AM Total Trips	Entering	Exiting
	709	745
Internal Capture Rates (12%)	85.02	89.376
Total(Rounded)	623	655
Combined Total	1278	

PM Total Trips	Entering	Exiting
	1158	1116
Internal Capture Rates (28%)	324.268	312.368
Total(Rounded)	834	803
Combined Total	1637	

2050 No-BUILD WITHOUT DEVELOPMENT TRAFFIC VOLUMES



<p>1 Amherst Hwy & Route 210</p>	<p>2 Main St & Route 210</p>	<p>3 US 29 BUS SB & Route 210</p>	<p>4 US 29 BUS NB & Route 210</p>	<p>5 Morris St. / Union St. & Route 210</p>
<p>6 Colony Rd. / New Wright Shop Rd. & Route 210</p>	<p>7 Riverview Rd & Route 210</p>	<p>8 US 29 SB & Route 210</p>	<p>9 US 29 NB Off Ramp</p>	<p>10 US 29 NB On Ramp</p>



Amherst County Connector Study 2050 No-Build w/o Development Peak Hour Traffic Volumes

AM(PM)

Date:
08/2025

2050 No-BUILD WITH DEVELOPMENT TRAFFIC



<p>1 Amhert Hwy & Route 210</p>	<p>2 Main St & Route 210</p>	<p>3 US 29 BUS SB & Route 210</p>	<p>4 US 29 BUS NB & Route 210</p>	<p>5 Morris St. / Union St. & Route 210</p>
<p>6 Colony Rd. / New Wright Shop Rd. & Route 210</p>	<p>7 Riverview Rd & Route 210</p>	<p>8 US 29 SB & Route 210</p>	<p>9 US 29 NB Off Ramp</p>	<p>10 US 29 NB On Ramp</p>



Amherst County Connector Study 2050 No Build w/ Development Peak Hour Traffic Volumes

AM(PM)

Date:
08/2025

2050 BUILD WITH DEVELOPMENT TRAFFIC VOLUMES



1 Amhert Hwy & Route 210 	2 Main St & Route 210 	3 US 29 BUS SB & Route 210 	4 US 29 BUS NB & Route 210 	5 Morris St. / Union St. & Route 210 	6 Colony Rd. / New Wright Shop Rd. & Route 210
7 New Development Int. 	8 Riverview Rd & Route 210 	9 US 29 SB & Route 210 	10 US 29 NB Off Ramp 	11 US 29 NB On Ramp 	



Amherst County Connector Study 2050 Build w/ Development Peak Hour Traffic Volumes (New Intersection)

AM(PM)

Date:
08/2025

2050 No-BUILD RESULTS TABLES

SYNCHRO CAPACITY ANALYSIS - INTERSECTION LEVEL OF SERVICE SUMMARY
2050 Future Volumes [No Build]
Amherst County Connector Road Study - Lynchburg, Virginia

Intersection Number and Description		Type of Control	Lane Group	Eastbound						Westbound						Northbound							Southbound							Overall																							
				AM			PM				AM			PM				AM			PM				AM			PM																									
				Delay	LOS	Max Q	Delay	LOS	Max Q	Storage	Delay	LOS	Max Q	Delay	LOS	Max Q	Storage	Delay	LOS	Max Q	Delay	LOS	Max Q	Storage	Delay	LOS	Max Q	Storage	Delay	LOS	Max Q	Storage	AM	PM																			
4	Amherst Hwy & Route 210	Signal																																																			
			Left							39.3	D	359	132.5	F	940	†	28.7	C	364	102.3	F	893	†	15.4	B	114	29.6	C	114	124.0	Delay	Delay																					
			Through							†	†	†	†	†	†	13.0								B	266	6.1	A	224	†	25.8	83.8																						
			Right							21.8	C	50	38.4	D	50	50.0								†	†	†	†	†	†	†	LOS	LOS																					
			Approach							38.3	D	†	122.6	F	†	†								28.7	C	†	102.3	F	†	†	13.2	B	†	10.4	B	†	†	C	F														
2	Main St & Route 210	TWSC																																																			
			Left	0.0	A	34	8.1	A	1023	†	8.2	A	39	9.1	A	63	136.0	17.2	C	113	29.9	D	588	†	27.4	D	31	56.5	F	284	†	Delay	Delay																				
			Through								†	†	†	†	†	†	3.0															5.6																					
			Right								†	†	†	†	†	†	LOS															LOS																					
			Approach								0.0	A	†	0.0	A	†	†															1.2	A	†	2.1	A	†	†	17.2	C	†	29.9	D	†	†	27.4	D	†	56.5	F	†	†	A
3	SBOffRampBus29 & Route 210	Signal																																																			
			Left	†	†	†	†	†	†	†	15.6	B	210	84.4	F	210	210.0							39.6	D	174	27.9	C	212	†	Delay	Delay																					
			Through	28.7	C	396	43.2	D	415	†	2.8	A	322	8.6	A	314	†														16.2	44.4																					
			Right	†	†	396	†	†	415	†	†	†	†	†	†	†															LOS	LOS																					
			Approach	28.7	C	†	43.2	D	†	†	10.4	B	†	48.3	D	†	†															39.6	D	†	27.9	C	†	†	B	D													
11	NBOffRampBus29 & Route 210	Signal																																																			
			Left	12.6	B	57	19.9	B	48	†	†	†	†	†	†	†	41.6	D	141	27.5	C	498	135.0								Delay	Delay																					
			Through	16.8	B	154	26.5	C	179	†	10.5	B	314	26.3	C	310								†													17.7	42.3															
			Right	†	†	†	†	†	†	†	†	297	†	†	306	†								41.8	D	209	81.3	F	804	†								LOS	LOS														
			Approach	16.6	B	†	26.4	C	†	†	10.5	B	†	26.3	C	†								†	41.7	D	†	77.0	E	†	†								B	D													
14	UnionSt /Morris St & Route 210	TWSC																																																			
			Left	13.5	B	34	11.0	B	32	152.0	0.0	A	†	13.8	B	100	136.0	67.2	F	5	162.0	F	24	†	16.0	C	167	72.8	F	237	†	Delay	Delay																				
			Through	†	†	9	†	†	48	†	†	†	590	†	†	564	†															0.2	0.8																				
			Right	†	†	9	†	†	48	†	†	†	574	†	†	525	†															LOS	LOS																				
			Approach	0.1	A	†	0.1	A	†	†	0.0	A	†	0.0	A	†	†															67.2	F	†	162.0	F	†	†	16.0	C	†	72.8	F	†	†	A	A						
17	ColonyRd /New Wright Shop Rd & Route 210	Signal																																																			
			Left	30.1	C	133	30.8	C	300	324.0	83.5	F	319	101.8	F	305	332.0	62.9	E	1095	84.9	F	1153	†	52.2	D	216	57.3	E	83	†	Delay	Delay																				
			Through	112.3	F	460	88.8	F	502	†	43.4	D	464	42.5	D	314	†															158.5	127.0																				
			Right	234.9	F	460	251.5	F	502	†	43.1	D	395	42.6	D	290	†															26.6	C	415	42.7	D	415	415.0	723.2	F	172	548.5	F	124	174.0	LOS	LOS						
			Approach	163.1	F	†	148.2	F	†	†	55.8	E	†	62.0	E	†	†															57.4	E	†	68.4	E	†	†	656.1	F	†	458.9	F	†	†	F	F						
20	Riverview Rd & Route 210	TWSC																																																			
			Left	9.7	A	27	8.9	A	26	308.0	8.4	A	30	9.8	A	21	307.0	16.7	C	44	21.9	C	73	†	27.8	D	63	33.3	D	68	†	Delay	Delay																				
			Through	†	†	1	†	†	†	†	†	†	†	†	1	†	1.1															1.2																					
			Right	†	†	†	†	†	†	†	†	†	†	†	1	†	9.4															A	29	10.8	B	29	250.0	LOS	LOS														
			Approach	0.1	A	†	0.1	A	†	†	0.2	A	†	0.1	A	†	†															13.1	B	†	18.7	C	†	†	27.8	D	†	33.3	D	†	†	A	A						
23	US29SBOffRamp & Route 210	TWSC																																																			
			Left	†	†	†	7.8	A	28	†	0.0	A	†	12.9	B	22	†							29.7	D	158	15.1	C	117	†	Delay	Delay																					
			Through	†	†	†	†	†	28	†																																											
			Right	†	†	22	†	†	14	†																																											
			Approach	0.0	A	†	0.0	A	†	†								0.0	A	†	0.0	A	†								†																						
26	US29NBOffRamp Loop & Route 210	TWSC																																																			
			Left	†	†	†	†	†	†	†	†	†	†	†	†	†							10.3	B	†	9.5	A	†	†	Delay	Delay																						
			Through																																																		
			Right																																																		
			Approach														0.0	A	†	0.0	A	†								†	0.0	A	†	0.0	A	†	†																












HCM 6 and HCM 2000 Results
NOTE: Lane configurations with a shared through lane shown as "through" lane group. Lane configurations with shared left-right lane shown as "left" lane group.
† SYNCHRO does not provide level of service or delay for movements with no conflicting volumes.

2050 No-BUILD *SYNCHRO* REPORTS

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	418	26	286	275	55	509
Future Volume (vph)	418	26	286	275	55	509
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	3%		0%			0%
Storage Length (ft)	0	50		0	124	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.934			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1726	1360	1715	0	1736	1863
Flt Permitted	0.950				0.197	
Satd. Flow (perm)	1726	1360	1715	0	360	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		9	55			
Link Speed (mph)	35		35			35
Link Distance (ft)	1859		865			1227
Travel Time (s)	36.2		16.9			23.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	17%	3%	4%	4%	2%
Adj. Flow (vph)	454	28	311	299	60	553
Shared Lane Traffic (%)						
Lane Group Flow (vph)	454	28	610	0	60	553
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA		D.P+P	NA

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	4	4	6		5	2
Permitted Phases					6	
Detector Phase	4	4	6		5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0
Minimum Split (s)	12.7	12.7	17.7		12.7	17.7
Total Split (s)	44.0	44.0	53.2		12.8	66.0
Total Split (%)	40.0%	40.0%	48.4%		11.6%	60.0%
Maximum Green (s)	38.3	38.3	47.5		7.1	60.3
Yellow Time (s)	3.0	3.0	3.9		3.9	3.9
All-Red Time (s)	2.7	2.7	1.8		1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	7.0		3.0	7.0
Minimum Gap (s)	2.5	2.5	2.5		0.2	2.5
Time Before Reduce (s)	8.0	8.0	8.0		0.0	8.0
Time To Reduce (s)	10.0	10.0	10.0		0.0	10.0
Recall Mode	None	None	Min		None	Min
Act Effect Green (s)	28.7	28.7	37.5		42.6	46.7
Actuated g/C Ratio	0.33	0.33	0.43		0.48	0.53
v/c Ratio	0.81	0.06	0.80		0.20	0.56
Control Delay	41.7	18.4	31.3		12.7	16.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	41.7	18.4	31.3		12.7	16.7
LOS	D	B	C		B	B
Approach Delay	40.4		31.3			16.3
Approach LOS	D		C			B
Queue Length 50th (ft)	251	8	289		16	198
Queue Length 95th (ft)	409	29	491		39	339
Internal Link Dist (ft)	1779		785			1147
Turn Bay Length (ft)		50			124	
Base Capacity (vph)	831	660	1037		297	1299
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	0.55	0.04	0.59		0.20	0.43

Intersection Summary

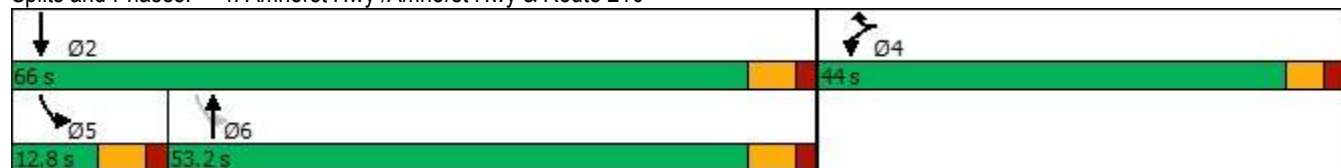
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 88.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025

Splits and Phases: 4: Amherst Hwy /Amherst Hwy & Route 210








HCM 6th Signalized Intersection Summary

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025




















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	418	26	286	275	55	509
Future Volume (veh/h)	418	26	286	275	55	509
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	1803	1595	1856	1841	1841	1870
Adj Flow Rate, veh/h	454	28	311	299	60	553
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	17	3	4	4	2
Cap, veh/h	503	396	389	374	303	1076
Arrive On Green	0.29	0.29	0.45	0.45	0.06	0.58
Sat Flow, veh/h	1717	1352	869	836	1753	1870
Grp Volume(v), veh/h	454	28	0	610	60	553
Grp Sat Flow(s),veh/h/ln	1717	1352	0	1705	1753	1870
Q Serve(g_s), s	22.0	1.3	0.0	26.6	1.5	15.4
Cycle Q Clear(g_c), s	22.0	1.3	0.0	26.6	1.5	15.4
Prop In Lane	1.00	1.00		0.49	1.00	
Lane Grp Cap(c), veh/h	503	396	0	763	303	1076
V/C Ratio(X)	0.90	0.07	0.00	0.80	0.20	0.51
Avail Cap(c_a), veh/h	761	599	0	937	339	1305
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	22.1	0.0	20.5	15.2	11.1
Incr Delay (d2), s/veh	10.0	0.1	0.0	8.6	0.3	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.0	0.0	0.0	11.5	0.6	6.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.3	22.1	0.0	29.1	15.5	12.8
LnGrp LOS	D	C	A	C	B	B
Approach Vol, veh/h	482		610			613
Approach Delay, s/veh	38.3		29.1			13.1
Approach LOS	D		C			B
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	55.4		31.0		11.0	44.4
Change Period (Y+Rc), s	* 5.7		* 5.7		* 5.7	* 5.7
Max Green Setting (Gmax), s	* 60		* 38		* 7.1	* 48
Max Q Clear Time (g_c+l1), s	17.4		24.0		3.5	28.6
Green Ext Time (p_c), s	13.7		1.4		0.0	10.1
Intersection Summary						
HCM 6th Ctrl Delay			26.0			
HCM 6th LOS			C			
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings






2: Main St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	320	10	79	437	31	6	29	78	7	6	1
Future Volume (vph)	0	320	10	79	437	31	6	29	78	7	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			1%	
Storage Length (ft)	0		0	136		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.990			0.906			0.991	
Flt Protected				0.950				0.998			0.974	
Satd. Flow (prot)	0	1785	0	1805	1797	0	0	1718	0	0	1825	0
Flt Permitted				0.950				0.998			0.974	
Satd. Flow (perm)	0	1785	0	1805	1797	0	0	1718	0	0	1825	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1859			310			644			686	
Travel Time (s)		50.7			8.5			17.6			18.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	4%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	344	11	85	470	33	6	31	84	8	6	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	85	503	0	0	121	0	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.03	1.03	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	59.0%						ICU Level of Service B					
Analysis Period (min)	15											

HCM 6th TWSC
2: Main St & Route 210

















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Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	320	10	79	437	31	6	29	78	7	6	1
Future Vol, veh/h	0	320	10	79	437	31	6	29	78	7	6	1
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	-	-	-	136	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	4	-	-	0	-	-	0	-	-	1	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	4	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	0	344	11	85	470	33	6	31	84	8	6	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	355	0	0	1010	1023	350	1064	1012	487
Stage 1	-	-	-	-	-	-	350	350	-	657	657	-
Stage 2	-	-	-	-	-	-	660	673	-	407	355	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.3	6.7	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.3	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1072	-	-	1215	-	-	220	238	698	191	228	577
Stage 1	-	-	-	-	-	-	671	636	-	441	448	-
Stage 2	-	-	-	-	-	-	455	457	-	611	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1072	-	-	1215	-	-	203	221	698	142	212	577
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	221	-	142	212	-
Stage 1	-	-	-	-	-	-	671	636	-	441	417	-
Stage 2	-	-	-	-	-	-	416	425	-	511	621	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.2			17.2			27.4		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	415	1072	-	-	1215	-	-	176				
HCM Lane V/C Ratio	0.293	-	-	-	0.07	-	-	0.086				
HCM Control Delay (s)	17.2	0	-	-	8.2	-	-	27.4				
HCM Lane LOS	C	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	1.2	0	-	-	0.2	-	-	0.3				

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Future Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Storage Length (ft)	0		0	210		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979									0.978	
Flt Protected				0.950							0.960	
Satd. Flow (prot)	0	3446	0	1752	3539	0	0	0	0	0	1655	0
Flt Permitted				0.394							0.960	
Satd. Flow (perm)	0	3446	0	727	3539	0	0	0	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14									129	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		398			329			900			621	
Travel Time (s)		10.9			9.0			17.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	6%	3%	2%	0%	0%	0%	0%	8%	0%	0%
Adj. Flow (vph)	0	387	63	859	588	0	0	0	0	97	0	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	450	0	859	588	0	0	0	0	0	116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA		D,P+P	NA					Perm	NA	

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0		8.0	10.0					8.0	8.0	
Minimum Split (s)		15.6		13.6	15.6					13.8	13.8	
Total Split (s)		27.0		62.0	75.4					28.0	28.0	
Total Split (%)		23.1%		53.0%	64.4%					23.9%	23.9%	
Maximum Green (s)		21.4		56.4	69.8					22.2	22.2	
Yellow Time (s)		3.4		3.4	3.4					3.6	3.6	
All-Red Time (s)		2.2		2.2	2.2					2.2	2.2	
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	
Total Lost Time (s)		5.6		5.6	5.6						5.8	
Lead/Lag		Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Vehicle Extension (s)		5.0		2.5	5.0					3.0	3.0	
Minimum Gap (s)		4.0		2.0	4.0					2.5	2.5	
Time Before Reduce (s)		8.0		8.0	8.0					8.0	8.0	
Time To Reduce (s)		10.0		10.0	10.0					10.0	10.0	
Recall Mode		Min		None	Min					None	None	
Act Effect Green (s)		23.9		68.4	69.3						11.7	
Actuated g/C Ratio		0.25		0.70	0.71						0.12	
v/c Ratio		0.53		0.88	0.23						0.37	
Control Delay		36.5		19.7	3.1						9.5	
Queue Delay		0.0		0.1	0.2						0.0	
Total Delay		36.5		19.8	3.3						9.5	
LOS		D		B	A						A	
Approach Delay		36.5			13.1						9.5	
Approach LOS		D			B						A	
Queue Length 50th (ft)		121		121	23						0	
Queue Length 95th (ft)		222		#696	35						41	
Internal Link Dist (ft)		318			249			820			541	
Turn Bay Length (ft)				210								
Base Capacity (vph)		857		1142	2605						482	
Starvation Cap Reductn		0		20	1231						0	
Spillback Cap Reductn		0		0	0						0	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.53		0.77	0.43						0.24	

Intersection Summary

Area Type: Other

Cycle Length: 117

Actuated Cycle Length: 97.4

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 18.1

Intersection Capacity Utilization 75.1%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service D

Lanes, Volumes, Timings
3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

Lane Group	Ø5	Ø8
Protected Phases	5	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	14.2
Total Split (s)	13.6	28.0
Total Split (%)	12%	24%
Maximum Green (s)	8.0	21.8
Yellow Time (s)	3.4	3.8
All-Red Time (s)	2.2	2.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings

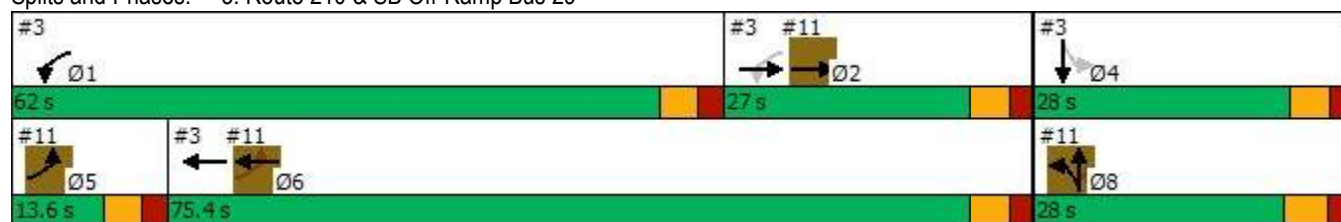
3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.


Splits and Phases: 3: Route 210 & SB Off-Ramp Bus 29



HCM Signalized Intersection Capacity Analysis

3: Route 210 & SB Off-Ramp Bus 29




















09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↓	
Traffic Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Future Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Total Lost time (s)		5.6		5.6	5.6						5.8	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Flt		0.98		1.00	1.00						0.98	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3446		1752	3539						1655	
Flt Permitted		1.00		0.39	1.00						0.96	
Satd. Flow (perm)		3446		728	3539						1655	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	387	63	859	588	0	0	0	0	97	0	19
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	103	0
Lane Group Flow (vph)	0	440	0	859	588	0	0	0	0	0	13	0
Heavy Vehicles (%)	0%	2%	6%	3%	2%	0%	0%	0%	0%	8%	0%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Actuated Green, G (s)		27.7		72.2	69.4						11.7	
Effective Green, g (s)		27.7		72.2	69.4						11.7	
Actuated g/C Ratio		0.27		0.72	0.69						0.12	
Clearance Time (s)		5.6		5.6	5.6						5.8	
Vehicle Extension (s)		5.0		2.5	5.0						3.0	
Lane Grp Cap (vph)		946		972	2434						191	
v/s Ratio Prot		0.13		c0.39	0.17							
v/s Ratio Perm				c0.24							0.01	
v/c Ratio		0.46		0.88	0.24						0.07	
Uniform Delay, d1		30.4		11.7	5.9						39.8	
Progression Factor		1.00		0.79	0.46						1.00	
Incremental Delay, d2		0.8		7.7	0.1						0.2	
Delay (s)		31.2		16.9	2.8						39.9	
Level of Service		C		B	A						D	
Approach Delay (s)		31.2			11.2			0.0			39.9	
Approach LOS		C			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			17.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			100.9			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			75.1%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

11: NB Off Ramp Bus 29 & Route 210













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Future Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Storage Length (ft)	0		0	0		0	135		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.980				0.850			
Flt Protected	0.950							0.955				
Satd. Flow (prot)	1805	3471	0	0	3430	0	0	1665	1478	0	0	0
Flt Permitted	0.106							0.955				
Satd. Flow (perm)	201	3471	0	0	3430	0	0	1665	1478	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26				450			
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		329			350			921			690	
Travel Time (s)		9.0			9.5			14.0			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	0%	3%	4%	6%	0%	6%	0%	0%	0%
Adj. Flow (vph)	17	467	0	0	1393	212	53	3	450	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	467	0	0	1605	0	0	56	450	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	D.P+P	NA			NA		Split	NA	Perm			

Lanes, Volumes, Timings

11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	10.0			10.0		8.0	8.0	8.0			
Minimum Split (s)	13.6	15.6			15.6		14.2	14.2	14.2			
Total Split (s)	13.6	27.0			75.4		28.0	28.0	28.0			
Total Split (%)	11.6%	23.1%			64.4%		23.9%	23.9%	23.9%			
Maximum Green (s)	8.0	21.4			69.8		21.8	21.8	21.8			
Yellow Time (s)	3.4	3.4			3.4		3.8	3.8	3.8			
All-Red Time (s)	2.2	2.2			2.2		2.4	2.4	2.4			
Lost Time Adjust (s)	0.0	0.0			0.0			0.0	0.0			
Total Lost Time (s)	5.6	5.6			5.6			6.2	6.2			
Lead/Lag	Lead	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	3.0	5.0			5.0		3.0	3.0	3.0			
Minimum Gap (s)	2.0	4.0			4.0		2.5	2.5	2.5			
Time Before Reduce (s)	8.0	8.0			8.0		8.0	8.0	8.0			
Time To Reduce (s)	10.0	10.0			10.0		10.0	10.0	10.0			
Recall Mode	None	Min			Min		None	None	None			
Act Effct Green (s)	72.1	23.9			69.3			11.3	11.3			
Actuated g/C Ratio	0.74	0.25			0.71			0.12	0.12			
v/c Ratio	0.06	0.55			0.66			0.29	0.79			
Control Delay	8.1	23.9			11.2			45.3	15.2			
Queue Delay	0.0	0.0			0.0			0.1	0.0			
Total Delay	8.1	23.9			11.2			45.4	15.2			
LOS	A	C			B			D	B			
Approach Delay		23.4			11.2			18.5				
Approach LOS		C			B			B				
Queue Length 50th (ft)	1	38			158			32	0			
Queue Length 95th (ft)	m11	126			544			74	102			
Internal Link Dist (ft)		249			270			841			610	
Turn Bay Length (ft)												
Base Capacity (vph)	282	852			2532			379	684			
Starvation Cap Reductn	0	14			0			0	0			
Spillback Cap Reductn	0	0			55			51	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.06	0.56			0.65			0.17	0.66			

Intersection Summary

Area Type: Other

Cycle Length: 117

Actuated Cycle Length: 97.4

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 14.9

Intersection LOS: B

Intersection Capacity Utilization 75.1%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

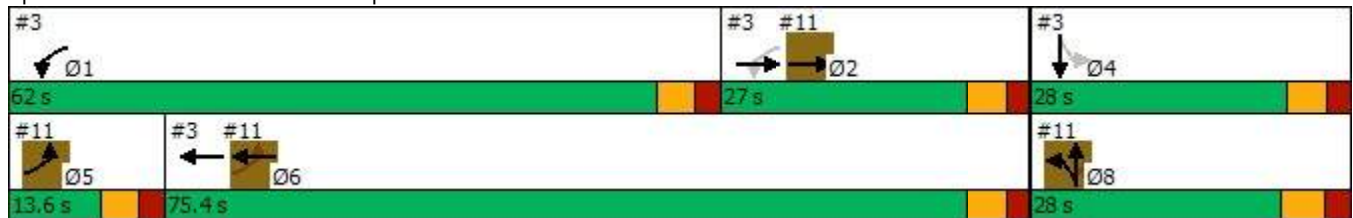
Lane Group	Ø1	Ø4
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	13.8
Total Split (s)	62.0	28.0
Total Split (%)	53%	24%
Maximum Green (s)	56.4	22.2
Yellow Time (s)	3.4	3.6
All-Red Time (s)	2.2	2.2
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings 11: NB Off Ramp Bus 29 & Route 210

09/09/2025

m Volume for 95th percentile queue is metered by upstream signal.





















Splits and Phases: 11: NB Off Ramp Bus 29 & Route 210



HCM Signalized Intersection Capacity Analysis




















11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Future Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Total Lost time (s)	5.6	5.6			5.6			6.2	6.2			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.98			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1805	3471			3431			1665	1478			
Flt Permitted	0.11	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	201	3471			3431			1665	1478			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	467	0	0	1393	212	53	3	450	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	400	0	0	0
Lane Group Flow (vph)	17	467	0	0	1597	0	0	56	50	0	0	0
Heavy Vehicles (%)	0%	4%	0%	0%	3%	4%	6%	0%	6%	0%	0%	0%
Turn Type	D.P+P	NA			NA		Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Actuated Green, G (s)	72.2	27.7			69.4			11.3	11.3			
Effective Green, g (s)	72.2	27.7			69.4			11.3	11.3			
Actuated g/C Ratio	0.72	0.27			0.69			0.11	0.11			
Clearance Time (s)	5.6	5.6			5.6			6.2	6.2			
Vehicle Extension (s)	3.0	5.0			5.0			3.0	3.0			
Lane Grp Cap (vph)	188	952			2359			186	165			
v/s Ratio Prot	c0.00	0.13			c0.47			0.03				
v/s Ratio Perm	0.06								c0.03			
v/c Ratio	0.09	0.49			0.68			0.30	0.31			
Uniform Delay, d1	6.7	30.7			9.2			41.2	41.2			
Progression Factor	2.03	0.61			1.00			1.00	1.00			
Incremental Delay, d2	0.2	0.7			1.0			0.9	1.1			
Delay (s)	13.8	19.4			10.2			42.1	42.2			
Level of Service	B	B			B			D	D			
Approach Delay (s)		19.2			10.2			42.2			0.0	
Approach LOS		B			B			D			A	
Intersection Summary												
HCM 2000 Control Delay		18.1			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		100.9			Sum of lost time (s)			17.4				
Intersection Capacity Utilization		75.1%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												







Lanes, Volumes, Timings
14: Union St/Morris St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	815	1	0	1431	5	1	0	0	0	0	13
Future Volume (vph)	8	815	1	0	1431	5	1	0	0	0	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	152		0	136		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt											0.865	
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1805	3471	0	1900	3505	0	0	1805	0	0	1644	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1805	3471	0	1900	3505	0	0	1805	0	0	1644	0
Link Speed (mph)		25			35			25			25	
Link Distance (ft)		350			629			414			423	
Travel Time (s)		9.5			12.3			11.3			11.5	
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
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	886	1	0	1555	5	1	0	0	0	0	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	887	0	0	1560	0	0	1	0	0	14	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type: Unsignalized												
Intersection Capacity Utilization 49.7%												
ICU Level of Service A												
Analysis Period (min) 15												

HCM 6th TWSC
14: Union St/Morris St & Route 210





















09/09/2025

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	815	1	0	1431	5	1	0	0	0	0	13
Future Vol, veh/h	8	815	1	0	1431	5	1	0	0	0	0	13
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	152	-	-	136	-	-	-	-	-	-	-	-
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, %	0	4	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	9	886	1	0	1555	5	1	0	0	0	0	14
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1560	0	0	887	0	0	1683	2465	444	2019	2463	780
Stage 1	-	-	-	-	-	-	905	905	-	1558	1558	-
Stage 2	-	-	-	-	-	-	778	1560	-	461	905	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	430	-	-	772	-	-	63	31	567	35	31	342
Stage 1	-	-	-	-	-	-	302	358	-	120	175	-
Stage 2	-	-	-	-	-	-	360	175	-	555	358	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	430	-	-	772	-	-	59	30	567	34	30	342
Mov Cap-2 Maneuver	-	-	-	-	-	-	59	30	-	34	30	-
Stage 1	-	-	-	-	-	-	296	350	-	117	175	-
Stage 2	-	-	-	-	-	-	345	175	-	543	350	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			67.2			16		
HCM LOS							F			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	59	430	-	-	772	-	-	342				
HCM Lane V/C Ratio	0.018	0.02	-	-	-	-	-	0.041				
HCM Control Delay (s)	67.2	13.5	-	-	0	-	-	16				
HCM Lane LOS	F	B	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1				

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

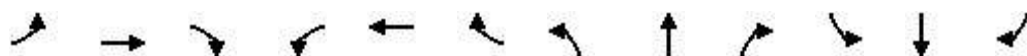
09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	339	393	269	588	6	572	1	102	31	0	276
Future Volume (vph)	83	339	393	269	588	6	572	1	102	31	0	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			4%			3%			3%	
Storage Length (ft)	324		0	332		0	0		415	0		174
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.999				0.850			0.850
Flt Protected	0.950			0.950				0.952			0.950	
Satd. Flow (prot)	1726	3194	0	1769	3424	0	0	1782	1591	0	1631	1544
Flt Permitted	0.280			0.162				0.952			0.950	
Satd. Flow (perm)	509	3194	0	302	3424	0	0	1782	1591	0	1631	1544
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		220			1				242			228
Link Speed (mph)		35			55			35			45	
Link Distance (ft)		629			10026			1162			925	
Travel Time (s)		12.3			124.3			22.6			14.0	
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
Heavy Vehicles (%)	3%	5%	0%	0%	3%	25%	0%	0%	0%	9%	0%	3%
Adj. Flow (vph)	86	353	409	280	613	6	596	1	106	32	0	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	762	0	280	619	0	0	597	106	0	32	288
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	D.P+P	NA		D.P+P	NA		Split	NA	Perm	Split	NA	Perm

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases	2			6					4			8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	13.1	15.1		13.1	15.1		12.5	12.5	12.5	14.0	14.0	14.0
Total Split (s)	14.1	30.3		22.4	38.6		49.0	49.0	49.0	17.0	17.0	17.0
Total Split (%)	11.9%	25.5%		18.9%	32.5%		41.3%	41.3%	41.3%	14.3%	14.3%	14.3%
Maximum Green (s)	7.0	23.2		15.3	31.5		42.5	42.5	42.5	9.0	9.0	9.0
Yellow Time (s)	4.7	4.7		4.7	4.7		4.0	4.0	4.0	5.1	5.1	5.1
All-Red Time (s)	2.4	2.4		2.4	2.4		2.5	2.5	2.5	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	7.1	7.1		7.1	7.1			6.5	6.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.5	6.0		1.5	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	2.5	5.0		2.5	5.0		3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	5.0	10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Act Effect Green (s)	40.0	23.2		38.5	34.6			40.9	40.9		8.8	8.8
Actuated g/C Ratio	0.34	0.20		0.33	0.30			0.35	0.35		0.08	0.08
v/c Ratio	0.35	0.94		0.96	0.61			0.96	0.15		0.26	0.88
Control Delay	28.2	53.5		77.1	40.0			64.8	0.4		57.5	41.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	28.2	53.5		77.1	40.0			64.8	0.4		57.5	41.3
LOS	C	D		E	D			E	A		E	D
Approach Delay		50.9			51.5			55.1			42.9	
Approach LOS		D			D			E			D	
Queue Length 50th (ft)	42	226		166	224			438	0		24	45
Queue Length 95th (ft)	78	#353		#345	289			#665	0		57	#201
Internal Link Dist (ft)		549			9946			1082			845	
Turn Bay Length (ft)	324			332					415			174
Base Capacity (vph)	247	810		291	1013			648	732		125	329
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	0.35	0.94		0.96	0.61			0.92	0.14		0.26	0.88

Intersection Summary

Area Type: Other

Cycle Length: 118.7

Actuated Cycle Length: 117

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 51.2

Intersection LOS: D

Intersection Capacity Utilization 92.6%

ICU Level of Service F

Analysis Period (min) 15

Lanes, Volumes, Timings







17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.





















Splits and Phases: 17: Colony Rd/New Wright Shop Rd & Route 210

 Ø1 14.1 s	 Ø2 38.6 s	 Ø4 49 s	 Ø8 17 s
 Ø5 22.4 s	 Ø6 30.3 s		

HCM 6th Signalized Intersection Summary




















17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	339	393	269	588	6	572	1	102	31	0	276
Future Volume (veh/h)	83	339	393	269	588	6	572	1	102	31	0	276
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	1803	1773	1847	1806	1761	1435	1847	1847	1847	1714	1847	1803
Adj Flow Rate, veh/h	86	353	409	280	612	6	596	1	106	32	0	288
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, %	3	5	0	0	3	25	0	0	0	9	0	3
Cap, veh/h	237	331	296	284	941	9	622	1	554	134	0	117
Arrive On Green	0.05	0.20	0.20	0.13	0.28	0.28	0.35	0.35	0.35	0.08	0.00	0.08
Sat Flow, veh/h	1717	1684	1502	1720	3395	33	1756	3	1565	1759	0	1528
Grp Volume(v), veh/h	86	353	409	280	302	316	597	0	106	32	0	288
Grp Sat Flow(s),veh/h/ln	1717	1684	1502	1720	1673	1755	1759	0	1565	1759	0	1528
Q Serve(g_s), s	4.2	23.2	23.2	15.3	18.7	18.8	39.1	0.0	5.5	2.0	0.0	9.0
Cycle Q Clear(g_c), s	4.2	23.2	23.2	15.3	18.7	18.8	39.1	0.0	5.5	2.0	0.0	9.0
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	331	296	284	464	486	623	0	554	134	0	117
V/C Ratio(X)	0.36	1.07	1.38	0.99	0.65	0.65	0.96	0.00	0.19	0.24	0.00	2.47
Avail Cap(c_a), veh/h	255	331	296	284	464	486	634	0	564	134	0	117
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	0.00	1.00
Uniform Delay (d), s/veh	29.8	47.4	47.4	34.4	37.6	37.6	37.3	0.0	26.4	51.3	0.0	54.5
Incr Delay (d2), s/veh	0.3	67.9	192.5	49.1	5.9	5.7	25.6	0.0	0.2	0.9	0.0	686.9
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(50%),veh/ln	1.7	15.8	24.3	9.9	8.0	8.4	20.8	0.0	2.0	0.9	0.0	25.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	115.3	239.9	83.5	43.5	43.3	62.9	0.0	26.6	52.2	0.0	741.4
LnGrp LOS	C	F	F	F	D	D	E	A	C	D	A	F
Approach Vol, veh/h	848			898			703			320		
Approach Delay, s/veh	166.7			55.9			57.4			672.5		
Approach LOS	F			E			E			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.9	39.8		48.3	22.4	30.3		17.0				
Change Period (Y+Rc), s	7.1	7.1		6.5	7.1	7.1		8.0				
Max Green Setting (Gmax), s	7.0	31.5		42.5	15.3	23.2		9.0				
Max Q Clear Time (g_c+I1), s	6.2	20.8		41.1	17.3	25.2		11.0				
Green Ext Time (p_c), s	0.0	5.0		0.6	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	161.5											
HCM 6th LOS	F											








Lanes, Volumes, Timings
20: Riverview Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	450	14	20	838	27	8	0	8	22	0	16
Future Volume (vph)	7	450	14	20	838	27	8	0	8	22	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			-10%			1%	
Storage Length (ft)	308		0	307		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.995				0.850		0.945	
Flt Protected	0.950			0.950				0.950			0.971	
Satd. Flow (prot)	1437	3476	0	1805	3420	0	0	1895	1696	0	1611	0
Flt Permitted	0.950			0.950				0.950			0.971	
Satd. Flow (perm)	1437	3476	0	1805	3420	0	0	1895	1696	0	1611	0
Link Speed (mph)		55			35			25			45	
Link Distance (ft)		10026			1037			1200			891	
Travel Time (s)		124.3			20.2			32.7			13.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	25%	3%	0%	0%	4%	37%	0%	0%	0%	13%	0%	0%
Adj. Flow (vph)	7	464	14	21	864	28	8	0	8	23	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	478	0	21	892	0	0	8	8	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	0.94	0.94	0.94	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 39.6%				ICU Level of Service A								
Analysis Period (min) 15												

HCM 6th TWSC
20: Riverview Rd & Route 210

09/09/2025

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	450	14	20	838	27	8	0	8	22	0	16
Future Vol, veh/h	7	450	14	20	838	27	8	0	8	22	0	16
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	308	-	-	307	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	0	-	-	-10	-	-	1	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	25	3	0	0	4	37	0	0	0	13	0	0
Mvmt Flow	7	464	14	21	864	28	8	0	8	23	0	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	892	0	0	478	0	0	959	1419	239	1166	1412	446
Stage 1	-	-	-	-	-	-	485	485	-	920	920	-
Stage 2	-	-	-	-	-	-	474	934	-	246	492	-
Critical Hdwy	4.6	-	-	4.1	-	-	5.5	4.5	5.9	7.96	6.7	7
Critical Hdwy Stg 1	-	-	-	-	-	-	4.5	3.5	-	6.96	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	4.5	3.5	-	6.96	5.7	-
Follow-up Hdwy	2.45	-	-	2.2	-	-	3.5	4	3.3	3.63	4	3.3
Pot Cap-1 Maneuver	627	-	-	1095	-	-	365	304	821	128	129	558
Stage 1	-	-	-	-	-	-	704	727	-	257	335	-
Stage 2	-	-	-	-	-	-	710	583	-	696	536	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	627	-	-	1095	-	-	346	295	821	124	125	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	346	295	-	124	125	-
Stage 1	-	-	-	-	-	-	696	719	-	254	329	-
Stage 2	-	-	-	-	-	-	676	572	-	681	530	-


















Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	12.5	29.8
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	346	821	627	-	-	1095	-	-	184
HCM Lane V/C Ratio	0.024	0.01	0.012	-	-	0.019	-	-	0.213
HCM Control Delay (s)	15.7	9.4	10.8	-	-	8.4	-	-	29.8
HCM Lane LOS	C	A	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.1	0	0	-	-	0.1	-	-	0.8

Lanes, Volumes, Timings

23: US 29 SB On-Ramp/US 29 SB Off-Ramp & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	289	193	0	368	0	0	0	0	1	3	516
Future Volume (vph)	0	289	193	0	368	0	0	0	0	1	3	516
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.866	
Flt Protected												
Satd. Flow (prot)	0	1827	1568	0	1810	0	0	0	0	0	1613	0
Flt Permitted												
Satd. Flow (perm)	0	1827	1568	0	1810	0	0	0	0	0	1613	0
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1037			1107			1017			759	
Travel Time (s)		20.2			21.6			15.4			11.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	4%	3%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	0	298	199	0	379	0	0	0	0	1	3	532
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	298	199	0	379	0	0	0	0	0	536	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	73.5%						ICU Level of Service D					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	10.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↖						↕	
Traffic Vol, veh/h	0	289	193	0	368	0	0	0	0	1	3	516
Future Vol, veh/h	0	289	193	0	368	0	0	0	0	1	3	516
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	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	6	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	4	3	0	5	0	0	0	0	0	0	2
Mvmt Flow	0	298	199	0	379	0	0	0	0	1	3	532
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	-	0	0	497	0	0				777	876	379
Stage 1	-	-	-	-	-	-				379	379	-
Stage 2	-	-	-	-	-	-				398	497	-
Critical Hdwy	-	-	-	4.1	-	-				6.4	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.4	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.4	5.5	-
Follow-up Hdwy	-	-	-	2.2	-	-				3.5	4	3.318
Pot Cap-1 Maneuver	0	-	-	1077	-	0				368	290	668
Stage 1	0	-	-	-	-	0				696	618	-
Stage 2	0	-	-	-	-	0				683	548	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1077	-	-				368	0	668
Mov Cap-2 Maneuver	-	-	-	-	-	-				368	0	-
Stage 1	-	-	-	-	-	-				696	0	-
Stage 2	-	-	-	-	-	-				683	0	-
Approach	EB			WB			SB					
HCM Control Delay, s	0			0			28.7					
HCM LOS							D					
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1							
Capacity (veh/h)	-	-	1077	-	667							
HCM Lane V/C Ratio	-	-	-	-	0.804							
HCM Control Delay (s)	-	-	0	-	28.7							
HCM Lane LOS	-	-	A	-	D							
HCM 95th %tile Q(veh)	-	-	0	-	8.2							

Lanes, Volumes, Timings
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↘
Traffic Volume (vph)	0	290	0	0	0	368
Future Volume (vph)	0	290	0	0	0	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		2%	-1%		3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	1791	1909	0	1872	1515
Flt Permitted						
Satd. Flow (perm)	0	1791	1909	0	1872	1515
Link Speed (mph)		35	35		45	
Link Distance (ft)		399	211		874	
Travel Time (s)		7.8	4.1		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%
Adj. Flow (vph)	0	315	0	0	0	400
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	315	0	0	0	400
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	0.99	0.99	1.02	1.02
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 26.1% ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025

Intersection						
Int Delay, s/veh	5.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	290	0	0	0	368
Future Vol, veh/h	0	290	0	0	0	368
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	2	-1	-	3	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	5	0	0	0	5
Mvmt Flow	0	315	0	0	0	400
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	316	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	-	-	7	6.55
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.345
Pot Cap-1 Maneuver	0	-	-	0	646	1075
Stage 1	0	-	-	0	1027	-
Stage 2	0	-	-	0	706	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	646	1075
Mov Cap-2 Maneuver	-	-	-	-	646	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	706	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		10.3		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	-	1075		
HCM Lane V/C Ratio	-	-	-	0.372		
HCM Control Delay (s)	-	-	0	10.3		
HCM Lane LOS	-	-	A	B		
HCM 95th %tile Q(veh)	-	-	-	1.7		

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	308	36	659	474	86	382
Future Volume (vph)	308	36	659	474	86	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	3%		0%			0%
Storage Length (ft)	0	50		0	124	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.944			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1710	1591	1747	0	1752	1863
Flt Permitted	0.950				0.060	
Satd. Flow (perm)	1710	1591	1747	0	111	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		14	60			
Link Speed (mph)	35		35			35
Link Distance (ft)	1859		865			1227
Travel Time (s)	36.2		16.9			23.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	1%	5%	3%	2%
Adj. Flow (vph)	335	39	716	515	93	415
Shared Lane Traffic (%)						
Lane Group Flow (vph)	335	39	1231	0	93	415
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA		D.P+P	NA

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	4	4	6		5	2
Permitted Phases					6	
Detector Phase	4	4	6		5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0
Minimum Split (s)	12.7	12.7	17.7		12.7	17.7
Total Split (s)	25.0	25.0	72.3		12.7	85.0
Total Split (%)	22.7%	22.7%	65.7%		11.5%	77.3%
Maximum Green (s)	19.3	19.3	66.6		7.0	79.3
Yellow Time (s)	3.0	3.0	3.9		3.9	3.9
All-Red Time (s)	2.7	2.7	1.8		1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	7.0		3.0	7.0
Minimum Gap (s)	2.5	2.5	2.5		0.2	2.5
Time Before Reduce (s)	8.0	8.0	8.0		0.0	8.0
Time To Reduce (s)	10.0	10.0	10.0		0.0	10.0
Recall Mode	None	None	Min		None	Min
Act Effect Green (s)	19.4	19.4	66.8		72.3	76.7
Actuated g/C Ratio	0.18	0.18	0.62		0.67	0.71
v/c Ratio	1.09	0.13	1.11		0.51	0.31
Control Delay	119.8	28.9	84.9		23.9	6.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	119.8	28.9	84.9		23.9	6.3
LOS	F	C	F		C	A
Approach Delay	110.3		84.9			9.5
Approach LOS	F		F			A
Queue Length 50th (ft)	~272	15	~1003		17	92
Queue Length 95th (ft)	#451	46	#1264		67	133
Internal Link Dist (ft)	1779		785			1147
Turn Bay Length (ft)		50			124	
Base Capacity (vph)	308	297	1108		181	1378
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	1.09	0.13	1.11		0.51	0.30

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 107.5

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 71.3

Intersection LOS: E

Intersection Capacity Utilization 98.0%

ICU Level of Service F

Analysis Period (min) 15

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025

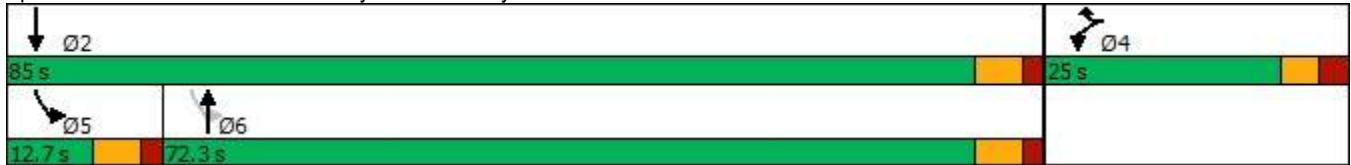
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Amherst Hwy /Amherst Hwy & Route 210








HCM 6th Signalized Intersection Summary

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025




















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	308	36	659	474	86	382
Future Volume (veh/h)	308	36	659	474	86	382
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	1788	1847	1885	1826	1856	1870
Adj Flow Rate, veh/h	335	39	716	515	93	415
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	1	5	3	2
Cap, veh/h	300	276	620	446	172	1346
Arrive On Green	0.18	0.18	0.61	0.61	0.06	0.72
Sat Flow, veh/h	1703	1565	1020	733	1767	1870
Grp Volume(v), veh/h	335	39	0	1231	93	415
Grp Sat Flow(s),veh/h/ln	1703	1565	0	1753	1767	1870
Q Serve(g_s), s	19.3	2.3	0.0	66.6	2.0	8.8
Cycle Q Clear(g_c), s	19.3	2.3	0.0	66.6	2.0	8.8
Prop In Lane	1.00	1.00		0.42	1.00	
Lane Grp Cap(c), veh/h	300	276	0	1065	172	1346
V/C Ratio(X)	1.12	0.14	0.00	1.16	0.54	0.31
Avail Cap(c_a), veh/h	300	276	0	1065	179	1353
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	38.1	0.0	21.5	26.6	5.5
Incr Delay (d2), s/veh	87.3	0.2	0.0	80.8	3.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.3	2.2	0.0	47.9	1.6	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	132.5	38.4	0.0	102.3	29.6	6.1
LnGrp LOS	F	D	A	F	C	A
Approach Vol, veh/h	374		1231			508
Approach Delay, s/veh	122.6		102.3			10.4
Approach LOS	F		F			B
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	84.6		25.0		12.3	72.3
Change Period (Y+Rc), s	* 5.7		* 5.7		* 5.7	* 5.7
Max Green Setting (Gmax), s	* 79		* 19		* 7	* 67
Max Q Clear Time (g_c+I1), s	10.8		21.3		4.0	68.6
Green Ext Time (p_c), s	10.3		0.0		0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			83.8			
HCM 6th LOS			F			
Notes						

Lanes, Volumes, Timings






2: Main St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	528	29	107	334	30	11	36	91	18	11	0
Future Volume (vph)	3	528	29	107	334	30	11	36	91	18	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			1%	
Storage Length (ft)	0		0	136		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.988			0.911				
Flt Protected				0.950				0.996			0.970	
Satd. Flow (prot)	0	1766	0	1805	1827	0	0	1706	0	0	1834	0
Flt Permitted				0.950				0.996			0.970	
Satd. Flow (perm)	0	1766	0	1805	1827	0	0	1706	0	0	1834	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1859			310			644			686	
Travel Time (s)		50.7			8.5			17.6			18.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	0%	0%	3%	0%	0%	4%	0%	0%	0%	0%
Adj. Flow (vph)	3	568	31	115	359	32	12	39	98	19	12	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	602	0	115	391	0	0	149	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
					Yes							
Headway Factor	1.03	1.03	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type: Other												
Control Type: Unsignalized												
Intersection Capacity Utilization 67.1%												
ICU Level of Service C												
Analysis Period (min) 15												

HCM 6th TWSC
2: Main St & Route 210

















09/09/2025

Intersection												
Int Delay, s/veh	5.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	528	29	107	334	30	11	36	91	18	11	0
Future Vol, veh/h	3	528	29	107	334	30	11	36	91	18	11	0
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	-	-	-	136	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	4	-	-	0	-	-	0	-	-	1	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	5	0	0	3	0	0	4	0	0	0	0
Mvmt Flow	3	568	31	115	359	32	12	39	98	19	12	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	391	0	0	599	0	0	1201	1211	584	1263	1210	375
Stage 1	-	-	-	-	-	-	590	590	-	605	605	-
Stage 2	-	-	-	-	-	-	611	621	-	658	605	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.54	6.2	7.3	6.7	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.3	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.036	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1179	-	-	988	-	-	163	181	515	138	172	669
Stage 1	-	-	-	-	-	-	497	492	-	472	474	-
Stage 2	-	-	-	-	-	-	484	476	-	440	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1179	-	-	988	-	-	139	159	515	83	151	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	159	-	83	151	-
Stage 1	-	-	-	-	-	-	495	490	-	470	419	-
Stage 2	-	-	-	-	-	-	416	421	-	327	472	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.1			30.4			56.5		
HCM LOS							D			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	286	1179	-	-	988	-	-	100				
HCM Lane V/C Ratio	0.519	0.003	-	-	0.116	-	-	0.312				
HCM Control Delay (s)	30.4	8.1	0	-	9.1	-	-	56.5				
HCM Lane LOS	D	A	A	-	A	-	-	F				
HCM 95th %tile Q(veh)	2.8	0	-	-	0.4	-	-	1.2				

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Future Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Storage Length (ft)	0		0	210		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985									0.986	
Flt Protected				0.950							0.957	
Satd. Flow (prot)	0	3426	0	1752	3505	0	0	0	0	0	1729	0
Flt Permitted				0.187							0.957	
Satd. Flow (perm)	0	3426	0	345	3505	0	0	0	0	0	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9									129	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		398			329			900			621	
Travel Time (s)		10.9			9.0			17.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	2%	3%	3%	0%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	0	639	69	549	501	0	0	0	0	179	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	708	0	549	501	0	0	0	0	0	200	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA		D,P+P	NA					Perm	NA	

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0		8.0	10.0					8.0	8.0	
Minimum Split (s)		15.6		13.6	15.6					13.8	13.8	
Total Split (s)		35.6		34.2	56.2					47.2	47.2	
Total Split (%)		30.4%		29.2%	48.0%					40.3%	40.3%	
Maximum Green (s)		30.0		28.6	50.6					41.4	41.4	
Yellow Time (s)		3.4		3.4	3.4					3.6	3.6	
All-Red Time (s)		2.2		2.2	2.2					2.2	2.2	
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	
Total Lost Time (s)		5.6		5.6	5.6						5.8	
Lead/Lag		Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Vehicle Extension (s)		5.0		2.5	5.0					3.0	3.0	
Minimum Gap (s)		4.0		2.0	4.0					2.5	2.5	
Time Before Reduce (s)		8.0		8.0	8.0					8.0	8.0	
Time To Reduce (s)		10.0		10.0	10.0					10.0	10.0	
Recall Mode		Min		None	Min					None	None	
Act Effect Green (s)		30.0		58.6	58.8						41.4	
Actuated g/C Ratio		0.26		0.50	0.50						0.35	
v/c Ratio		0.80		1.06	0.28						0.29	
Control Delay		48.1		88.6	8.7						11.2	
Queue Delay		0.6		14.2	0.4						0.0	
Total Delay		48.7		102.8	9.1						11.2	
LOS		D		F	A						B	
Approach Delay		48.7			58.1						11.3	
Approach LOS		D			E						B	
Queue Length 50th (ft)		260		~362	31						36	
Queue Length 95th (ft)		334		#585	62						91	
Internal Link Dist (ft)		318			249			820			541	
Turn Bay Length (ft)				210								
Base Capacity (vph)		885		516	1760						695	
Starvation Cap Reductn		0		42	764						0	
Spillback Cap Reductn		34		0	0						1	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.83		1.16	0.50						0.29	

Intersection Summary

Area Type: Other

Cycle Length: 117

Actuated Cycle Length: 117

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 49.9

Intersection LOS: D

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

Lane Group	Ø5	Ø8
Protected Phases	5	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	14.2
Total Split (s)	13.6	47.2
Total Split (%)	12%	40%
Maximum Green (s)	8.0	41.0
Yellow Time (s)	3.4	3.8
All-Red Time (s)	2.2	2.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

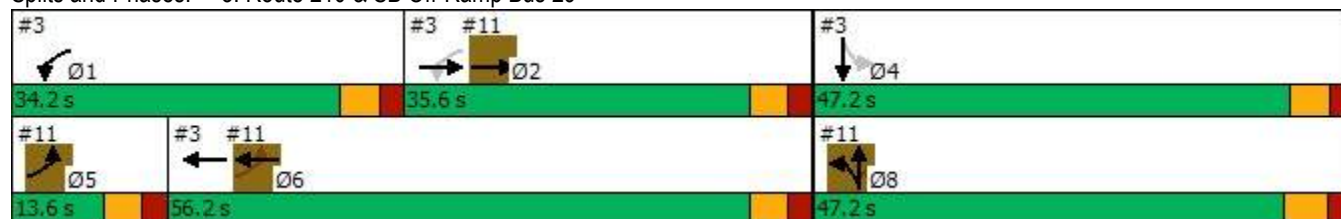
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















Splits and Phases: 3: Route 210 & SB Off-Ramp Bus 29



HCM Signalized Intersection Capacity Analysis




















3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Future Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Total Lost time (s)		5.6		5.6	5.6						5.8	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Flt		0.99		1.00	1.00						0.99	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3427		1752	3505						1728	
Flt Permitted		1.00		0.19	1.00						0.96	
Satd. Flow (perm)		3427		344	3505						1728	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	639	69	549	501	0	0	0	0	179	0	21
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	85	0
Lane Group Flow (vph)	0	701	0	549	501	0	0	0	0	0	115	0
Heavy Vehicles (%)	0%	4%	2%	3%	3%	0%	0%	0%	0%	3%	0%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Actuated Green, G (s)		33.4		62.0	58.8						41.4	
Effective Green, g (s)		33.4		62.0	58.8						41.4	
Actuated g/C Ratio		0.28		0.51	0.49						0.34	
Clearance Time (s)		5.6		5.6	5.6						5.8	
Vehicle Extension (s)		5.0		2.5	5.0						3.0	
Lane Grp Cap (vph)		950		511	1711						594	
v/s Ratio Prot		0.20		c0.25	0.14							
v/s Ratio Perm				c0.30							0.07	
v/c Ratio		0.74		1.07	0.29						0.19	
Uniform Delay, d1		39.5		30.8	18.4						27.8	
Progression Factor		1.00		1.25	0.46						1.00	
Incremental Delay, d2		3.7		56.0	0.1						0.2	
Delay (s)		43.2		94.4	8.6						27.9	
Level of Service		D		F	A						C	
Approach Delay (s)		43.2			53.5			0.0			27.9	
Approach LOS		D			D			A			C	
Intersection Summary												
HCM 2000 Control Delay			47.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			120.4			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			77.2%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												













Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Future Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Storage Length (ft)	0		0	0		0	135		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972				0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1805	3505	0	0	3366	0	0	1717	1551	0	0	0
Flt Permitted	0.123							0.950				
Satd. Flow (perm)	234	3505	0	0	3366	0	0	1717	1551	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					30				482			
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		329			350			921			690	
Travel Time (s)		9.0			9.5			14.0			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	5%	1%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	16	803	0	0	977	226	74	0	851	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	803	0	0	1203	0	0	74	851	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	D.P+P	NA			NA		Split	NA	Perm			

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	10.0			10.0		8.0	8.0	8.0			
Minimum Split (s)	13.6	15.6			15.6		14.2	14.2	14.2			
Total Split (s)	13.6	35.6			56.2		47.2	47.2	47.2			
Total Split (%)	11.6%	30.4%			48.0%		40.3%	40.3%	40.3%			
Maximum Green (s)	8.0	30.0			50.6		41.0	41.0	41.0			
Yellow Time (s)	3.4	3.4			3.4		3.8	3.8	3.8			
All-Red Time (s)	2.2	2.2			2.2		2.4	2.4	2.4			
Lost Time Adjust (s)	0.0	0.0			0.0			0.0	0.0			
Total Lost Time (s)	5.6	5.6			5.6			6.2	6.2			
Lead/Lag	Lead	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	3.0	5.0			5.0		3.0	3.0	3.0			
Minimum Gap (s)	2.0	4.0			4.0		2.5	2.5	2.5			
Time Before Reduce (s)	8.0	8.0			8.0		8.0	8.0	8.0			
Time To Reduce (s)	10.0	10.0			10.0		10.0	10.0	10.0			
Recall Mode	None	Min			Min		None	None	None			
Act Effct Green (s)	62.0	30.0			58.8			41.0	41.0			
Actuated g/C Ratio	0.53	0.26			0.50			0.35	0.35			
v/c Ratio	0.07	0.89			0.71			0.12	0.99			
Control Delay	14.1	33.4			25.9			26.6	46.6			
Queue Delay	0.0	2.8			0.3			0.1	0.0			
Total Delay	14.1	36.2			26.3			26.6	46.6			
LOS	B	D			C			C	D			
Approach Delay		35.8			26.3			45.0				
Approach LOS		D			C			D				
Queue Length 50th (ft)	3	98			311			38	353			
Queue Length 95th (ft)	m8	#391			496			72	#655			
Internal Link Dist (ft)		249			270			841			610	
Turn Bay Length (ft)												
Base Capacity (vph)	231	898			1705			601	856			
Starvation Cap Reductn	0	41			0			0	0			
Spillback Cap Reductn	0	0			131			100	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.07	0.94			0.76			0.15	0.99			

Intersection Summary

Area Type: Other

Cycle Length: 117

Actuated Cycle Length: 117

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 34.8

Intersection LOS: C

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

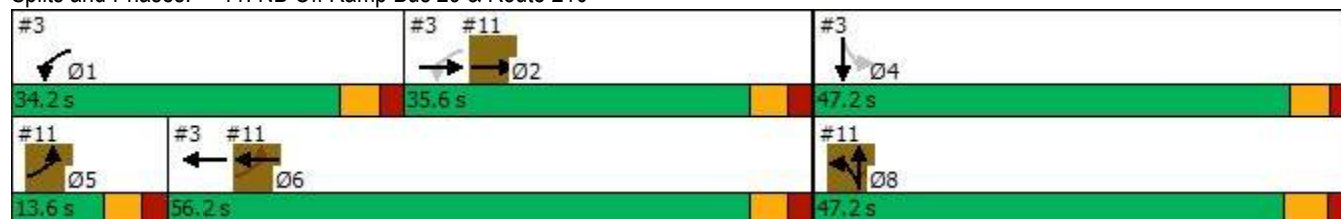
Lane Group	Ø1	Ø4
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	13.8
Total Split (s)	34.2	47.2
Total Split (%)	29%	40%
Maximum Green (s)	28.6	41.4
Yellow Time (s)	3.4	3.6
All-Red Time (s)	2.2	2.2
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
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.




















Splits and Phases: 11: NB Off Ramp Bus 29 & Route 210



HCM Signalized Intersection Capacity Analysis



















11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Future Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Total Lost time (s)	5.6	5.6			5.6			6.2	6.2			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.97			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1805	3505			3365			1717	1551			
Flt Permitted	0.12	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	234	3505			3365			1717	1551			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	16	803	0	0	977	226	74	0	851	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	318	0	0	0
Lane Group Flow (vph)	16	803	0	0	1188	0	0	74	533	0	0	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	1%	2%	0%	1%	0%	0%	0%
Turn Type	D.P+P	NA			NA		Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Actuated Green, G (s)	62.0	33.4			58.8			41.0	41.0			
Effective Green, g (s)	62.0	33.4			58.8			41.0	41.0			
Actuated g/C Ratio	0.51	0.28			0.49			0.34	0.34			
Clearance Time (s)	5.6	5.6			5.6			6.2	6.2			
Vehicle Extension (s)	3.0	5.0			5.0			3.0	3.0			
Lane Grp Cap (vph)	162	972			1643			584	528			
v/s Ratio Prot	c0.00	c0.23			c0.35			0.04				
v/s Ratio Perm	0.05								c0.34			
v/c Ratio	0.10	0.83			0.72			0.13	1.01			
Uniform Delay, d1	17.6	40.8			24.4			27.4	39.7			
Progression Factor	1.12	0.53			1.00			1.00	1.00			
Incremental Delay, d2	0.2	4.8			2.0			0.1	41.6			
Delay (s)	19.9	26.5			26.3			27.5	81.3			
Level of Service	B	C			C			C	F			
Approach Delay (s)		26.4			26.3			77.0			0.0	
Approach LOS		C			C			E			A	
Intersection Summary												
HCM 2000 Control Delay		42.3			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		120.4			Sum of lost time (s)			17.4				
Intersection Capacity Utilization		77.2%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												







Lanes, Volumes, Timings
14: Union St/Morris St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1477	1	3	1066	5	1	0	0	10	0	14
Future Volume (vph)	10	1477	1	3	1066	5	1	0	0	10	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	152		0	136		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999							0.922
Flt Protected	0.950			0.950				0.950				0.979
Satd. Flow (prot)	1805	3539	0	1805	3435	0	0	1805	0	0	1715	0
Flt Permitted	0.950			0.950				0.950				0.979
Satd. Flow (perm)	1805	3539	0	1805	3435	0	0	1805	0	0	1715	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		350			629			414			423	
Travel Time (s)		9.5			17.2			11.3			11.5	
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
Heavy Vehicles (%)	0%	2%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	11	1605	1	3	1159	5	1	0	0	11	0	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1606	0	3	1164	0	0	1	0	0	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	50.9%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
14: Union St/Morris St & Route 210

09/09/2025

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	10	1477	1	3	1066	5	1	0	0	10	0	14
Future Vol, veh/h	10	1477	1	3	1066	5	1	0	0	10	0	14
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	152	-	-	136	-	-	-	-	-	-	-	-
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, %	0	2	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	11	1605	1	3	1159	5	1	0	0	11	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1164	0	0	1606	0	0	2214	2798	803	1993	2796	582
Stage 1	-	-	-	-	-	-	1628	1628	-	1168	1168	-
Stage 2	-	-	-	-	-	-	586	1170	-	825	1628	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	607	-	-	412	-	-	25	19	331	37	19	461
Stage 1	-	-	-	-	-	-	108	162	-	209	270	-
Stage 2	-	-	-	-	-	-	468	269	-	337	162	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	607	-	-	412	-	-	24	19	331	36	19	461
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	19	-	36	19	-
Stage 1	-	-	-	-	-	-	106	159	-	205	268	-
Stage 2	-	-	-	-	-	-	449	267	-	331	159	-





















Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	162	72.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	24	607	-	-	412	-	-	78
HCM Lane V/C Ratio	0.045	0.018	-	-	0.008	-	-	0.334
HCM Control Delay (s)	162	11	-	-	13.8	-	-	72.8
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1.3

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	309	525	654	210	399	32	524	6	341	27	7	151
Future Volume (vph)	309	525	654	210	399	32	524	6	341	27	7	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			4%			3%			3%	
Storage Length (ft)	324		0	332		0	0		415	0		174
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.917			0.989				0.850			0.850
Flt Protected	0.950			0.950				0.953			0.962	
Satd. Flow (prot)	1778	3204	0	1769	3404	0	0	1732	1591	0	1800	1575
Flt Permitted	0.390			0.108				0.953			0.962	
Satd. Flow (perm)	730	3204	0	201	3404	0	0	1732	1591	0	1800	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		275			6				355			228
Link Speed (mph)		25			55			35			45	
Link Distance (ft)		629			10026			1162			925	
Travel Time (s)		17.2			124.3			22.6			14.0	
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
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	322	547	681	219	416	33	546	6	355	28	7	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	322	1228	0	219	449	0	0	552	355	0	35	157
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	D.P+P	NA		D.P+P	NA		Split	NA	Perm	Split	NA	Perm

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases	2			6					4			8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	13.1	15.1		13.1	15.1		12.5	12.5	12.5	14.0	14.0	14.0
Total Split (s)	28.0	44.1		17.6	33.7		43.0	43.0	43.0	14.0	14.0	14.0
Total Split (%)	23.6%	37.2%		14.8%	28.4%		36.2%	36.2%	36.2%	11.8%	11.8%	11.8%
Maximum Green (s)	20.9	37.0		10.5	26.6		36.5	36.5	36.5	6.0	6.0	6.0
Yellow Time (s)	4.7	4.7		4.7	4.7		4.0	4.0	4.0	5.1	5.1	5.1
All-Red Time (s)	2.4	2.4		2.4	2.4		2.5	2.5	2.5	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	7.1	7.1		7.1	7.1			6.5	6.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.5	6.0		1.5	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	2.5	5.0		2.5	5.0		3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	5.0	10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Act Effect Green (s)	47.5	37.0		47.5	30.1			36.5	36.5		6.0	6.0
Actuated g/C Ratio	0.40	0.31		0.40	0.25			0.31	0.31		0.05	0.05
v/c Ratio	0.72	1.03		1.00	0.52			1.04	0.48		0.39	0.53
Control Delay	31.8	66.9		91.7	40.9			89.7	5.6		67.4	7.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	31.8	66.9		91.7	40.9			89.7	5.6		67.4	7.8
LOS	C	E		F	D			F	A		E	A
Approach Delay		59.6			57.5			56.8			18.7	
Approach LOS		E			E			E			B	
Queue Length 50th (ft)	159	~450		118	155			~455	0		26	0
Queue Length 95th (ft)	234	#589		#283	216			#674	68		62	12
Internal Link Dist (ft)		549			9946			1082			845	
Turn Bay Length (ft)	324			332					415			174
Base Capacity (vph)	495	1187		219	866			532	735		90	296
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	0.65	1.03		1.00	0.52			1.04	0.48		0.39	0.53

Intersection Summary

Area Type: Other

Cycle Length: 118.7

Actuated Cycle Length: 118.7

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 56.1

Intersection LOS: E

Intersection Capacity Utilization 100.4%

ICU Level of Service G

Analysis Period (min) 15

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025







~ 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.





















Splits and Phases: 17: Colony Rd/New Wright Shop Rd & Route 210

 Ø1	 Ø2	 Ø4	 Ø8
28 s	33.7 s	43 s	14 s
 Ø5	 Ø6		
17.6 s	44.1 s		

HCM 6th Signalized Intersection Summary




















17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	309	525	654	210	399	32	524	6	341	27	7	151
Future Volume (veh/h)	309	525	654	210	399	32	524	6	341	27	7	151
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	1847	1788	1847	1806	1761	1806	1803	1847	1847	1847	1847	1832
Adj Flow Rate, veh/h	322	547	681	219	416	33	546	6	355	28	7	157
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, %	0	4	0	0	3	0	3	0	0	0	0	1
Cap, veh/h	452	529	472	213	779	62	535	6	481	72	18	78
Arrive On Green	0.15	0.31	0.31	0.09	0.25	0.25	0.31	0.31	0.31	0.05	0.05	0.05
Sat Flow, veh/h	1759	1698	1515	1720	3142	248	1741	19	1565	1421	355	1553
Grp Volume(v), veh/h	322	547	681	219	221	228	552	0	355	35	0	157
Grp Sat Flow(s),veh/h/ln	1759	1698	1515	1720	1673	1717	1760	0	1565	1776	0	1553
Q Serve(g_s), s	16.0	37.0	37.0	10.5	13.6	13.7	36.5	0.0	24.1	2.3	0.0	6.0
Cycle Q Clear(g_c), s	16.0	37.0	37.0	10.5	13.6	13.7	36.5	0.0	24.1	2.3	0.0	6.0
Prop In Lane	1.00		1.00	1.00		0.14	0.99		1.00	0.80		1.00
Lane Grp Cap(c), veh/h	452	529	472	213	415	426	541	0	481	90	0	78
V/C Ratio(X)	0.71	1.03	1.44	1.03	0.53	0.54	1.02	0.00	0.74	0.39	0.00	2.00
Avail Cap(c_a), veh/h	494	529	472	213	415	426	541	0	481	90	0	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	0.00	1.00
Uniform Delay (d), s/veh	27.3	40.8	40.9	32.3	38.7	38.7	41.1	0.0	36.8	54.6	0.0	56.4
Incr Delay (d2), s/veh	3.5	47.9	210.7	69.5	3.9	3.8	43.8	0.0	5.9	2.7	0.0	492.1
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(50%),veh/ln	7.2	22.4	41.4	7.9	5.7	5.9	22.0	0.0	9.6	1.1	0.0	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	88.8	251.5	101.8	42.5	42.6	84.9	0.0	42.7	57.3	0.0	548.5
LnGrp LOS	C	F	F	F	D	D	F	A	D	E	A	F
Approach Vol, veh/h	1550			668			907			192		
Approach Delay, s/veh	148.2			62.0			68.4			458.9		
Approach LOS	F			E			E			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.2	36.5		43.0	17.6	44.1		14.0				
Change Period (Y+Rc), s	7.1	7.1		6.5	7.1	7.1		8.0				
Max Green Setting (Gmax), s	20.9	26.6		36.5	10.5	37.0		6.0				
Max Q Clear Time (g_c+I1), s	18.0	15.7		38.5	12.5	39.0		8.0				
Green Ext Time (p_c), s	0.1	3.7		0.0	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	127.0											
HCM 6th LOS	F											








Lanes, Volumes, Timings
20: Riverview Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	861	20	10	615	32	14	3	7	32	0	10
Future Volume (vph)	11	861	20	10	615	32	14	3	7	32	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			-10%			1%	
Storage Length (ft)	308		0	307		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.993				0.850		0.969	
Flt Protected	0.950			0.950				0.960			0.963	
Satd. Flow (prot)	1796	3513	0	1805	3418	0	0	1730	1696	0	1712	0
Flt Permitted	0.950			0.950				0.960			0.963	
Satd. Flow (perm)	1796	3513	0	1805	3418	0	0	1730	1696	0	1712	0
Link Speed (mph)		55			55			25			45	
Link Distance (ft)		10026			1037			1200			891	
Travel Time (s)		124.3			12.9			32.7			13.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	0%	0%	4%	22%	13%	0%	0%	4%	0%	0%
Adj. Flow (vph)	11	888	21	10	634	33	14	3	7	33	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	909	0	10	667	0	0	17	7	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	0.94	0.94	0.94	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	41.1%						ICU Level of Service A					
Analysis Period (min)	15											

HCM 6th TWSC
20: Riverview Rd & Route 210

















09/09/2025

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	861	20	10	615	32	14	3	7	32	0	10
Future Vol, veh/h	11	861	20	10	615	32	14	3	7	32	0	10
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	308	-	-	307	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	0	-	-	-10	-	-	1	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	0	0	4	22	13	0	0	4	0	0
Mvmt Flow	11	888	21	10	634	33	14	3	7	33	0	10
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	667	0	0	909	0	0	1258	1608	455	1139	1602	334
Stage 1	-	-	-	-	-	-	921	921	-	671	671	-
Stage 2	-	-	-	-	-	-	337	687	-	468	931	-
Critical Hdwy	4.1	-	-	4.1	-	-	5.76	4.5	5.9	7.78	6.7	7
Critical Hdwy Stg 1	-	-	-	-	-	-	4.76	3.5	-	6.78	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	4.76	3.5	-	6.78	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.63	4	3.3	3.54	4	3.3
Pot Cap-1 Maneuver	932	-	-	757	-	-	234	259	633	144	98	661
Stage 1	-	-	-	-	-	-	450	587	-	393	441	-
Stage 2	-	-	-	-	-	-	749	660	-	526	331	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	932	-	-	757	-	-	226	253	633	138	96	661
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	253	-	138	96	-
Stage 1	-	-	-	-	-	-	445	580	-	388	435	-
Stage 2	-	-	-	-	-	-	728	651	-	511	327	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			18.7			33.3		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	230	633	932	-	-	757	-	-	170			
HCM Lane V/C Ratio	0.076	0.011	0.012	-	-	0.014	-	-	0.255			
HCM Control Delay (s)	21.9	10.8	8.9	-	-	9.8	-	-	33.3			
HCM Lane LOS	C	B	A	-	-	A	-	-	D			
HCM 95th %tile Q(veh)	0.2	0	0	-	-	0	-	-	1			

Lanes, Volumes, Timings

23: US 29 SB On-Ramp/US 29 SB Off-Ramp & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	510	388	1	259	0	0	0	0	0	1	398
Future Volume (vph)	2	510	388	1	259	0	0	0	0	0	1	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.865	
Flt Protected												
Satd. Flow (prot)	0	1863	1583	0	1838	0	0	0	0	0	1565	0
Flt Permitted												
Satd. Flow (perm)	0	1863	1583	0	1838	0	0	0	0	0	1565	0
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		1037			1107			1017			759	
Travel Time (s)		12.9			13.7			15.4			11.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	2%	100%	3%	0%	0%	0%	0%	0%	0%	5%
Adj. Flow (vph)	2	526	400	1	267	0	0	0	0	0	1	410
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	400	0	268	0	0	0	0	0	411	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	72.4%						ICU Level of Service C					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↖						↕	
Traffic Vol, veh/h	2	510	388	1	259	0	0	0	0	0	1	398
Future Vol, veh/h	2	510	388	1	259	0	0	0	0	0	1	398
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	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	6	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	2	100	3	0	0	0	0	0	0	5
Mvmt Flow	2	526	400	1	267	0	0	0	0	0	1	410
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	267	0	0	926	0	0	999	1199	267			
Stage 1	-	-	-	-	-	-	269	269	-			
Stage 2	-	-	-	-	-	-	730	930	-			
Critical Hdwy	4.1	-	-	5.1	-	-	6.4	6.5	6.25			
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.5	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.5	-			
Follow-up Hdwy	2.2	-	-	3.1	-	-	3.5	4	3.345			
Pot Cap-1 Maneuver	1308	-	-	454	-	0	272	187	764			
Stage 1	-	-	-	-	-	0	781	690	-			
Stage 2	-	-	-	-	-	0	481	349	-			
Platoon blocked, %	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	1308	-	-	454	-	-	270	0	764			
Mov Cap-2 Maneuver	-	-	-	-	-	-	270	0	-			
Stage 1	-	-	-	-	-	-	779	0	-			
Stage 2	-	-	-	-	-	-	480	0	-			
Approach	EB			WB			SB					
HCM Control Delay, s	0			0			15.1					
HCM LOS							C					
Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	SBLn1						
Capacity (veh/h)	1308	-	-	454	-	764						
HCM Lane V/C Ratio	0.002	-	-	0.002	-	0.538						
HCM Control Delay (s)	7.8	-	-	12.9	0	15.1						
HCM Lane LOS	A	-	-	B	A	C						
HCM 95th %tile Q(veh)	0	-	-	0	-	3.3						

Lanes, Volumes, Timings
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↘
Traffic Volume (vph)	0	512	4	0	0	257
Future Volume (vph)	0	512	4	0	0	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		2%	-1%		3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	1844	1273	0	1872	1544
Flt Permitted						
Satd. Flow (perm)	0	1844	1273	0	1872	1544
Link Speed (mph)		55	55		45	
Link Distance (ft)		399	211		874	
Travel Time (s)		4.9	2.6		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	50%	0%	0%	3%
Adj. Flow (vph)	0	557	4	0	0	279
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	557	4	0	0	279
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	0.99	0.99	1.02	1.02
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 30.3% ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	512	4	0	0	257
Future Vol, veh/h	0	512	4	0	0	257
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	2	-1	-	3	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	50	0	0	3
Mvmt Flow	0	557	4	0	0	279
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	-	0	-	0	561	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	557	-
Critical Hdwy	-	-	-	-	7	6.53
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.327
Pot Cap-1 Maneuver	0	-	-	0	448	1076
Stage 1	0	-	-	0	1024	-
Stage 2	0	-	-	0	526	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	448	1076
Mov Cap-2 Maneuver	-	-	-	-	448	-
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	526	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.5		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	-	1076		
HCM Lane V/C Ratio	-	-	-	0.26		
HCM Control Delay (s)	-	-	0	9.5		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	-	1		

2050 BUILD RESULTS TABLES

SYNCHRO CAPACITY ANALYSIS - INTERSECTION LEVEL OF SERVICE SUMMARY
2050 Future Volumes [Build]
Amherst County Connector Road Study - Lynchburg, Virginia

Intersection Number and Description		Type of Control	Lane Group	Eastbound					Storage	Westbound					Storage	Northbound					Storage	Southbound					Storage	Overall																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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4	Amherst Hwy & Route 210	Signal																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
			Left							39.3	D	364	132.5	F	904	↑	28.7	C	346	102.3	F	894	↑	15.4	B	116	29.6	C	116	124.0	Delay	Delay																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
			Through							↑	↑	↑	↑	↑	↑	13.0								B	268	6.1	A	184	↑	25.8	83.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
			Right							21.8	C	60	38.4	D	50	50.0								↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑

HCM 6 and HCM 2000 Results












NOTE: Lane configurations with a shared through lane shown as "through" lane group. Lane configurations with shared left-right lane shown as "left" lane group.

† SYNCHRO does not provide level of service or delay for movements with no conflicting volumes.

2050 BUILD *SYNCHRO* REPORTS

Lanes, Volumes, Timings
4: Amherst Hwy & Route 210

09/09/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	418	26	286	275	55	509
Future Volume (vph)	418	26	286	275	55	509
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	3%		0%			0%
Storage Length (ft)	0	50		0	124	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.934			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1726	1360	1715	0	1736	1863
Flt Permitted	0.950				0.192	
Satd. Flow (perm)	1726	1360	1715	0	351	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		10	62			
Link Speed (mph)	35		35			35
Link Distance (ft)	1859		865			1227
Travel Time (s)	36.2		16.9			23.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	17%	3%	4%	4%	2%
Adj. Flow (vph)	454	28	311	299	60	553
Shared Lane Traffic (%)						
Lane Group Flow (vph)	454	28	610	0	60	553
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA		D.P+P	NA

Lanes, Volumes, Timings
4: Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	4	4	6		5	2
Permitted Phases					6	
Detector Phase	4	4	6		5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0
Minimum Split (s)	12.7	12.7	17.7		12.7	17.7
Total Split (s)	37.0	37.0	46.1		12.8	58.9
Total Split (%)	38.6%	38.6%	48.1%		13.3%	61.4%
Maximum Green (s)	31.3	31.3	40.4		7.1	53.2
Yellow Time (s)	3.0	3.0	3.9		3.9	3.9
All-Red Time (s)	2.7	2.7	1.8		1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	7.0		3.0	7.0
Minimum Gap (s)	2.5	2.5	2.5		0.2	2.5
Time Before Reduce (s)	8.0	8.0	8.0		0.0	8.0
Time To Reduce (s)	10.0	10.0	10.0		0.0	10.0
Recall Mode	None	None	Min		None	Min
Act Effect Green (s)	26.2	26.2	34.3		39.4	43.5
Actuated g/C Ratio	0.32	0.32	0.42		0.48	0.53
v/c Ratio	0.83	0.06	0.81		0.20	0.56
Control Delay	42.2	17.0	30.5		11.5	15.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	42.2	17.0	30.5		11.5	15.5
LOS	D	B	C		B	B
Approach Delay	40.7		30.5			15.1
Approach LOS	D		C			B
Queue Length 50th (ft)	248	7	283		16	196
Queue Length 95th (ft)	#409	27	#459		34	294
Internal Link Dist (ft)	1779		785			1147
Turn Bay Length (ft)		50			124	
Base Capacity (vph)	715	569	946		298	1247
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	0.63	0.05	0.64		0.20	0.44

Intersection Summary

Area Type: Other
Cycle Length: 95.9
Actuated Cycle Length: 82.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 27.9
Intersection Capacity Utilization 75.1%
Analysis Period (min) 15

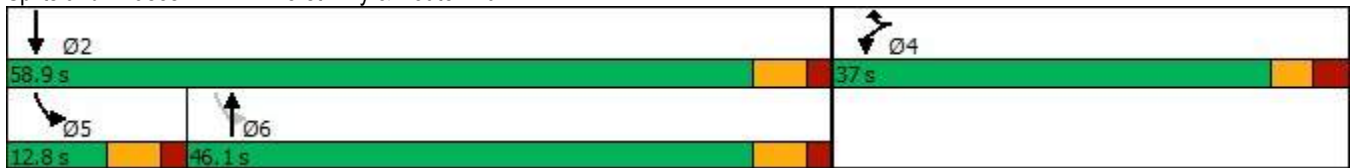
Intersection LOS: C
ICU Level of Service D

Lanes, Volumes, Timings 4: Amherst Hwy & Route 210

09/09/2025

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.












Splits and Phases: 4: Amherst Hwy & Route 210



HCM 6th Signalized Intersection Summary

4: Amherst Hwy & Route 210

09/09/2025


















						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	418	26	286	275	55	509
Future Volume (veh/h)	418	26	286	275	55	509
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	1803	1595	1856	1841	1841	1870
Adj Flow Rate, veh/h	454	28	311	299	60	553
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	17	3	4	4	2
Cap, veh/h	502	395	376	362	294	1061
Arrive On Green	0.29	0.29	0.43	0.43	0.06	0.57
Sat Flow, veh/h	1717	1352	869	836	1753	1870
Grp Volume(v), veh/h	454	28	0	610	60	553
Grp Sat Flow(s),veh/h/ln	1717	1352	0	1705	1753	1870
Q Serve(g_s), s	20.6	1.2	0.0	25.6	1.4	14.7
Cycle Q Clear(g_c), s	20.6	1.2	0.0	25.6	1.4	14.7
Prop In Lane	1.00	1.00		0.49	1.00	
Lane Grp Cap(c), veh/h	502	395	0	738	294	1061
V/C Ratio(X)	0.90	0.07	0.00	0.83	0.20	0.52
Avail Cap(c_a), veh/h	662	521	0	849	336	1226
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.6	20.7	0.0	20.3	15.0	10.8
Incr Delay (d2), s/veh	13.2	0.1	0.0	10.3	0.3	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	1.1	0.0	11.3	0.5	5.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.8	20.8	0.0	30.6	15.4	12.6
LnGrp LOS	D	C	A	C	B	B
Approach Vol, veh/h	482		610			613
Approach Delay, s/veh	39.6		30.6			12.9
Approach LOS	D		C			B
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	51.7		29.4		10.9	40.8
Change Period (Y+Rc), s	* 5.7		* 5.7		* 5.7	* 5.7
Max Green Setting (Gmax), s	* 53		* 31		* 7.1	* 40
Max Q Clear Time (g_c+l1), s	16.7		22.6		3.4	27.6
Green Ext Time (p_c), s	12.8		1.1		0.0	7.5
Intersection Summary						
HCM 6th Ctrl Delay			26.8			
HCM 6th LOS			C			
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings






2: Main St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	320	10	79	437	31	6	29	78	7	6	1
Future Volume (vph)	0	320	10	79	437	31	6	29	78	7	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			1%	
Storage Length (ft)	0		0	136		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.990			0.906			0.991	
Flt Protected				0.950				0.998			0.974	
Satd. Flow (prot)	0	1750	0	1805	1797	0	0	1718	0	0	1825	0
Flt Permitted				0.950				0.998			0.974	
Satd. Flow (perm)	0	1750	0	1805	1797	0	0	1718	0	0	1825	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1859			310			644			686	
Travel Time (s)		50.7			8.5			17.6			18.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	4%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	5	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	0	344	11	85	470	33	6	31	84	8	6	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	85	503	0	0	121	0	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.03	1.05	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 59.0%	ICU Level of Service B											
Analysis Period (min) 15												

HCM 6th TWSC
2: Main St & Route 210

















09/09/2025

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	320	10	79	437	31	6	29	78	7	6	1
Future Vol, veh/h	0	320	10	79	437	31	6	29	78	7	6	1
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	-	-	-	136	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	4	-	-	0	-	-	0	-	-	1	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	4	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	0	344	11	85	470	33	6	31	84	8	6	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	503	0	0	355	0	0	1010	1023	350	1064	1012	487
Stage 1	-	-	-	-	-	-	350	350	-	657	657	-
Stage 2	-	-	-	-	-	-	660	673	-	407	355	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.3	6.7	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.3	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1072	-	-	1215	-	-	220	238	698	191	228	577
Stage 1	-	-	-	-	-	-	671	636	-	441	448	-
Stage 2	-	-	-	-	-	-	455	457	-	611	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1072	-	-	1215	-	-	203	221	698	142	212	577
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	221	-	142	212	-
Stage 1	-	-	-	-	-	-	671	636	-	441	417	-
Stage 2	-	-	-	-	-	-	416	425	-	511	621	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.2			17.2			27.4		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	415	1072	-	-	1215	-	-	176				
HCM Lane V/C Ratio	0.293	-	-	-	0.07	-	-	0.086				
HCM Control Delay (s)	17.2	0	-	-	8.2	-	-	27.4				
HCM Lane LOS	C	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	1.2	0	-	-	0.2	-	-	0.3				

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Future Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Storage Length (ft)	0		0	210		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979									0.978	
Flt Protected				0.950							0.960	
Satd. Flow (prot)	0	3446	0	1752	3539	0	0	0	0	0	1655	0
Flt Permitted				0.392							0.960	
Satd. Flow (perm)	0	3446	0	723	3539	0	0	0	0	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14									133	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		398			329			900			621	
Travel Time (s)		10.9			9.0			17.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	6%	3%	2%	0%	0%	0%	0%	8%	0%	0%
Adj. Flow (vph)	0	387	63	859	588	0	0	0	0	97	0	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	450	0	859	588	0	0	0	0	0	116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		D,P+P	NA					Perm	NA	

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0		8.0	10.0					8.0	8.0	
Minimum Split (s)		15.6		13.6	15.6					13.8	13.8	
Total Split (s)		26.0		60.0	72.2					27.0	27.0	
Total Split (%)		23.0%		53.1%	63.9%					23.9%	23.9%	
Maximum Green (s)		20.4		54.4	66.6					21.2	21.2	
Yellow Time (s)		3.4		3.4	3.4					3.6	3.6	
All-Red Time (s)		2.2		2.2	2.2					2.2	2.2	
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	
Total Lost Time (s)		5.6		5.6	5.6						5.8	
Lead/Lag		Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Vehicle Extension (s)		5.0		2.5	5.0					3.0	3.0	
Minimum Gap (s)		4.0		2.0	4.0					2.5	2.5	
Time Before Reduce (s)		8.0		8.0	8.0					8.0	8.0	
Time To Reduce (s)		10.0		10.0	10.0					10.0	10.0	
Recall Mode		Min		None	Min					None	None	
Act Effect Green (s)		22.6		66.1	67.1						11.7	
Actuated g/C Ratio		0.24		0.70	0.71						0.12	
v/c Ratio		0.54		0.88	0.24						0.36	
Control Delay		36.5		20.5	3.1						8.5	
Queue Delay		0.0		0.2	0.2						0.0	
Total Delay		36.5		20.6	3.4						8.5	
LOS		D		C	A						A	
Approach Delay		36.5			13.6						8.5	
Approach LOS		D			B						A	
Queue Length 50th (ft)		120		121	22						0	
Queue Length 95th (ft)		215		#683	35						38	
Internal Link Dist (ft)		318			249			820			541	
Turn Bay Length (ft)				210								
Base Capacity (vph)		828		1129	2563						478	
Starvation Cap Reductn		0		21	1215						0	
Spillback Cap Reductn		1		0	0						0	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.54		0.78	0.44						0.24	
Intersection Summary												
Area Type:	Other											
Cycle Length: 113												
Actuated Cycle Length: 95.1												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.88												
Intersection Signal Delay: 18.4	Intersection LOS: B											
Intersection Capacity Utilization 75.1%	ICU Level of Service D											
Analysis Period (min) 15												

Lanes, Volumes, Timings
3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

Lane Group	Ø5	Ø8
Protected Phases	5	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.8	14.2
Total Split (s)	13.8	27.0
Total Split (%)	12%	24%
Maximum Green (s)	8.2	20.8
Yellow Time (s)	3.4	3.8
All-Red Time (s)	2.2	2.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings

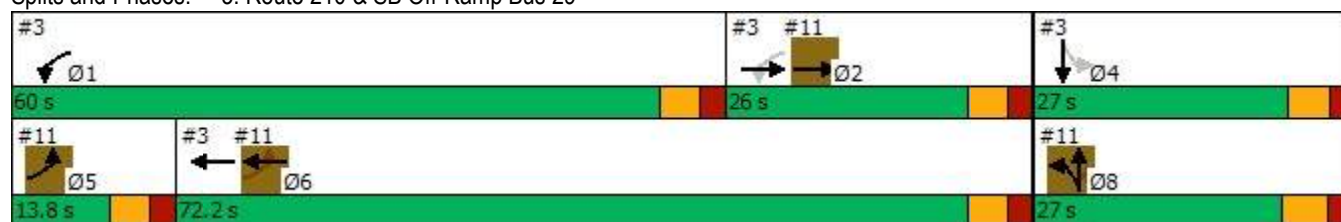
3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















Splits and Phases: 3: Route 210 & SB Off-Ramp Bus 29



HCM Signalized Intersection Capacity Analysis

3: Route 210 & SB Off-Ramp Bus 29




















09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Future Volume (vph)	0	348	57	773	529	0	0	0	0	87	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Total Lost time (s)		5.6		5.6	5.6						5.8	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Flt		0.98		1.00	1.00						0.98	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3446		1752	3539						1655	
Flt Permitted		1.00		0.39	1.00						0.96	
Satd. Flow (perm)		3446		723	3539						1655	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	387	63	859	588	0	0	0	0	97	0	19
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	102	0
Lane Group Flow (vph)	0	440	0	859	588	0	0	0	0	0	14	0
Heavy Vehicles (%)	0%	2%	6%	3%	2%	0%	0%	0%	0%	8%	0%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Actuated Green, G (s)		26.3		69.8	67.0						11.7	
Effective Green, g (s)		26.3		69.8	67.0						11.7	
Actuated g/C Ratio		0.27		0.71	0.68						0.12	
Clearance Time (s)		5.6		5.6	5.6						5.8	
Vehicle Extension (s)		5.0		2.5	5.0						3.0	
Lane Grp Cap (vph)		920		966	2407						196	
v/s Ratio Prot		0.13		c0.39	0.17							
v/s Ratio Perm				c0.24							0.01	
v/c Ratio		0.48		0.89	0.24						0.07	
Uniform Delay, d1		30.3		11.8	6.0						38.6	
Progression Factor		1.00		0.83	0.46						1.00	
Incremental Delay, d2		0.8		8.0	0.1						0.2	
Delay (s)		31.2		17.7	2.8						38.7	
Level of Service		C		B	A						D	
Approach Delay (s)		31.2			11.7			0.0			38.7	
Approach LOS		C			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			17.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			98.5			Sum of lost time (s)				17.4		
Intersection Capacity Utilization			75.1%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings













11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Future Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Storage Length (ft)	0		0	0		0	135		0	0		0
Storage Lanes	1		0	0		0	1		1	0		0
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.980				0.850			
Flt Protected	0.950							0.955				
Satd. Flow (prot)	1805	3471	0	0	3430	0	0	1665	1478	0	0	0
Flt Permitted	0.104							0.955				
Satd. Flow (perm)	198	3471	0	0	3430	0	0	1665	1478	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26				450			
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		329			350			921			690	
Travel Time (s)		9.0			9.5			14.0			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	0%	3%	4%	6%	0%	6%	0%	0%	0%
Adj. Flow (vph)	17	467	0	0	1393	212	53	3	450	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	467	0	0	1605	0	0	56	450	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	D.P+P	NA			NA		Split	NA	Perm			

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	10.0			10.0		8.0	8.0	8.0			
Minimum Split (s)	13.8	15.6			15.6		14.2	14.2	14.2			
Total Split (s)	13.8	26.0			72.2		27.0	27.0	27.0			
Total Split (%)	12.2%	23.0%			63.9%		23.9%	23.9%	23.9%			
Maximum Green (s)	8.2	20.4			66.6		20.8	20.8	20.8			
Yellow Time (s)	3.4	3.4			3.4		3.8	3.8	3.8			
All-Red Time (s)	2.2	2.2			2.2		2.4	2.4	2.4			
Lost Time Adjust (s)	0.0	0.0			0.0			0.0	0.0			
Total Lost Time (s)	5.6	5.6			5.6			6.2	6.2			
Lead/Lag	Lead	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	3.0	5.0			5.0		3.0	3.0	3.0			
Minimum Gap (s)	2.0	4.0			4.0		2.5	2.5	2.5			
Time Before Reduce (s)	8.0	8.0			8.0		8.0	8.0	8.0			
Time To Reduce (s)	10.0	10.0			10.0		10.0	10.0	10.0			
Recall Mode	None	Min			Min		None	None	None			
Act Effct Green (s)	69.9	22.6			67.1			11.3	11.3			
Actuated g/C Ratio	0.74	0.24			0.71			0.12	0.12			
v/c Ratio	0.06	0.57			0.66			0.28	0.79			
Control Delay	8.9	25.1			11.5			43.8	14.8			
Queue Delay	0.0	0.0			0.0			0.1	0.0			
Total Delay	8.9	25.2			11.5			43.9	14.8			
LOS	A	C			B			D	B			
Approach Delay		24.6			11.5			18.1				
Approach LOS		C			B			B				
Queue Length 50th (ft)	1	38			156			31	0			
Queue Length 95th (ft)	m11	128			534			73	100			
Internal Link Dist (ft)		249			270			841			610	
Turn Bay Length (ft)												
Base Capacity (vph)	286	823			2491			370	678			
Starvation Cap Reductn	0	9			0			0	0			
Spillback Cap Reductn	0	0			60			51	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.06	0.57			0.66			0.18	0.66			

Intersection Summary

Area Type: Other

Cycle Length: 113

Actuated Cycle Length: 95.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 15.2

Intersection LOS: B

Intersection Capacity Utilization 75.1%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

Lane Group	Ø1	Ø4
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	13.8
Total Split (s)	60.0	27.0
Total Split (%)	53%	24%
Maximum Green (s)	54.4	21.2
Yellow Time (s)	3.4	3.6
All-Red Time (s)	2.2	2.2
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

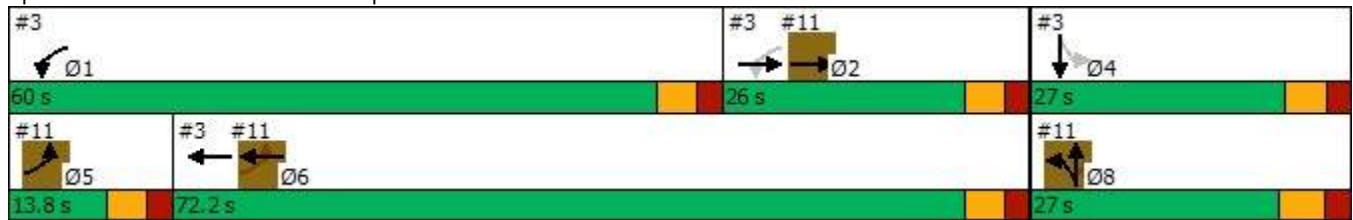
Lanes, Volumes, Timings

11: NB Off Ramp Bus 29 & Route 210

09/09/2025

m Volume for 95th percentile queue is metered by upstream signal.





















Splits and Phases: 11: NB Off Ramp Bus 29 & Route 210



HCM Signalized Intersection Capacity Analysis



















11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Future Volume (vph)	15	420	0	0	1254	191	48	3	405	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Total Lost time (s)	5.6	5.6			5.6			6.2	6.2			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.98			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1805	3471			3431			1665	1478			
Flt Permitted	0.10	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	198	3471			3431			1665	1478			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	467	0	0	1393	212	53	3	450	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	398	0	0	0
Lane Group Flow (vph)	17	467	0	0	1597	0	0	56	52	0	0	0
Heavy Vehicles (%)	0%	4%	0%	0%	3%	4%	6%	0%	6%	0%	0%	0%
Turn Type	D.P+P	NA			NA		Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases	6								8			
Actuated Green, G (s)	69.8	26.3			67.0			11.3	11.3			
Effective Green, g (s)	69.8	26.3			67.0			11.3	11.3			
Actuated g/C Ratio	0.71	0.27			0.68			0.11	0.11			
Clearance Time (s)	5.6	5.6			5.6			6.2	6.2			
Vehicle Extension (s)	3.0	5.0			5.0			3.0	3.0			
Lane Grp Cap (vph)	185	926			2333			191	169			
v/s Ratio Prot	c0.00	0.13			c0.47			0.03				
v/s Ratio Perm	0.06								c0.03			
v/c Ratio	0.09	0.50			0.68			0.29	0.31			
Uniform Delay, d1	6.9	30.6			9.4			39.9	40.0			
Progression Factor	2.23	0.64			1.00			1.00	1.00			
Incremental Delay, d2	0.2	0.8			1.1			0.9	1.0			
Delay (s)	15.5	20.4			10.5			40.8	41.0			
Level of Service	B	C			B			D	D			
Approach Delay (s)		20.3			10.5			41.0			0.0	
Approach LOS		C			B			D			A	
Intersection Summary												
HCM 2000 Control Delay		18.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		98.5			Sum of lost time (s)			17.4				
Intersection Capacity Utilization		75.1%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												







Lanes, Volumes, Timings
14: Union St/Morris St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	815	1	0	1431	5	1	0	0	0	0	13
Future Volume (vph)	8	815	1	0	1431	5	1	0	0	0	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	152		0	136		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt											0.865	
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1805	3471	0	1900	3505	0	0	1805	0	0	1644	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1805	3471	0	1900	3505	0	0	1805	0	0	1644	0
Link Speed (mph)		25			35			25			25	
Link Distance (ft)		350			629			414			423	
Travel Time (s)		9.5			12.3			11.3			11.5	
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
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	886	1	0	1555	5	1	0	0	0	0	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	887	0	0	1560	0	0	1	0	0	14	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.7%						ICU Level of Service A					
Analysis Period (min)	15											

HCM 6th TWSC
14: Union St/Morris St & Route 210





















09/09/2025

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	815	1	0	1431	5	1	0	0	0	0	13
Future Vol, veh/h	8	815	1	0	1431	5	1	0	0	0	0	13
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	152	-	-	136	-	-	-	-	-	-	-	-
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, %	0	4	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	9	886	1	0	1555	5	1	0	0	0	0	14
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1560	0	0	887	0	0	1683	2465	444	2019	2463	780
Stage 1	-	-	-	-	-	-	905	905	-	1558	1558	-
Stage 2	-	-	-	-	-	-	778	1560	-	461	905	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	430	-	-	772	-	-	63	31	567	35	31	342
Stage 1	-	-	-	-	-	-	302	358	-	120	175	-
Stage 2	-	-	-	-	-	-	360	175	-	555	358	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	430	-	-	772	-	-	59	30	567	34	30	342
Mov Cap-2 Maneuver	-	-	-	-	-	-	59	30	-	34	30	-
Stage 1	-	-	-	-	-	-	296	350	-	117	175	-
Stage 2	-	-	-	-	-	-	345	175	-	543	350	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			67.2			16		
HCM LOS							F			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	59	430	-	-	772	-	-	342				
HCM Lane V/C Ratio	0.018	0.02	-	-	-	-	-	0.041				
HCM Control Delay (s)	67.2	13.5	-	-	0	-	-	16				
HCM Lane LOS	F	B	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1				

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

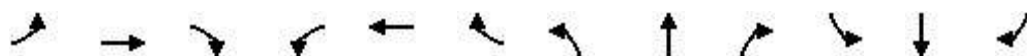
09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	713	20	20	1145	6	15	1	4	31	0	276
Future Volume (vph)	83	713	20	20	1145	6	15	1	4	31	0	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			4%			3%			3%	
Storage Length (ft)	324		0	332		0	0		415	0		174
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.999				0.850			0.850
Flt Protected	0.950			0.950				0.955			0.950	
Satd. Flow (prot)	1726	3377	0	1769	3428	0	0	1787	1591	0	1631	1544
Flt Permitted	0.137			0.318				0.955			0.950	
Satd. Flow (perm)	249	3377	0	592	3428	0	0	1787	1591	0	1631	1544
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			1				176			194
Link Speed (mph)		35			55			35			45	
Link Distance (ft)		629			2302			1162			925	
Travel Time (s)		12.3			28.5			22.6			14.0	
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
Heavy Vehicles (%)	3%	5%	0%	0%	3%	25%	0%	0%	0%	9%	0%	3%
Adj. Flow (vph)	86	743	21	21	1193	6	16	1	4	32	0	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	764	0	21	1199	0	0	17	4	0	32	288
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	D.P+P	NA		D.P+P	NA		Split	NA	Perm	Split	NA	Perm

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases	2			6					4			8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	13.1	15.1		13.1	15.1		12.5	12.5	12.5	14.0	14.0	14.0
Total Split (s)	15.0	61.9		13.2	60.1		12.6	12.6	12.6	31.0	31.0	31.0
Total Split (%)	12.6%	52.1%		11.1%	50.6%		10.6%	10.6%	10.6%	26.1%	26.1%	26.1%
Maximum Green (s)	7.9	54.8		6.1	53.0		6.1	6.1	6.1	23.0	23.0	23.0
Yellow Time (s)	4.7	4.7		4.7	4.7		4.0	4.0	4.0	5.1	5.1	5.1
All-Red Time (s)	2.4	2.4		2.4	2.4		2.5	2.5	2.5	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	7.1	7.1		7.1	7.1			6.5	6.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.5	6.0		1.5	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	2.5	5.0		2.5	5.0		3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	5.0	10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Act Effect Green (s)	47.0	48.4		50.2	42.1			6.8	6.8		12.7	12.7
Actuated g/C Ratio	0.55	0.56		0.59	0.49			0.08	0.08		0.15	0.15
v/c Ratio	0.33	0.40		0.05	0.71			0.12	0.01		0.13	0.73
Control Delay	12.5	14.1		9.4	22.4			51.2	0.0		39.1	26.5
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	12.5	14.1		9.4	22.4			51.2	0.0		39.1	26.5
LOS	B	B		A	C			D	A		D	C
Approach Delay		14.0			22.2			41.5			27.7	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	13	75		3	228			8	0		15	45
Queue Length 95th (ft)	52	263		18	492			37	0		49	160
Internal Link Dist (ft)		549			2222			1082			845	
Turn Bay Length (ft)	324			332					415			174
Base Capacity (vph)	292	2291		441	2267			143	289		494	603
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	0.29	0.33		0.05	0.53			0.12	0.01		0.06	0.48

Intersection Summary

Area Type: Other

Cycle Length: 118.7

Actuated Cycle Length: 85.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 20.2

Intersection LOS: C

Intersection Capacity Utilization 71.9%

ICU Level of Service C







Analysis Period (min) 15

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025





















Splits and Phases: 17: Colony Rd/New Wright Shop Rd & Route 210

 Ø1 15 s	 Ø2 60.1 s	 Ø4 12.6 s	 Ø8 31 s
 Ø5 13.2 s	 Ø6 61.9 s		

HCM 6th Signalized Intersection Summary







17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	713	20	20	1145	6	15	1	4	31	0	276
Future Volume (veh/h)	83	713	20	20	1145	6	15	1	4	31	0	276
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	1803	1773	1847	1806	1761	1435	1847	1847	1847	1714	1847	1803
Adj Flow Rate, veh/h	86	743	21	21	1193	6	16	1	4	32	0	288
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, %	3	5	0	0	3	25	0	0	0	9	0	3
Cap, veh/h	224	1583	45	331	1527	8	43	3	41	361	0	313
Arrive On Green	0.05	0.47	0.47	0.03	0.45	0.45	0.03	0.03	0.03	0.21	0.00	0.21
Sat Flow, veh/h	1717	3346	95	1720	3414	17	1660	104	1565	1759	0	1528
Grp Volume(v), veh/h	86	374	390	21	585	614	17	0	4	32	0	288
Grp Sat Flow(s),veh/h/ln	1717	1684	1756	1720	1673	1758	1764	0	1565	1759	0	1528
Q Serve(g_s), s	2.8	16.0	16.0	0.7	31.6	31.6	1.0	0.0	0.3	1.6	0.0	19.7
Cycle Q Clear(g_c), s	2.8	16.0	16.0	0.7	31.6	31.6	1.0	0.0	0.3	1.6	0.0	19.7
Prop In Lane	1.00		0.05	1.00		0.01	0.94		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	224	797	831	331	748	786	46	0	41	361	0	313
V/C Ratio(X)	0.38	0.47	0.47	0.06	0.78	0.78	0.37	0.00	0.10	0.09	0.00	0.92
Avail Cap(c_a), veh/h	263	867	904	385	833	876	101	0	90	380	0	330
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	0.00	1.00
Uniform Delay (d), s/veh	19.8	19.0	19.0	14.8	25.0	25.0	51.0	0.0	50.6	34.2	0.0	41.4
Incr Delay (d2), s/veh	0.4	1.6	1.5	0.0	7.0	6.7	4.9	0.0	1.0	0.1	0.0	29.1
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(50%),veh/ln	1.1	6.3	6.6	0.2	12.5	13.1	0.5	0.0	0.1	0.7	0.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	20.5	20.5	14.8	32.0	31.7	55.8	0.0	51.6	34.4	0.0	70.5
LnGrp LOS	C	C	C	B	C	C	E	A	D	C	A	E
Approach Vol, veh/h	850			1220			21			320		
Approach Delay, s/veh	20.5			31.5			55.0			66.9		
Approach LOS	C			C			E			E		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	54.7		9.3	9.9	57.4		29.8				
Change Period (Y+Rc), s	7.1	7.1		6.5	7.1	7.1		8.0				
Max Green Setting (Gmax), s	7.9	53.0		6.1	6.1	54.8		23.0				
Max Q Clear Time (g_c+I1), s	4.8	33.6		3.0	2.7	18.0		21.7				
Green Ext Time (p_c), s	0.0	14.0		0.0	0.0	13.8		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				32.5								
HCM 6th LOS				C								

Lanes, Volumes, Timings
33: New Dev Int. & Route 210

09/09/2025

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	
Traffic Volume (vph)	374	374	249	613	557	98
Future Volume (vph)	374	374	249	613	557	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			4%	0%	
Storage Length (ft)		200	250		0	0
Storage Lanes		1	1		2	0
Taper Length (ft)			0		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	0.95
Frt		0.850			0.977	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	3487	1560	1717	3435	3353	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	3487	1560	1717	3435	3353	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		407			25	
Link Speed (mph)	55			55	30	
Link Distance (ft)	2302			7633	1311	
Travel Time (s)	28.5			94.6	29.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	407	407	271	666	605	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	407	407	271	666	712	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.03	1.03	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2	1	1	2	1	
Detector Template	Thru	Right	Left	Thru	Left	
Leading Detector (ft)	100	20	20	100	20	
Trailing Detector (ft)	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	
Detector 1 Size(ft)	6	20	20	6	20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Prot	NA	Prot	

Lanes, Volumes, Timings
33: New Dev Int. & Route 210

09/09/2025

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2		1	6	4	
Permitted Phases		2				
Detector Phase	2	2	1	6	4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	28.0	28.0	25.0	53.0	27.0	
Total Split (%)	35.0%	35.0%	31.3%	66.3%	33.8%	
Maximum Green (s)	22.0	22.0	19.0	47.0	21.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	14.7	14.7	15.1	35.9	18.2	
Actuated g/C Ratio	0.22	0.22	0.23	0.54	0.27	
v/c Ratio	0.53	0.62	0.70	0.36	0.76	
Control Delay	26.3	7.3	35.5	9.3	28.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.3	7.3	35.5	9.3	28.8	
LOS	C	A	D	A	C	
Approach Delay	16.8			16.9	28.8	
Approach LOS	B			B	C	
Queue Length 50th (ft)	82	0	107	80	135	
Queue Length 95th (ft)	128	64	202	112	#226	
Internal Link Dist (ft)	2222			7553	1231	
Turn Bay Length (ft)		200	250			
Base Capacity (vph)	1191	801	507	2507	1110	
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	0.34	0.51	0.53	0.27	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 66.5

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 20.3

Intersection LOS: C

Intersection Capacity Utilization 58.1%

ICU Level of Service B

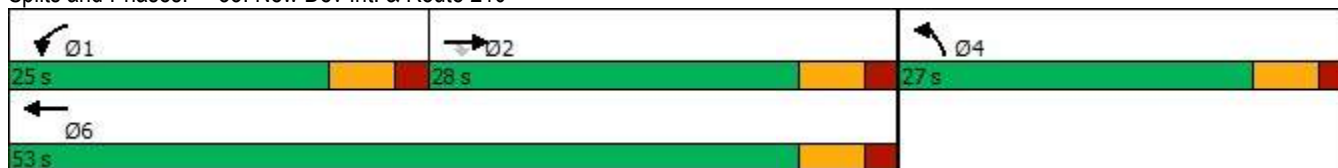
Analysis Period (min) 15

Lanes, Volumes, Timings 33: New Dev Int. & Route 210

09/09/2025

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 33: New Dev Int. & Route 210



HCM Signalized Intersection Capacity Analysis

33: New Dev Int. & Route 210























09/09/2025

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↗	
Traffic Volume (vph)	374	374	249	613	557	98
Future Volume (vph)	374	374	249	613	557	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			4%	0%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (prot)	3487	1560	1717	3435	3355	
Flt Permitted	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (perm)	3487	1560	1717	3435	3355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	407	271	666	605	107
RTOR Reduction (vph)	0	316	0	0	18	0
Lane Group Flow (vph)	407	91	271	666	694	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases		2				
Actuated Green, G (s)	14.8	14.8	15.1	35.9	18.1	
Effective Green, g (s)	14.8	14.8	15.1	35.9	18.1	
Actuated g/C Ratio	0.22	0.22	0.23	0.54	0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	781	349	392	1868	920	
v/s Ratio Prot	c0.12		c0.16	0.19	c0.21	
v/s Ratio Perm		0.06				
v/c Ratio	0.52	0.26	0.69	0.36	0.75	
Uniform Delay, d1	22.5	21.1	23.3	8.5	21.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.4	5.2	0.1	3.5	
Delay (s)	23.1	21.5	28.5	8.6	25.5	
Level of Service	C	C	C	A	C	
Approach Delay (s)	22.3			14.4	25.5	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay			20.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			66.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			58.1%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
20: Riverview Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	7	450	14	20	838	27	8	0	8	22	0	16
Future Volume (vph)	7	450	14	20	838	27	8	0	8	22	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			-10%			1%	
Storage Length (ft)	308		0	307		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.995				0.850		0.945	
Flt Protected	0.950			0.950				0.950			0.971	
Satd. Flow (prot)	1437	3476	0	1805	3420	0	0	1895	1696	0	1611	0
Flt Permitted	0.950			0.950				0.950			0.971	
Satd. Flow (perm)	1437	3476	0	1805	3420	0	0	1895	1696	0	1611	0
Link Speed (mph)		55			45			25			45	
Link Distance (ft)		7633			1037			1200			891	
Travel Time (s)		94.6			15.7			32.7			13.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	25%	3%	0%	0%	4%	37%	0%	0%	0%	13%	0%	0%
Adj. Flow (vph)	7	464	14	21	864	28	8	0	8	23	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	478	0	21	892	0	0	8	8	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	0.94	0.94	0.94	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 39.6%				ICU Level of Service A								
Analysis Period (min) 15												


















HCM 6th TWSC
20: Riverview Rd & Route 210

09/09/2025

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	↑↑		7	↑↑			↑	↑		↑↑	
Traffic Vol, veh/h	7	450	14	20	838	27	8	0	8	22	0	16
Future Vol, veh/h	7	450	14	20	838	27	8	0	8	22	0	16
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	308	-	-	307	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	0	-	-	-10	-	-	1	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	25	3	0	0	4	37	0	0	0	13	0	0
Mvmt Flow	7	464	14	21	864	28	8	0	8	23	0	16
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	892	0	0	478	0	0	959	1419	239	1166	1412	446
Stage 1	-	-	-	-	-	-	485	485	-	920	920	-
Stage 2	-	-	-	-	-	-	474	934	-	246	492	-
Critical Hdwy	4.6	-	-	4.1	-	-	5.5	4.5	5.9	7.96	6.7	7
Critical Hdwy Stg 1	-	-	-	-	-	-	4.5	3.5	-	6.96	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	4.5	3.5	-	6.96	5.7	-
Follow-up Hdwy	2.45	-	-	2.2	-	-	3.5	4	3.3	3.63	4	3.3
Pot Cap-1 Maneuver	627	-	-	1095	-	-	365	304	821	128	129	558
Stage 1	-	-	-	-	-	-	704	727	-	257	335	-
Stage 2	-	-	-	-	-	-	710	583	-	696	536	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	627	-	-	1095	-	-	346	295	821	124	125	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	346	295	-	124	125	-
Stage 1	-	-	-	-	-	-	696	719	-	254	329	-
Stage 2	-	-	-	-	-	-	676	572	-	681	530	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.2			12.5			29.8		
HCM LOS							B			D		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)	346	821	627	-	-	1095	-	-	184			
HCM Lane V/C Ratio	0.024	0.01	0.012	-	-	0.019	-	-	0.213			
HCM Control Delay (s)	15.7	9.4	10.8	-	-	8.4	-	-	29.8			
HCM Lane LOS	C	A	B	-	-	A	-	-	D			
HCM 95th %tile Q(veh)	0.1	0	0	-	-	0.1	-	-	0.8			

Lanes, Volumes, Timings
23: Route 210 & US 29 SB Off-Ramp

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	289	193	0	368	0	0	0	0	1	3	516
Future Volume (vph)	0	289	193	0	368	0	0	0	0	1	3	516
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.866	
Flt Protected												
Satd. Flow (prot)	0	1827	1568	0	1810	0	0	0	0	0	1613	0
Flt Permitted												
Satd. Flow (perm)	0	1827	1568	0	1810	0	0	0	0	0	1613	0
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1037			1089			1017			621	
Travel Time (s)		20.2			21.2			15.4			9.4	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	4%	3%	0%	5%	0%	0%	0%	0%	0%	0%	2%
Adj. Flow (vph)	0	298	199	0	379	0	0	0	0	1	3	532
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	298	199	0	379	0	0	0	0	0	536	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	73.5%					ICU Level of Service D						
Analysis Period (min)	15											

HCM 6th TWSC
23: Route 210 & US 29 SB Off-Ramp

09/09/2025

Intersection												
Int Delay, s/veh	10.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗		↖						↕	
Traffic Vol, veh/h	0	289	193	0	368	0	0	0	0	1	3	516
Future Vol, veh/h	0	289	193	0	368	0	0	0	0	1	3	516
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	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	6	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	4	3	0	5	0	0	0	0	0	0	2
Mvmt Flow	0	298	199	0	379	0	0	0	0	1	3	532
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	-	0	0	497	0	0				777	876	379
Stage 1	-	-	-	-	-	-				379	379	-
Stage 2	-	-	-	-	-	-				398	497	-
Critical Hdwy	-	-	-	4.1	-	-				6.4	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-				5.4	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.4	5.5	-
Follow-up Hdwy	-	-	-	2.2	-	-				3.5	4	3.318
Pot Cap-1 Maneuver	0	-	-	1077	-	0				368	290	668
Stage 1	0	-	-	-	-	0				696	618	-
Stage 2	0	-	-	-	-	0				683	548	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1077	-	-				368	0	668
Mov Cap-2 Maneuver	-	-	-	-	-	-				368	0	-
Stage 1	-	-	-	-	-	-				696	0	-
Stage 2	-	-	-	-	-	-				683	0	-
Approach	EB			WB			SB					
HCM Control Delay, s	0			0			28.7					
HCM LOS							D					
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1							
Capacity (veh/h)	-	-	1077	-	667							
HCM Lane V/C Ratio	-	-	-	-	0.804							
HCM Control Delay (s)	-	-	0	-	28.7							
HCM Lane LOS	-	-	A	-	D							
HCM 95th %tile Q(veh)	-	-	0	-	8.2							

Lanes, Volumes, Timings
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↘
Traffic Volume (vph)	0	290	0	0	0	368
Future Volume (vph)	0	290	0	0	0	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		2%	-1%		3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	1791	1909	0	1872	1515
Flt Permitted						
Satd. Flow (perm)	0	1791	1909	0	1872	1515
Link Speed (mph)		35	35		45	
Link Distance (ft)		413	211		859	
Travel Time (s)		8.0	4.1		13.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	0%	0%	0%	5%
Adj. Flow (vph)	0	315	0	0	0	400
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	315	0	0	0	400
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	0.99	0.99	1.02	1.02
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 26.1% ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025

Intersection						
Int Delay, s/veh	5.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	290	0	0	0	368
Future Vol, veh/h	0	290	0	0	0	368
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	2	-1	-	3	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	5	0	0	0	5
Mvmt Flow	0	315	0	0	0	400
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	316	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	-	-	7	6.55
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.345
Pot Cap-1 Maneuver	0	-	-	0	646	1075
Stage 1	0	-	-	0	1027	-
Stage 2	0	-	-	0	706	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	646	1075
Mov Cap-2 Maneuver	-	-	-	-	646	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	706	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		10.3		
HCM LOS	B					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	-	1075		
HCM Lane V/C Ratio	-	-	-	0.372		
HCM Control Delay (s)	-	-	0	10.3		
HCM Lane LOS	-	-	A	B		
HCM 95th %tile Q(veh)	-	-	-	1.7		

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	308	36	659	474	86	382
Future Volume (vph)	308	36	659	474	86	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	3%		0%			0%
Storage Length (ft)	0	50		0	124	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.944			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1710	1591	1747	0	1752	1863
Flt Permitted	0.950				0.072	
Satd. Flow (perm)	1710	1591	1747	0	133	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		16	64			
Link Speed (mph)	35		35			35
Link Distance (ft)	1859		865			1227
Travel Time (s)	36.2		16.9			23.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	1%	5%	3%	2%
Adj. Flow (vph)	335	39	716	515	93	415
Shared Lane Traffic (%)						
Lane Group Flow (vph)	335	39	1231	0	93	415
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (ft)	20	20	100		20	100
Trailing Detector (ft)	0	0	0		0	0
Detector 1 Position(ft)	0	0	0		0	0
Detector 1 Size(ft)	20	20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA		D.P+P	NA

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	4	4	6		5	2
Permitted Phases					6	
Detector Phase	4	4	6		5	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0
Minimum Split (s)	13.2	13.2	17.7		12.7	17.7
Total Split (s)	22.0	22.0	61.2		12.7	73.9
Total Split (%)	22.9%	22.9%	63.8%		13.2%	77.1%
Maximum Green (s)	16.3	16.3	55.5		7.0	68.2
Yellow Time (s)	3.0	3.0	3.9		3.9	3.9
All-Red Time (s)	2.7	2.7	1.8		1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7		5.7	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	7.0		3.0	7.0
Minimum Gap (s)	2.5	2.5	2.5		0.2	2.5
Time Before Reduce (s)	8.0	8.0	8.0		0.0	8.0
Time To Reduce (s)	10.0	10.0	10.0		0.0	10.0
Recall Mode	None	None	Min		None	Min
Act Effect Green (s)	16.4	16.4	55.7		61.2	65.6
Actuated g/C Ratio	0.18	0.18	0.60		0.66	0.70
v/c Ratio	1.12	0.13	1.15		0.45	0.32
Control Delay	126.6	24.5	101.4		16.7	6.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	126.6	24.5	101.4		16.7	6.0
LOS	F	C	F		B	A
Approach Delay	116.0		101.4			8.0
Approach LOS	F		F			A
Queue Length 50th (ft)	~242	12	~897		15	81
Queue Length 95th (ft)	#411	41	#1152		52	120
Internal Link Dist (ft)	1779		785			1147
Turn Bay Length (ft)		50			124	
Base Capacity (vph)	299	291	1067		208	1365
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	1.12	0.13	1.15		0.45	0.30

Intersection Summary

Area Type: Other

Cycle Length: 95.9

Actuated Cycle Length: 93.4

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 81.5

Intersection LOS: F

Intersection Capacity Utilization 98.0%

ICU Level of Service F

Analysis Period (min) 15

Lanes, Volumes, Timings

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025

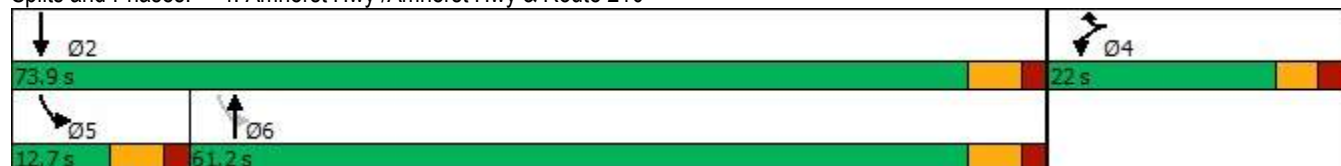
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Amherst Hwy /Amherst Hwy & Route 210



HCM 6th Signalized Intersection Summary

4: Amherst Hwy /Amherst Hwy & Route 210

09/09/2025




















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	308	36	659	474	86	382
Future Volume (veh/h)	308	36	659	474	86	382
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	1788	1847	1885	1826	1856	1870
Adj Flow Rate, veh/h	335	39	716	515	93	415
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	1	5	3	2
Cap, veh/h	291	268	594	427	194	1327
Arrive On Green	0.17	0.17	0.58	0.58	0.07	0.71
Sat Flow, veh/h	1703	1565	1020	733	1767	1870
Grp Volume(v), veh/h	335	39	0	1231	93	415
Grp Sat Flow(s),veh/h/ln	1703	1565	0	1753	1767	1870
Q Serve(g_s), s	16.3	2.0	0.0	55.5	1.9	7.9
Cycle Q Clear(g_c), s	16.3	2.0	0.0	55.5	1.9	7.9
Prop In Lane	1.00	1.00		0.42	1.00	
Lane Grp Cap(c), veh/h	291	268	0	1021	194	1327
V/C Ratio(X)	1.15	0.15	0.00	1.21	0.48	0.31
Avail Cap(c_a), veh/h	291	268	0	1021	205	1338
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	33.6	0.0	19.9	22.3	5.2
Incr Delay (d2), s/veh	99.8	0.2	0.0	102.0	1.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.7	0.0	0.0	48.4	1.2	2.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	139.3	33.8	0.0	121.9	24.2	5.8
LnGrp LOS	F	C	A	F	C	A
Approach Vol, veh/h	374		1231			508
Approach Delay, s/veh	128.3		121.9			9.2
Approach LOS	F		F			A
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		73.3		22.0	12.1	61.2
Change Period (Y+Rc), s		* 5.7		* 5.7	* 5.7	* 5.7
Max Green Setting (Gmax), s		* 68		* 16	* 7	* 56
Max Q Clear Time (g_c+I1), s		9.9		18.3	3.9	57.5
Green Ext Time (p_c), s		10.1		0.0	0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			95.9			
HCM 6th LOS			F			
Notes						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Lanes, Volumes, Timings






2: Main St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	528	29	107	334	30	11	36	91	18	11	0
Future Volume (vph)	3	528	29	107	334	30	11	36	91	18	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			1%	
Storage Length (ft)	0		0	136		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.988			0.911				
Flt Protected				0.950				0.996			0.970	
Satd. Flow (prot)	0	1766	0	1805	1827	0	0	1706	0	0	1834	0
Flt Permitted				0.950				0.996			0.970	
Satd. Flow (perm)	0	1766	0	1805	1827	0	0	1706	0	0	1834	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1859			310			644			686	
Travel Time (s)		50.7			8.5			17.6			18.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	0%	0%	3%	0%	0%	4%	0%	0%	0%	0%
Adj. Flow (vph)	3	568	31	115	359	32	12	39	98	19	12	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	602	0	115	391	0	0	149	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
Headway Factor	1.03	1.03	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	67.1%						ICU Level of Service C					
Analysis Period (min)	15											

HCM 6th TWSC
2: Main St & Route 210

















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Intersection												
Int Delay, s/veh	5.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	528	29	107	334	30	11	36	91	18	11	0
Future Vol, veh/h	3	528	29	107	334	30	11	36	91	18	11	0
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	-	-	-	136	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	4	-	-	0	-	-	0	-	-	1	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	5	0	0	3	0	0	4	0	0	0	0
Mvmt Flow	3	568	31	115	359	32	12	39	98	19	12	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	391	0	0	599	0	0	1201	1211	584	1263	1210	375
Stage 1	-	-	-	-	-	-	590	590	-	605	605	-
Stage 2	-	-	-	-	-	-	611	621	-	658	605	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.54	6.2	7.3	6.7	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.3	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.036	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1179	-	-	988	-	-	163	181	515	138	172	669
Stage 1	-	-	-	-	-	-	497	492	-	472	474	-
Stage 2	-	-	-	-	-	-	484	476	-	440	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1179	-	-	988	-	-	139	159	515	83	151	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	159	-	83	151	-
Stage 1	-	-	-	-	-	-	495	490	-	470	419	-
Stage 2	-	-	-	-	-	-	416	421	-	327	472	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.1			30.4			56.5		
HCM LOS							D			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	286	1179	-	-	988	-	-	100				
HCM Lane V/C Ratio	0.519	0.003	-	-	0.116	-	-	0.312				
HCM Control Delay (s)	30.4	8.1	0	-	9.1	-	-	56.5				
HCM Lane LOS	D	A	A	-	A	-	-	F				
HCM 95th %tile Q(veh)	2.8	0	-	-	0.4	-	-	1.2				

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29













09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Future Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Storage Length (ft)	0		0	210		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985									0.986	
Flt Protected				0.950							0.957	
Satd. Flow (prot)	0	3426	0	1752	3505	0	0	0	0	0	1729	0
Flt Permitted				0.182							0.957	
Satd. Flow (perm)	0	3426	0	336	3505	0	0	0	0	0	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9									129	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		398			329			900			621	
Travel Time (s)		10.9			9.0			17.5			12.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	2%	3%	3%	0%	0%	0%	0%	3%	0%	0%
Adj. Flow (vph)	0	639	69	549	501	0	0	0	0	179	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	708	0	549	501	0	0	0	0	0	200	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.05	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	
Detector Template		Thru		Left	Thru					Left	Thru	
Leading Detector (ft)		100		20	100					20	100	
Trailing Detector (ft)		0		0	0					0	0	
Detector 1 Position(ft)		0		0	0					0	0	
Detector 1 Size(ft)		6		20	6					20	6	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		D,P+P	NA					Perm	NA	

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0		8.0	10.0					8.0	8.0	
Minimum Split (s)		15.6		13.6	15.6					13.8	13.8	
Total Split (s)		35.0		34.0	55.4					48.0	48.0	
Total Split (%)		29.9%		29.1%	47.4%					41.0%	41.0%	
Maximum Green (s)		29.4		28.4	49.8					42.2	42.2	
Yellow Time (s)		3.4		3.4	3.4					3.6	3.6	
All-Red Time (s)		2.2		2.2	2.2					2.2	2.2	
Lost Time Adjust (s)		0.0		0.0	0.0						0.0	
Total Lost Time (s)		5.6		5.6	5.6						5.8	
Lead/Lag		Lag		Lead	Lag							
Lead-Lag Optimize?		Yes		Yes	Yes							
Vehicle Extension (s)		5.0		2.5	5.0					3.0	3.0	
Minimum Gap (s)		4.0		2.0	4.0					2.5	2.5	
Time Before Reduce (s)		8.0		8.0	8.0					8.0	8.0	
Time To Reduce (s)		10.0		10.0	10.0					10.0	10.0	
Recall Mode		Min		None	Min					None	None	
Act Effct Green (s)		29.4		57.8	58.0						41.8	
Actuated g/C Ratio		0.25		0.50	0.50						0.36	
v/c Ratio		0.81		1.07	0.29						0.28	
Control Delay		49.2		92.4	9.2						11.0	
Queue Delay		0.8		10.5	0.4						0.0	
Total Delay		50.0		102.9	9.6						11.0	
LOS		D		F	A						B	
Approach Delay		50.0			58.4						11.0	
Approach LOS		D			E						B	
Queue Length 50th (ft)		262		~372	31						35	
Queue Length 95th (ft)		336		#594	66						90	
Internal Link Dist (ft)		318			249			820			541	
Turn Bay Length (ft)				210								
Base Capacity (vph)		870		511	1743						708	
Starvation Cap Reductn		0		42	749						0	
Spillback Cap Reductn		36		0	0						1	
Storage Cap Reductn		0		0	0						0	
Reduced v/c Ratio		0.85		1.17	0.50						0.28	
Intersection Summary												
Area Type:	Other											
Cycle Length: 117												
Actuated Cycle Length: 116.6												
Natural Cycle: 120												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 1.07												
Intersection Signal Delay: 50.5					Intersection LOS: D							
Intersection Capacity Utilization 77.2%					ICU Level of Service D							
Analysis Period (min) 15												

Lanes, Volumes, Timings
3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

Lane Group	Ø5	Ø8
Protected Phases	5	8
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	14.2
Total Split (s)	13.6	48.0
Total Split (%)	12%	41%
Maximum Green (s)	8.0	41.8
Yellow Time (s)	3.4	3.8
All-Red Time (s)	2.2	2.4
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings

3: Route 210 & SB Off-Ramp Bus 29

09/09/2025

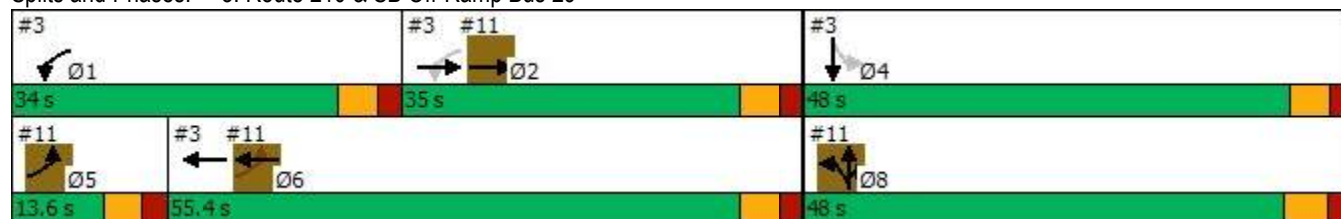
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Route 210 & SB Off-Ramp Bus 29



HCM Signalized Intersection Capacity Analysis

3: Route 210 & SB Off-Ramp Bus 29





















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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑						↑↓	
Traffic Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Future Volume (vph)	0	575	62	494	451	0	0	0	0	161	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			7%			2%	
Total Lost time (s)		5.6		5.6	5.6						5.8	
Lane Util. Factor		0.95		1.00	0.95						1.00	
Flt		0.99		1.00	1.00						0.99	
Flt Protected		1.00		0.95	1.00						0.96	
Satd. Flow (prot)		3427		1752	3505						1728	
Flt Permitted		1.00		0.18	1.00						0.96	
Satd. Flow (perm)		3427		336	3505						1728	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	639	69	549	501	0	0	0	0	179	0	21
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	84	0
Lane Group Flow (vph)	0	701	0	549	501	0	0	0	0	0	116	0
Heavy Vehicles (%)	0%	4%	2%	3%	3%	0%	0%	0%	0%	3%	0%	0%
Turn Type		NA		D.P+P	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases				2						4		
Actuated Green, G (s)		32.8		61.2	58.0						41.8	
Effective Green, g (s)		32.8		61.2	58.0						41.8	
Actuated g/C Ratio		0.27		0.51	0.48						0.35	
Clearance Time (s)		5.6		5.6	5.6						5.8	
Vehicle Extension (s)		5.0		2.5	5.0						3.0	
Lane Grp Cap (vph)		936		506	1694						601	
v/s Ratio Prot		0.20		c0.26	0.14							
v/s Ratio Perm				c0.30							0.07	
v/c Ratio		0.75		1.08	0.30						0.19	
Uniform Delay, d1		39.8		31.1	18.7						27.3	
Progression Factor		1.00		1.25	0.48						1.00	
Incremental Delay, d2		4.0		59.6	0.2						0.2	
Delay (s)		43.8		98.6	9.1						27.5	
Level of Service		D		F	A						C	
Approach Delay (s)		43.8			55.9			0.0			27.5	
Approach LOS		D			E			A			C	
Intersection Summary												
HCM 2000 Control Delay			48.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			17.4			
Intersection Capacity Utilization			77.2%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings













11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Future Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Storage Length (ft)	0		0	0		0	135		0	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Taper Length (ft)	25			25			0			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.972				0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1805	3505	0	0	3366	0	0	1717	1551	0	0	0
Flt Permitted	0.121							0.950				
Satd. Flow (perm)	230	3505	0	0	3366	0	0	1717	1551	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					30				484			
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		329			350			921			690	
Travel Time (s)		9.0			9.5			14.0			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	3%	0%	0%	5%	1%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	16	803	0	0	977	226	74	0	851	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	803	0	0	1203	0	0	74	851	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.10	1.10	1.10
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	D.P+P	NA			NA		Split	NA	Prot			

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2			6		8	8	8			
Permitted Phases	6											
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	10.0			10.0		8.0	8.0	8.0			
Minimum Split (s)	13.6	15.6			15.6		14.2	14.2	14.2			
Total Split (s)	13.6	35.0			55.4		48.0	48.0	48.0			
Total Split (%)	11.6%	29.9%			47.4%		41.0%	41.0%	41.0%			
Maximum Green (s)	8.0	29.4			49.8		41.8	41.8	41.8			
Yellow Time (s)	3.4	3.4			3.4		3.8	3.8	3.8			
All-Red Time (s)	2.2	2.2			2.2		2.4	2.4	2.4			
Lost Time Adjust (s)	0.0	0.0			0.0			0.0	0.0			
Total Lost Time (s)	5.6	5.6			5.6			6.2	6.2			
Lead/Lag	Lead	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	3.0	5.0			5.0		3.0	3.0	3.0			
Minimum Gap (s)	2.0	4.0			4.0		2.5	2.5	2.5			
Time Before Reduce (s)	8.0	8.0			8.0		8.0	8.0	8.0			
Time To Reduce (s)	10.0	10.0			10.0		10.0	10.0	10.0			
Recall Mode	None	Min			Min		None	None	None			
Act Effct Green (s)	61.2	29.4			58.0			41.4	41.4			
Actuated g/C Ratio	0.52	0.25			0.50			0.36	0.36			
v/c Ratio	0.07	0.91			0.71			0.12	0.99			
Control Delay	15.0	35.8			26.5			26.1	44.5			
Queue Delay	0.0	3.5			0.4			0.1	0.0			
Total Delay	15.0	39.3			26.9			26.1	44.5			
LOS	B	D			C			C	D			
Approach Delay		38.8			26.9			43.0				
Approach LOS		D			C			D				
Queue Length 50th (ft)	3	105			316			37	347			
Queue Length 95th (ft)	m8	#398			502			72	#650			
Internal Link Dist (ft)		249			270			841			610	
Turn Bay Length (ft)												
Base Capacity (vph)	228	883			1689			615	866			
Starvation Cap Reductn	0	39			0			0	0			
Spillback Cap Reductn	0	0			135			102	0			
Storage Cap Reductn	0	0			0			0	0			
Reduced v/c Ratio	0.07	0.95			0.77			0.14	0.98			

Intersection Summary

Area Type: Other

Cycle Length: 117

Actuated Cycle Length: 116.6

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 35.3

Intersection LOS: D

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
11: NB Off Ramp Bus 29 & Route 210

09/09/2025

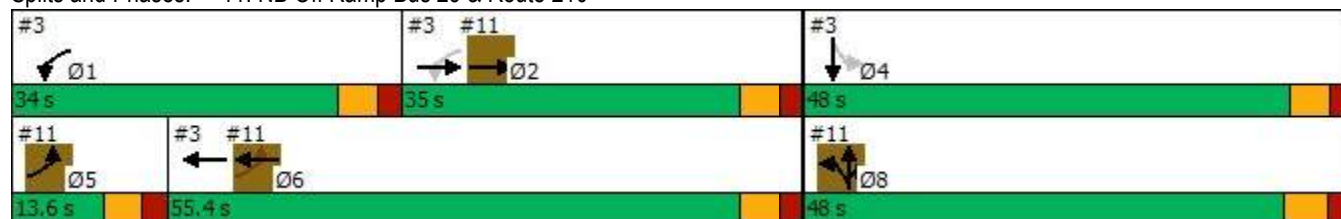
Lane Group	Ø1	Ø4
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	8.0	8.0
Minimum Split (s)	13.6	13.8
Total Split (s)	34.0	48.0
Total Split (%)	29%	41%
Maximum Green (s)	28.4	42.2
Yellow Time (s)	3.4	3.6
All-Red Time (s)	2.2	2.2
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.5	3.0
Minimum Gap (s)	2.0	2.5
Time Before Reduce (s)	8.0	8.0
Time To Reduce (s)	10.0	10.0
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
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.




















Splits and Phases: 11: NB Off Ramp Bus 29 & Route 210



HCM Signalized Intersection Capacity Analysis



















11: NB Off Ramp Bus 29 & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Future Volume (vph)	14	723	0	0	879	203	67	0	766	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			14%	
Total Lost time (s)	5.6	5.6			5.6			6.2	6.2			
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00			
Frt	1.00	1.00			0.97			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1805	3505			3365			1717	1551			
Flt Permitted	0.12	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	230	3505			3365			1717	1551			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	16	803	0	0	977	226	74	0	851	0	0	0
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	317	0	0	0
Lane Group Flow (vph)	16	803	0	0	1188	0	0	74	534	0	0	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	1%	2%	0%	1%	0%	0%	0%
Turn Type	D.P+P	NA			NA		Split	NA	Prot			
Protected Phases	5	2			6		8	8	8			
Permitted Phases	6											
Actuated Green, G (s)	61.2	32.8			58.0			41.4	41.4			
Effective Green, g (s)	61.2	32.8			58.0			41.4	41.4			
Actuated g/C Ratio	0.51	0.27			0.48			0.34	0.34			
Clearance Time (s)	5.6	5.6			5.6			6.2	6.2			
Vehicle Extension (s)	3.0	5.0			5.0			3.0	3.0			
Lane Grp Cap (vph)	159	958			1626			592	535			
v/s Ratio Prot	c0.00	c0.23			c0.35			0.04	c0.34			
v/s Ratio Perm	0.05											
v/c Ratio	0.10	0.84			0.73			0.12	1.00			
Uniform Delay, d1	17.9	41.1			24.8			26.9	39.3			
Progression Factor	1.15	0.55			1.00			1.00	1.00			
Incremental Delay, d2	0.2	5.2			2.1			0.1	38.1			
Delay (s)	20.9	28.0			26.8			27.0	77.4			
Level of Service	C	C			C			C	E			
Approach Delay (s)		27.8			26.8			73.4			0.0	
Approach LOS		C			C			E			A	
Intersection Summary												
HCM 2000 Control Delay		41.7			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			17.4				
Intersection Capacity Utilization		77.2%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												







Lanes, Volumes, Timings
14: Union St/Morris St & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1477	1	3	1066	5	1	0	0	10	0	14
Future Volume (vph)	10	1477	1	3	1066	5	1	0	0	10	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	152		0	136		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999							0.922
Flt Protected	0.950			0.950				0.950				0.979
Satd. Flow (prot)	1805	3539	0	1805	3435	0	0	1805	0	0	1715	0
Flt Permitted	0.950			0.950				0.950				0.979
Satd. Flow (perm)	1805	3539	0	1805	3435	0	0	1805	0	0	1715	0
Link Speed (mph)		25			35			25			25	
Link Distance (ft)		350			629			414			423	
Travel Time (s)		9.5			12.3			11.3			11.5	
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
Heavy Vehicles (%)	0%	2%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	11	1605	1	3	1159	5	1	0	0	11	0	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1606	0	3	1164	0	0	1	0	0	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	50.9%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM 6th TWSC
14: Union St/Morris St & Route 210

09/09/2025

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	10	1477	1	3	1066	5	1	0	0	10	0	14
Future Vol, veh/h	10	1477	1	3	1066	5	1	0	0	10	0	14
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	152	-	-	136	-	-	-	-	-	-	-	-
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, %	0	2	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	11	1605	1	3	1159	5	1	0	0	11	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1164	0	0	1606	0	0	2214	2798	803	1993	2796	582
Stage 1	-	-	-	-	-	-	1628	1628	-	1168	1168	-
Stage 2	-	-	-	-	-	-	586	1170	-	825	1628	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	607	-	-	412	-	-	25	19	331	37	19	461
Stage 1	-	-	-	-	-	-	108	162	-	209	270	-
Stage 2	-	-	-	-	-	-	468	269	-	337	162	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	607	-	-	412	-	-	24	19	331	36	19	461
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	19	-	36	19	-
Stage 1	-	-	-	-	-	-	106	159	-	205	268	-
Stage 2	-	-	-	-	-	-	449	267	-	331	159	-





















Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	162	72.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	24	607	-	-	412	-	-	78
HCM Lane V/C Ratio	0.045	0.018	-	-	0.008	-	-	0.334
HCM Control Delay (s)	162	11	-	-	13.8	-	-	72.8
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1.3

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	309	1151	28	1	881	32	42	6	20	27	7	151
Future Volume (vph)	309	1151	28	1	881	32	42	6	20	27	7	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			4%			3%			3%	
Storage Length (ft)	324		0	332		0	0		415	0		174
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.995				0.850			0.850
Flt Protected	0.950			0.950				0.958			0.962	
Satd. Flow (prot)	1778	3409	0	1769	3421	0	0	1747	1591	0	1800	1575
Flt Permitted	0.195			0.160				0.958			0.962	
Satd. Flow (perm)	365	3409	0	298	3421	0	0	1747	1591	0	1800	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			3				242			228
Link Speed (mph)		35			55			35			45	
Link Distance (ft)		629			2110			1162			925	
Travel Time (s)		12.3			26.2			22.6			14.0	
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
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	3%	0%	0%	0%	0%	1%
Adj. Flow (vph)	322	1199	29	1	918	33	44	6	21	28	7	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	322	1228	0	1	951	0	0	50	21	0	35	157
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	D.P+P	NA		D.P+P	NA		Split	NA	Perm	Split	NA	Perm

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases	2			6					4			8
Detector Phase	1	6		5	2		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	13.1	15.1		13.1	15.1		12.5	12.5	12.5	14.0	14.0	14.0
Total Split (s)	35.0	72.5		13.2	50.7		15.0	15.0	15.0	18.0	18.0	18.0
Total Split (%)	29.5%	61.1%		11.1%	42.7%		12.6%	12.6%	12.6%	15.2%	15.2%	15.2%
Maximum Green (s)	27.9	65.4		6.1	43.6		8.5	8.5	8.5	10.0	10.0	10.0
Yellow Time (s)	4.7	4.7		4.7	4.7		4.0	4.0	4.0	5.1	5.1	5.1
All-Red Time (s)	2.4	2.4		2.4	2.4		2.5	2.5	2.5	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	7.1	7.1		7.1	7.1			6.5	6.5		8.0	8.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.5	6.0		1.5	6.0		3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	2.5	5.0		2.5	5.0		3.5	3.5	3.5	3.5	3.5	3.5
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	5.0	10.0		5.0	10.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Act Effect Green (s)	51.8	57.3		58.3	36.5			7.9	7.9		7.8	7.8
Actuated g/C Ratio	0.55	0.61		0.62	0.39			0.08	0.08		0.08	0.08
v/c Ratio	0.75	0.59		0.00	0.72			0.34	0.06		0.23	0.46
Control Delay	25.6	13.8		7.0	29.3			54.6	0.3		51.5	5.7
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	25.6	13.8		7.0	29.3			54.6	0.3		51.5	5.7
LOS	C	B		A	C			D	A		D	A
Approach Delay		16.2			29.3			38.5			14.0	
Approach LOS		B			C			D			B	
Queue Length 50th (ft)	90	220		0	260			30	0		21	0
Queue Length 95th (ft)	196	404		2	403			79	0		60	12
Internal Link Dist (ft)		549			2030			1082			845	
Turn Bay Length (ft)	324			332					415			174
Base Capacity (vph)	674	2463		286	1703			168	372		204	380
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	0.48	0.50		0.00	0.56			0.30	0.06		0.17	0.41

Intersection Summary

Area Type: Other

Cycle Length: 118.7

Actuated Cycle Length: 94.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 69.5%

ICU Level of Service C







Analysis Period (min) 15

Lanes, Volumes, Timings

17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025





















Splits and Phases: 17: Colony Rd/New Wright Shop Rd & Route 210

 Ø1	 Ø2	 Ø4	 Ø8
35 s	50.7 s	15 s	18 s
 Ø5	 Ø6		
13.2 s	72.5 s		

HCM 6th Signalized Intersection Summary







17: Colony Rd/New Wright Shop Rd & Route 210

09/09/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	309	1151	28	1	881	32	42	6	20	27	7	151
Future Volume (veh/h)	309	1151	28	1	881	32	42	6	20	27	7	151
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	1847	1788	1847	1806	1761	1806	1803	1847	1847	1847	1847	1832
Adj Flow Rate, veh/h	322	1199	29	1	918	33	44	6	21	28	7	157
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, %	0	4	0	0	3	0	3	0	0	0	0	1
Cap, veh/h	408	1829	44	204	1368	49	83	11	83	149	37	163
Arrive On Green	0.13	0.54	0.54	0.00	0.42	0.42	0.05	0.05	0.05	0.10	0.10	0.10
Sat Flow, veh/h	1759	3389	82	1720	3295	118	1557	212	1565	1421	355	1553
Grp Volume(v), veh/h	322	601	627	1	466	485	50	0	21	35	0	157
Grp Sat Flow(s),veh/h/ln	1759	1698	1773	1720	1673	1740	1769	0	1565	1776	0	1553
Q Serve(g_s), s	9.8	24.0	24.1	0.0	21.6	21.6	2.6	0.0	1.2	1.7	0.0	9.6
Cycle Q Clear(g_c), s	9.8	24.0	24.1	0.0	21.6	21.6	2.6	0.0	1.2	1.7	0.0	9.6
Prop In Lane	1.00		0.05	1.00		0.07	0.88		1.00	0.80		1.00
Lane Grp Cap(c), veh/h	408	917	957	204	695	722	94	0	83	186	0	163
V/C Ratio(X)	0.79	0.66	0.66	0.00	0.67	0.67	0.53	0.00	0.25	0.19	0.00	0.97
Avail Cap(c_a), veh/h	700	1163	1214	311	764	795	158	0	139	186	0	163
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	0.00	1.00
Uniform Delay (d), s/veh	17.4	15.6	15.7	13.1	22.6	22.6	44.0	0.0	43.4	39.0	0.0	42.6
Incr Delay (d2), s/veh	1.3	2.9	2.8	0.0	4.3	4.1	4.6	0.0	1.6	0.5	0.0	60.1
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(50%),veh/ln	3.7	9.2	9.6	0.0	8.3	8.6	1.3	0.0	0.5	0.7	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.7	18.6	18.4	13.1	26.9	26.8	48.6	0.0	44.9	39.5	0.0	102.7
LnGrp LOS	B	B	B	B	C	C	D	A	D	D	A	F
Approach Vol, veh/h	1550			952			71			192		
Approach Delay, s/veh	18.5			26.8			47.5			91.2		
Approach LOS	B			C			D			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.2	46.7		11.6	7.3	58.6		18.0				
Change Period (Y+Rc), s	7.1	7.1		6.5	7.1	7.1		8.0				
Max Green Setting (Gmax), s	27.9	43.6		8.5	6.1	65.4		10.0				
Max Q Clear Time (g_c+I1), s	11.8	23.6		4.6	2.0	26.1		11.6				
Green Ext Time (p_c), s	0.2	11.6		0.1	0.0	25.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				27.2								
HCM 6th LOS				C								

Lanes, Volumes, Timings
33: New Dev Int. & Route 210

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵↵	
Traffic Volume (vph)	571	626	209	432	482	321
Future Volume (vph)	571	626	209	432	482	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			4%	0%	
Storage Length (ft)		200	200		0	0
Storage Lanes		1	1		2	0
Taper Length (ft)			0		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	0.95
Frt		0.850			0.940	
Flt Protected			0.950		0.971	
Satd. Flow (prot)	3487	1560	1717	3435	3266	0
Flt Permitted			0.950		0.971	
Satd. Flow (perm)	3487	1560	1717	3435	3266	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		680			237	
Link Speed (mph)	55			55	30	
Link Distance (ft)	2110			7774	1566	
Travel Time (s)	26.2			96.4	35.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	621	680	227	470	524	349
Shared Lane Traffic (%)						
Lane Group Flow (vph)	621	680	227	470	873	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.03	1.03	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2	1	1	2	1	
Detector Template	Thru	Right	Left	Thru	Left	
Leading Detector (ft)	100	20	20	100	20	
Trailing Detector (ft)	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	
Detector 1 Size(ft)	6	20	20	6	20	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Prot	NA	Prot	

Lanes, Volumes, Timings
33: New Dev Int. & Route 210

09/09/2025

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Protected Phases	2		1	6	4	
Permitted Phases		2				
Detector Phase	2	2	1	6	4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	29.0	29.0	16.0	45.0	25.0	
Total Split (%)	41.4%	41.4%	22.9%	64.3%	35.7%	
Maximum Green (s)	23.0	23.0	10.0	39.0	19.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Max	Max	None	None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	23.0	23.0	10.0	39.0	19.0	
Actuated g/C Ratio	0.33	0.33	0.14	0.56	0.27	
v/c Ratio	0.54	0.70	0.93	0.25	0.82	
Control Delay	21.4	6.3	74.9	8.4	25.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.4	6.3	74.9	8.4	25.4	
LOS	C	A	E	A	C	
Approach Delay	13.5			30.0	25.4	
Approach LOS	B			C	C	
Queue Length 50th (ft)	113	0	98	50	132	
Queue Length 95th (ft)	162	73	#222	73	#227	
Internal Link Dist (ft)	2030			7694	1486	
Turn Bay Length (ft)		200	200			
Base Capacity (vph)	1145	969	245	1913	1059	
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	0.54	0.70	0.93	0.25	0.82	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 21.1

Intersection LOS: C

Intersection Capacity Utilization 66.2%

ICU Level of Service C

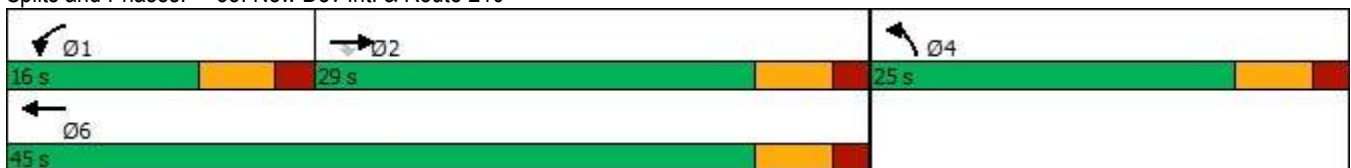
Analysis Period (min) 15

Lanes, Volumes, Timings 33: New Dev Int. & Route 210

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95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 33: New Dev Int. & Route 210



HCM Signalized Intersection Capacity Analysis























33: New Dev Int. & Route 210

09/09/2025

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↗	
Traffic Volume (vph)	571	626	209	432	482	321
Future Volume (vph)	571	626	209	432	482	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			4%	0%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3487	1560	1717	3435	3266	
Flt Permitted	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (perm)	3487	1560	1717	3435	3266	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	621	680	227	470	524	349
RTOR Reduction (vph)	0	457	0	0	173	0
Lane Group Flow (vph)	621	223	227	470	700	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Turn Type	NA	Perm	Prot	NA	Prot	
Protected Phases	2		1	6	4	
Permitted Phases		2				
Actuated Green, G (s)	23.0	23.0	10.0	39.0	19.0	
Effective Green, g (s)	23.0	23.0	10.0	39.0	19.0	
Actuated g/C Ratio	0.33	0.33	0.14	0.56	0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1145	512	245	1913	886	
v/s Ratio Prot	c0.18		c0.13	0.14	c0.21	
v/s Ratio Perm		0.14				
v/c Ratio	0.54	0.44	0.93	0.25	0.79	
Uniform Delay, d1	19.2	18.4	29.6	8.0	23.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	2.7	37.7	0.1	7.1	
Delay (s)	21.0	21.1	67.4	8.0	30.8	
Level of Service	C	C	E	A	C	
Approach Delay (s)	21.1			27.3	30.8	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			25.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			70.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			66.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						








Lanes, Volumes, Timings
20: Riverview Rd & Route 210

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	11	861	20	10	615	32	14	3	7	32	0	10
Future Volume (vph)	11	861	20	10	615	32	14	3	7	32	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			-10%			1%	
Storage Length (ft)	308		0	307		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	0			0			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.993				0.850		0.969	
Flt Protected	0.950			0.950				0.960			0.963	
Satd. Flow (prot)	1796	3513	0	1805	3418	0	0	1730	1696	0	1712	0
Flt Permitted	0.950			0.950				0.960			0.963	
Satd. Flow (perm)	1796	3513	0	1805	3418	0	0	1730	1696	0	1712	0
Link Speed (mph)		55			35			25			45	
Link Distance (ft)		7774			1037			1200			891	
Travel Time (s)		96.4			20.2			32.7			13.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	0%	0%	4%	22%	13%	0%	0%	4%	0%	0%
Adj. Flow (vph)	11	888	21	10	634	33	14	3	7	33	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	909	0	10	667	0	0	17	7	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	0.94	0.94	0.94	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	41.1%						ICU Level of Service A					
Analysis Period (min)	15											

HCM 6th TWSC
20: Riverview Rd & Route 210

















09/09/2025

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	861	20	10	615	32	14	3	7	32	0	10
Future Vol, veh/h	11	861	20	10	615	32	14	3	7	32	0	10
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	308	-	-	307	-	-	-	-	250	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	0	-	-	-10	-	-	1	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	0	0	4	22	13	0	0	4	0	0
Mvmt Flow	11	888	21	10	634	33	14	3	7	33	0	10
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	667	0	0	909	0	0	1258	1608	455	1139	1602	334
Stage 1	-	-	-	-	-	-	921	921	-	671	671	-
Stage 2	-	-	-	-	-	-	337	687	-	468	931	-
Critical Hdwy	4.1	-	-	4.1	-	-	5.76	4.5	5.9	7.78	6.7	7
Critical Hdwy Stg 1	-	-	-	-	-	-	4.76	3.5	-	6.78	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	4.76	3.5	-	6.78	5.7	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.63	4	3.3	3.54	4	3.3
Pot Cap-1 Maneuver	932	-	-	757	-	-	234	259	633	144	98	661
Stage 1	-	-	-	-	-	-	450	587	-	393	441	-
Stage 2	-	-	-	-	-	-	749	660	-	526	331	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	932	-	-	757	-	-	226	253	633	138	96	661
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	253	-	138	96	-
Stage 1	-	-	-	-	-	-	445	580	-	388	435	-
Stage 2	-	-	-	-	-	-	728	651	-	511	327	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			18.7			33.3		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1		NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1		
Capacity (veh/h)	230		633	932	-	-	757	-	-	170		
HCM Lane V/C Ratio	0.076		0.011	0.012	-	-	0.014	-	-	0.255		
HCM Control Delay (s)	21.9		10.8	8.9	-	-	9.8	-	-	33.3		
HCM Lane LOS	C		B	A	-	-	A	-	-	D		
HCM 95th %tile Q(veh)	0.2		0	0	-	-	0	-	-	1		

Lanes, Volumes, Timings

23: Route 210 & US 29 SB Off-Ramp

09/09/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	510	388	1	259	0	0	0	0	0	1	398
Future Volume (vph)	2	510	388	1	259	0	0	0	0	0	1	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			6%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850								0.865	
Flt Protected												
Satd. Flow (prot)	0	1863	1583	0	1838	0	0	0	0	0	1565	0
Flt Permitted												
Satd. Flow (perm)	0	1863	1583	0	1838	0	0	0	0	0	1565	0
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1037			1107			1017			621	
Travel Time (s)		20.2			21.6			15.4			9.4	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	2%	100%	3%	0%	0%	0%	0%	0%	0%	5%
Adj. Flow (vph)	2	526	400	1	267	0	0	0	0	0	1	410
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	400	0	268	0	0	0	0	0	411	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	72.4%						ICU Level of Service C					
Analysis Period (min)	15											

HCM 6th TWSC
23: Route 210 & US 29 SB Off-Ramp

09/09/2025

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑		↑						↕	
Traffic Vol, veh/h	2	510	388	1	259	0	0	0	0	0	1	398
Future Vol, veh/h	2	510	388	1	259	0	0	0	0	0	1	398
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	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	6	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	2	2	100	3	0	0	0	0	0	0	5
Mvmt Flow	2	526	400	1	267	0	0	0	0	0	1	410
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	267	0	0	926	0	0		999	1199	267		
Stage 1	-	-	-	-	-	-		269	269	-		
Stage 2	-	-	-	-	-	-		730	930	-		
Critical Hdwy	4.1	-	-	5.1	-	-		6.4	6.5	6.25		
Critical Hdwy Stg 1	-	-	-	-	-	-		5.4	5.5	-		
Critical Hdwy Stg 2	-	-	-	-	-	-		5.4	5.5	-		
Follow-up Hdwy	2.2	-	-	3.1	-	-		3.5	4	3.345		
Pot Cap-1 Maneuver	1308	-	-	454	-	0		272	187	764		
Stage 1	-	-	-	-	-	0		781	690	-		
Stage 2	-	-	-	-	-	0		481	349	-		
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1308	-	-	454	-	-		270	0	764		
Mov Cap-2 Maneuver	-	-	-	-	-	-		270	0	-		
Stage 1	-	-	-	-	-	-		779	0	-		
Stage 2	-	-	-	-	-	-		480	0	-		
Approach	EB			WB			SB					
HCM Control Delay, s	0			0				15.1				
HCM LOS								C				
Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	SBLn1						
Capacity (veh/h)	1308	-	-	454	-	764						
HCM Lane V/C Ratio	0.002	-	-	0.002	-	0.538						
HCM Control Delay (s)	7.8	-	-	12.9	0	15.1						
HCM Lane LOS	A	-	-	B	A	C						
HCM 95th %tile Q(veh)	0	-	-	0	-	3.3						

Lanes, Volumes, Timings

26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↘
Traffic Volume (vph)	0	512	4	0	0	257
Future Volume (vph)	0	512	4	0	0	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		2%	-1%		3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	0	1844	1273	0	1872	1544
Flt Permitted						
Satd. Flow (perm)	0	1844	1273	0	1872	1544
Link Speed (mph)		35	35		45	
Link Distance (ft)		399	211		874	
Travel Time (s)		7.8	4.1		13.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	50%	0%	0%	3%
Adj. Flow (vph)	0	557	4	0	0	279
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	557	4	0	0	279
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	0.99	0.99	1.02	1.02
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 30.3% ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC
26: Route 210 & US 29 NB Off-Ramp Loop

09/09/2025

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Vol, veh/h	0	512	4	0	0	257
Future Vol, veh/h	0	512	4	0	0	257
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	2	-1	-	3	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	50	0	0	3
Mvmt Flow	0	557	4	0	0	279
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	561	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	557	-
Critical Hdwy	-	-	-	-	7	6.53
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	-	-	-	-	3.5	3.327
Pot Cap-1 Maneuver	0	-	-	0	448	1076
Stage 1	0	-	-	0	1024	-
Stage 2	0	-	-	0	526	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	448	1076
Mov Cap-2 Maneuver	-	-	-	-	448	-
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	526	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.5		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	-	1076		
HCM Lane V/C Ratio	-	-	-	0.26		
HCM Control Delay (s)	-	-	0	9.5		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	-	1		

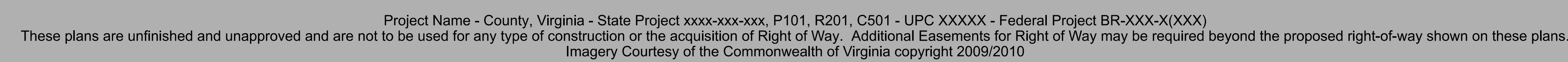
2050 VJUST SCREENING

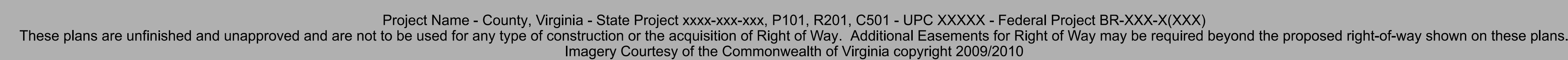
VJust Summary

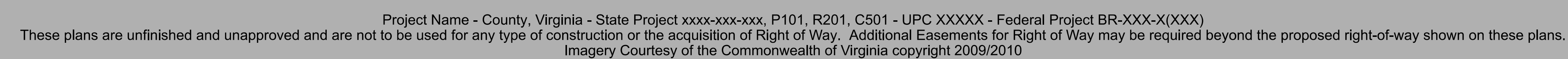
Node	Cross Street	Maximum V/C (Weighted Conflict Points)													
		At-Grade													
		Conventional		RCUT		Continuous Green-T		Partial Median U-Turn		Quadrant Roadway SE		Single Loop		Thru-Cut	
		(48)		(20)		(12)		(28)		(40)		(28)		(28)	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Colony Rd/Wright Shop Rd	0.84	0.91	0.73	0.68	n/a	n/a	1.40	1.00	0.66	0.79	0.86	0.93	0.66	0.79
2	Potential New Intersection for Development (East of Colony Road)	0.62	0.77	0.82	0.71	0.68	0.69	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Node	Cross Street	Maximum V/C (Weighted Conflict Points)													
		Grade Separated													
		Traditional Diamond		Contraflow Left		Displaced Left Turn		Diverging Diamond		Single Point		Double Roundabout		Single Roundabout	
		(28)		(32)		(28)		(20)		(32)		(16)		(12)	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
2	Potential New Intersection for Development (East of Colony Road)	0.57	0.52	n/a	n/a	n/a	n/a	0.36	0.6	0.57	0.68	n/a	n/a	0.42	0.64
3	US 29 BUS Interchange	0.92	0.95	0.92	0.96	0.63	0.93	0.37	0.62	0.34	0.71	0.89	1.49	0.81	1.49

APPENDIX C – ALTERNATIVE SCROLLS







APPENDIX D – LYNCHBURG REGIONAL BUSINESS ALLIANCE
TRAINING CENTER REDEVELOPMENT PLAN



Training Center **Redevelopment Plan**

Madison Heights, Virginia

April 2022



This document is a flexible tool, which presents a vision, framework, principles, and guidelines for the redevelopment of the Training Center Site in Madison Heights, Virginia. **It is important to note that the physical design of buildings, open spaces, and mobility corridors has not been determined.** Rather, these designs are conceptual in nature, depicting possible improvements that will fulfill the vision, follow the framework initiatives, and create the desired identity for the study area. Changes in priorities, budgets, programming, and/or physical constraints will almost certainly occur over time. However, this plan will provide a foundation and cohesive approach to future development initiatives.

ACKNOWLEDGEMENTS

A special thanks to the following members of the Training Center Advisory Council and Leadership Committee, who provided great time and effort into this project. The input these individuals provided throughout helped shape the vision for the Redevelopment Plan, laying the foundation toward meaningful implementation.



Ms. Amanda Adams, CJMW Architecture
Delegate Terry Austin, Virginia House of Delegates
Mr. Robert G. Barnes, Virginia Department of Transportation
Mr. Jeremy Bryant, Amherst County
Delegate Kathy J. Byron, Virginia House of Delegates
Delegate Ronnie R. Campbell, Virginia House of Delegates
Mr. Rob Campbell, James River Association
Ms. Whitney Czelusniak, Appalachian Power
Mr. Joseph Damico, Virginia Department of General Services
Mr. Ron Davia, Virginia Department of Behavioral Health and Development Services
Ms. Lauren B. Dianich, Atelier 11 Architecture
Mr. Luke Dykeman, Coldwell Banker Commercial Read & Co.
Mr. Chad Eby, Amherst County Economic Development Authority
Ms. Holly Eve, Virginia Department of General Services
Delegate Matthew Fariss, Virginia House of Delegates
Delegate Scott Garrett, Former Virginia Delegate
Ms. Jamie Glass, Lynchburg Regional Business Alliance
Ms. Victoria Hanson, Amherst County Economic Development Authority
Ms. Angela Harvell, Virginia Department of Behavioral Health and Development Services
Ms. Kelly T. Hitchcock, Central Virginia Planning District Commission

Mr. Hugh Hubinger, Virginia Department of General Services
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Ms. Ashley Kershner, Downtown Lynchburg Association
Mr. Dennis W. Knight Jr., Wiley | Wilson
Mr. John Loftus, Virginia Economic Development Partnership
Ms. Megan Lucas, Lynchburg Regional Business Alliance
Ms. Sara McGuffin, Town of Amherst
Mr. Chet McPhatter, Banker Steel Company
Mr. Karl Miller, Karl Miller Realty
Mr. Chad Mooney, Petty, Livingston, Dawson & Richards, PC
Ms. Jennifer Moore, BWX Technologies, Former Amherst County Board of Supervisors
Mr. Andrew Neiderer, Selective Wealth Management
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Mr. L. Kimball Payne, Retired
Senator Mark J. Peake, Virginia Senate
Mr. John Putney, Bedford County
Mr. Dean Rodgers, Amherst County
Ms. Lisa Stinnette, Commercial Steel Erection
Mr. Ben Summers, S&S Machine, Inc. / T.R.U. Ball
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Ms. Claudia D. Tucker, Amherst County Board of Supervisors
Ms. Marjette G. Upshur, City of Lynchburg Office of Economic Development & Tourism
Mr. Drew Wade, BWX Technologies, Inc., Amherst County Board of Supervisors
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Ms. Denise Woernle, Framatome

In addition, thanks to all members of the public who attended and participated in the Design Charrette, held in Lynchburg in November 2020, as well as those who provided responses to the online Visioning Workshop posted on the Training Center Redevelopment Plan project website.

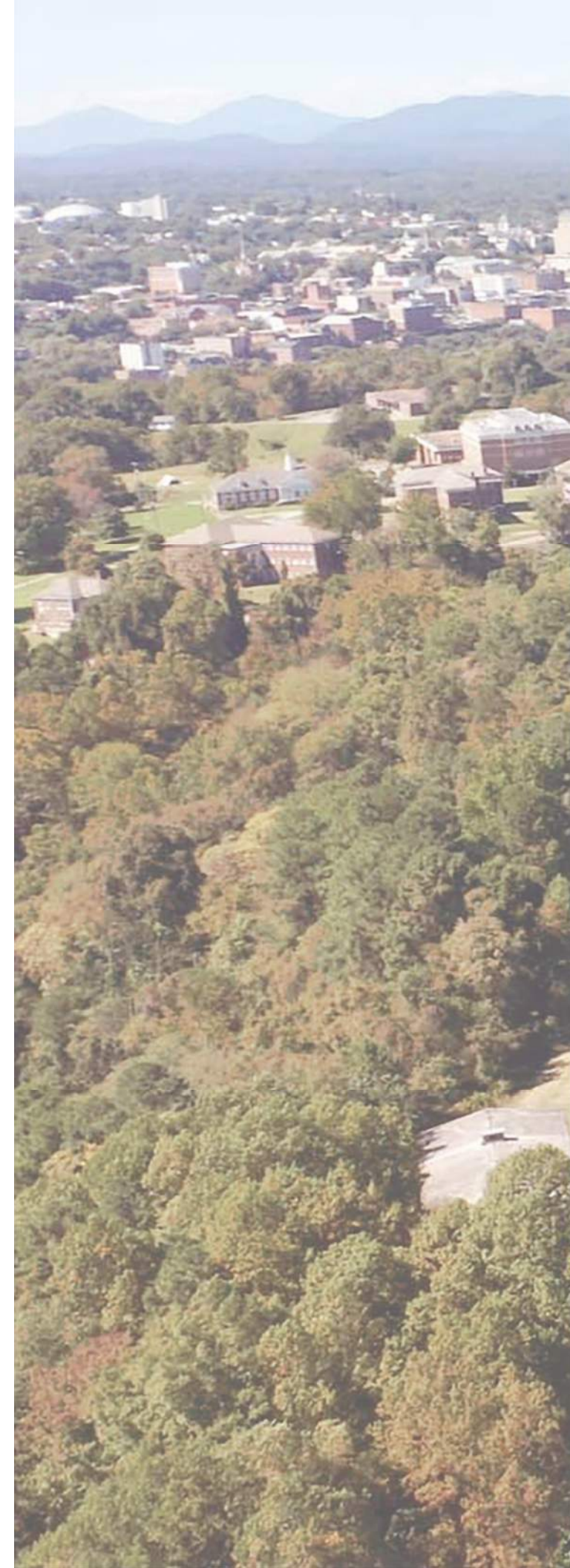
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1 | EXECUTIVE SUMMARY





EXECUTIVE SUMMARY

In the spring of 2020, the Lynchburg Regional Business Alliance (LRBA) commenced the process to create an in-depth redevelopment master plan for the Central Virginia Training Center (CVTC) campus and adjacent VC Mobile Home Park. Collectively, the two properties make up the majority of the redevelopment study, thus referred to as the Training Center Site (the Site). The Site is located in Madison Heights, Amherst County, Virginia, on approximately 350 acres of land across a series of ridgelines and ravines overlooking the James River valley across from downtown Lynchburg. The Training Center Site, due to its size and unique position within the region, has the potential, when redeveloped, to be a catalyst for a true transformation for the Lynchburg region and the local communities it could serve.

The master planning process, as envisioned, was to follow an iterative, collaborative approach where the Consultant Team (Team) would engage with LRBA and Amherst County representatives, along with a diverse group of local stakeholders, to help determine the overall vision and primary goals and objectives for the Site's redevelopment. The multi-disciplinary Team was comprised of planners, landscape architects, urban designers, architects, market and economic analysts, and strategic communication professionals.

Major tasks associated with the master planning process included an in-depth inventory and analysis phase of both the local/regional markets as well as the physical conditions of the Site itself, interactive visioning sessions with the stakeholders and public at-large, an immersive 5-day Design Charrette, and the development of this comprehensive Summary Document, the graphics-based roadmap toward Plan implementation for the LRBA and local communities and jurisdictions to follow.



Existing CVTC campus & mobile home park (together "the Training Center Site") spread across ridgelines above the forested James River Valley opposite downtown Lynchburg



Proposed Redevelopment Plan for the Training Center Site

The final Training Center Redevelopment Plan proposes a mixed-use, walkable neighborhood for the Training Center Site. The neighborhood is “fit” into the natural environment, with the various districts and development sites laid out along the study area’s flat bluffs and ridgelines, with the surrounding forested ravines preserved and even enhanced with re-cultivated vegetation cover. The neighborhood is urban in nature, with a contiguous network of streets spread across the Site. The adjacent developments front onto the streets, engaging the public realm as vehicles, cyclists, and pedestrians are provided with a robust network of mobility options across which to circulate. Mobility options are extended beyond the bluffs, as a large series of multi-use trails, nature paths, and even a Funicular, traverse down the hillsides to connect to the regional trail network.

The neighborhood’s series of vibrant parks and open spaces serve as datums around which the various development projects are oriented. These green spaces are diverse in size, amenities, and general character, responding to the distinct characters of the various districts. The building typologies and land uses of these districts offer a true mix of uses, creating a multi-faceted environment that encourages live, work, and play within the neighborhood.

While the majority of existing buildings on the CVTC campus were deemed unfavorable or not feasible for preservation, The Redevelopment Plan does propose the adaptive reuse of several buildings and key site features. Thus, the Master Plan strives to create a redevelopment that is transformative in its vision, yet sensitive to the character of the Site’s context. The proposed neighborhood can become the new urban hub for Madison Heights and Amherst County, achieving the economic potential for the region as a new lifestyle center for residents and visitors alike.



2 | INVENTORY & ANALYSIS

THE SITE

SITE ANALYSIS

DEVELOPMENT POTENTIAL

TREE SURVEY

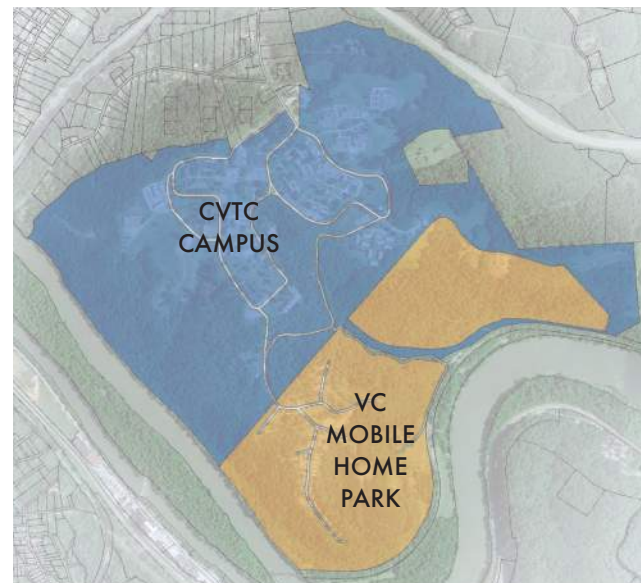




THE SITE

The Training Center Site, located in Madison Heights Virginia, includes the CVTC campus and the VC Mobile Home Park. The Site comprises approximately 350 acres of land, the majority of which is characterized by rolling forested ridgelines and ravines rising above the James River Valley. On the CVTC campus, complexes of brick-facade buildings and large surface parking lots are scattered across a man-made landscape of open lawn areas with large specimen trees and meandering service drives constructed over the course of 100+ years. The units within the mobile home park are aligned along four ridgelines in the far southern portion of the Site.

Only one access point currently exists for the Site, as Colony Road enters from the north from its signalized intersection with the Old Town Connector (Highway 210). Connection from the Site to the James River Heritage Trail is provided via Fertilizer Road, a narrow road in deteriorating condition.



Site Ownership: State-owned (blue), privately-owned (orange)



Aerial view looking southeast over the existing CVTC campus along Colony Road



Aerial view looking southwest toward Bradford Hall and downtown Lynchburg in the distance



Vacant buildings and unkept landscaping on the current campus



Monument sign along Colony Road near The Inn

Past use within the CVTC campus has left environmentally-impacted areas across the property in need of remediation before redevelopment could occur. Many of the on-site buildings, while having pleasing exterior facades of brick and colonial detailing, contain hazardous materials and confining layouts in their interiors that would restrict renovation.

Once the environmental remediation, demolition of buildings, and site clearing and re-grading are complete, the over 100 acres of developable land, sitting on a prime piece of real estate within the growing region, comprise a property with incredible redevelopment potential.



Historical marker/sign for the CVTC campus



Aerial photo looking north over the CVTC campus taken around 1954

SITE HISTORY

The first development on the property that would become the CVTC campus began in 1910. The property was originally established as the Virginia Epileptic Colony. From its founding up to 1983, the campus's facilities served as an asylum, a state hospital, and training school. During its years as a state asylum, eugenics was researched and practiced at the Colony, a fact well-known through the community today and given the modern perspective, something that gives the property a negative connotation in many people's minds.

In 1983, the campus was re-designated as the Central Virginia Training Center, becoming the commonwealth's largest facility providing care for the disabled and mentally ill. The campus remained in use by a number of governmental agencies up to 2020, when the state-run facilities closed. When it closed, only 6 of the 98 buildings on campus were in operation, supporting 47 residents and jobs for 215 employees. **Among the early goals of this Master Plan was to re-invent this site, learning from its diverse history to create a vision for an impactful future.**



Historic photos of buildings still found on the CVTC campus; from left-to-right: The Drewry Gilliam (built 1910); the Mastin-Minor Building (built 1913); the Strode-Massie Building (built 1913); the Bowles-Davis Building (built 1929)

**Historic photos and information on the campus provided by the Museum Committee*

EXISTING CONDITIONS

With over 90% of the campus buildings vacant and not in-use, most of the structures had reached a state of disrepair by the time of the Redevelopment Plan project. Many of the buildings evoke a prominent character in their exterior facades. The uses of the individual structures are conveyed in their forms. The residences/dormitories, classroom and administrative buildings, laboratories and research facilities, as well as the more utilitarian structures, like the greenhouses, laundry facility, and farm complex, are easily identifiable and unique despite the common set of building materials.

Between most of the structures, large expanses of lawn are dotted with huge, stately trees that have grown to great heights through the decades. As the topography falls away from the campus, the landscape reverts back to the natural context of forested hillsides. Unfortunately, many areas of the ravines surrounding the Site have been infested with invasive Kudzu vines.

As new buildings, landscapes, and parking areas were constructed on the CVTC campus over a large number of phases through the years, the overall development of the campus never truly followed a defined pattern. Building sites were selected because of their convenience rather than their cohesion within the overall campus layout. Thus, like the vast majority of the structures themselves, much of the campus's network of roads and utilities as well as block structure proved not feasible for adaptation into the Redevelopment Plan.



Photos of existing CVTC campus buildings (top 4), the mobile home park (lower left), and a vegetated ravine (lower right) typical of the surrounding landscape

SITE ANALYSIS MAPS

SITE VICINITY

The Training Center Site’s proximity to downtown Lynchburg offers a number of unique opportunities that other, more recent development projects on the periphery of the city did not have. Downtown Lynchburg is an area in transformation. A great number of historic buildings are being renovated across the district, providing commercial, office, and residential space in the civic and cultural heart of the community. New construction infill projects are building on this momentum to bring people to downtown.

Downtown has access to the James River, though the crossing of railroad tracks is required. The James River Heritage Trail runs from downtown to Percival’s Island and then across the James River to the waterfront of the Training Center Site. From the heart of the CVTC campus, downtown Lynchburg could be within a 20-minute walk for most people. Thus, redevelopment on the Site could easily build upon what’s happening in downtown Lynchburg given the potential neighborhood’s ease of access across the river via future mobility enhancements.

The same proximity holds between the Site and the adjacent residential areas of Madison Heights across Highways 210 and 29. Within the campus itself, almost all of the developable land lies within a 1/2-mile or 10-minute walkshed, allowing any proposed redeveloped neighborhood to be extremely pedestrian-friendly.





BUILT FORM

As previously mentioned, the various building sites across the CVTC are haphazardly scattered across campus. The footprints of these buildings are mostly large and simple in shape. Most are clustered into complexes that represents the phased growth of the campus through the years. The individual complexes of structures are generally laid out around a common open lawn area, or quad, or shared surface parking lot.

The units in the VC Mobile Home Park line gravel roads that follow the ridgelines within that area of the Site. The small-footprint buildings lie in close proximity to each other and the road, as the individual lots fall steeply away toward the surrounding hillsides.

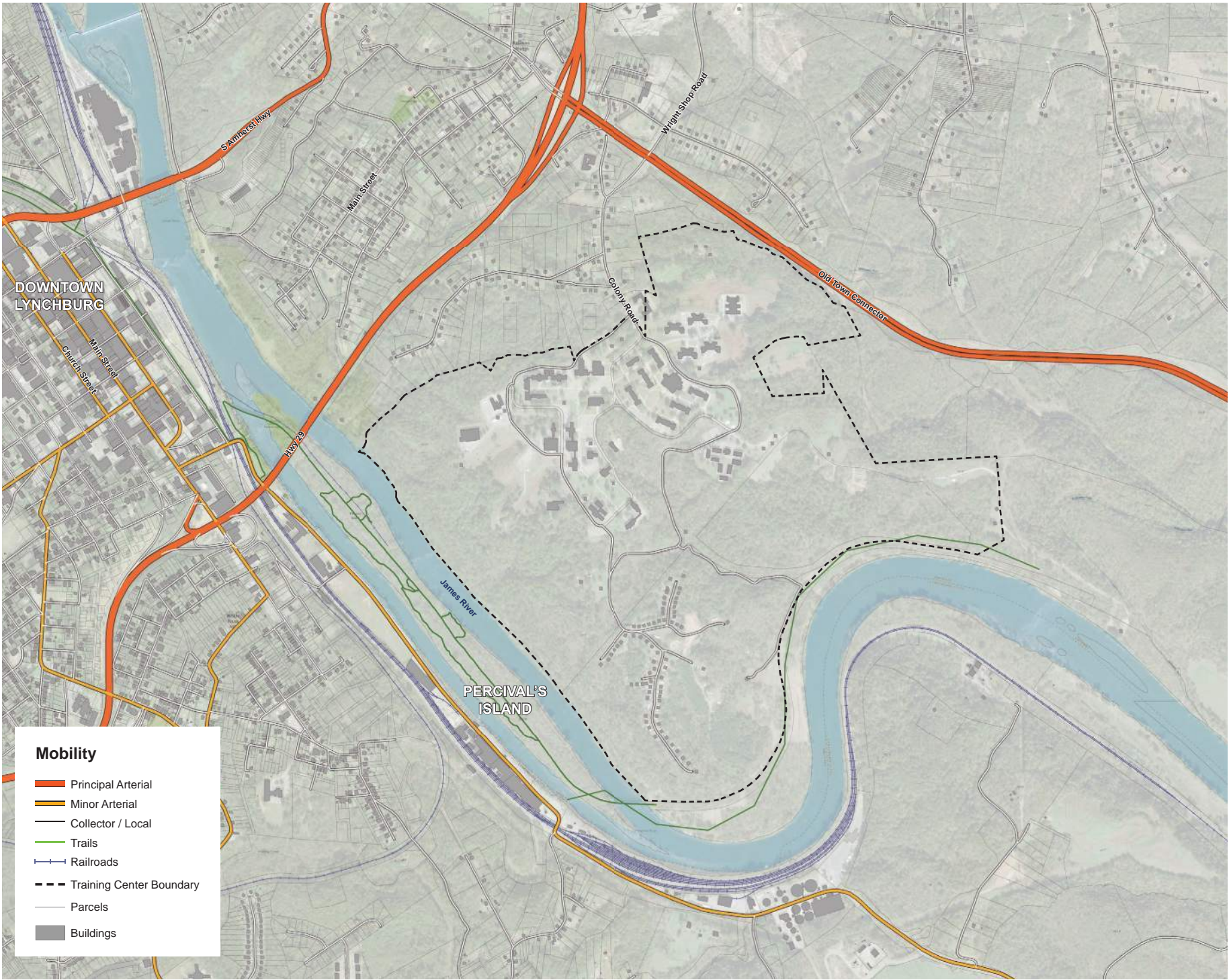


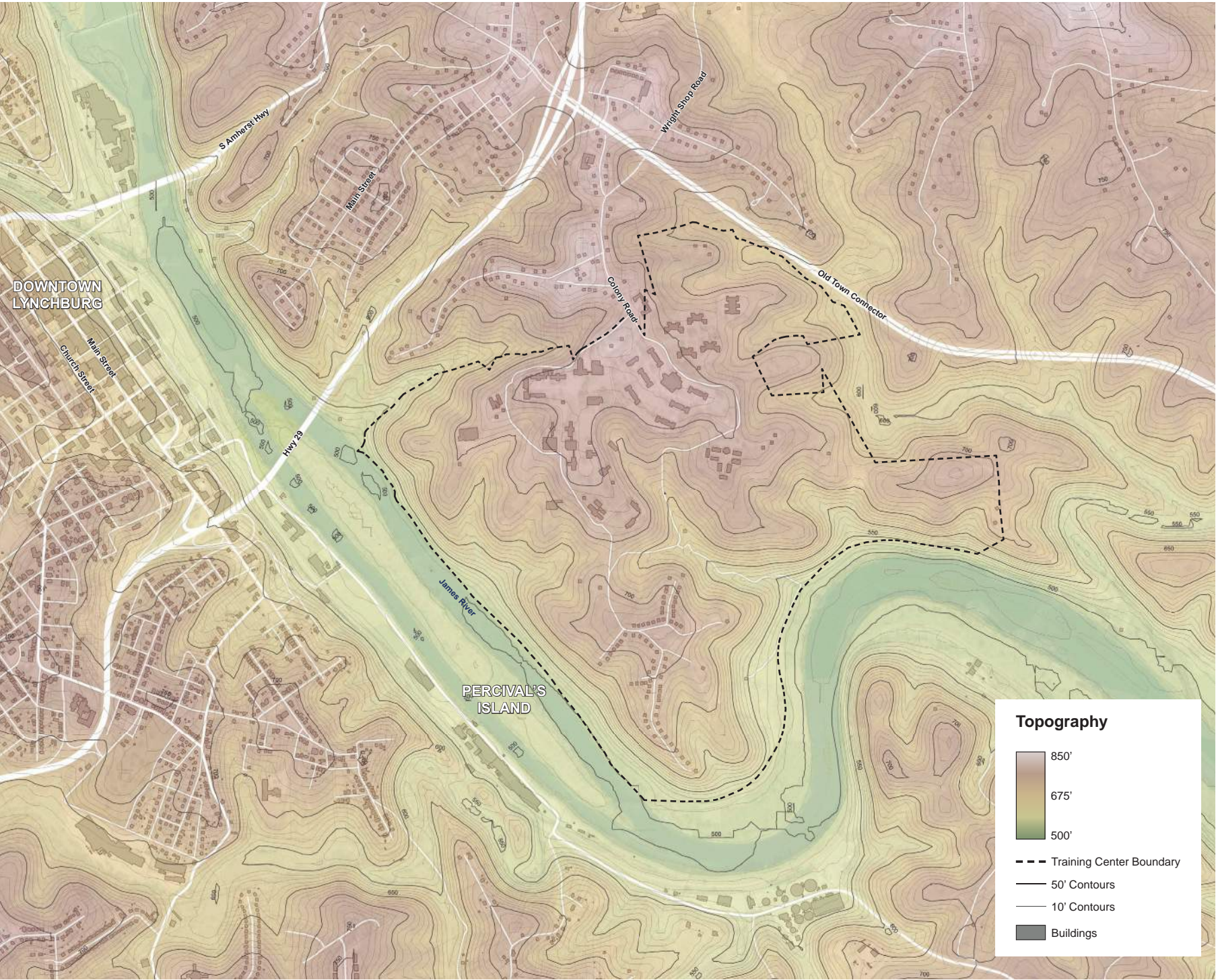
MOBILITY

The Training Center Site can only be accessed via Colony Road from the north. Highway 210 runs in close proximity to the Site’s north boundary, but steep topography and limited access guidelines from the Virginia Department of Transportation (VDOT) have made a potential connection challenging. Highway 29 spans the James River and connects Madison Heights with downtown Lynchburg just to the west of the Site.

Within the Site itself, Colony Road transitions to a localized service drive loop connecting the various building complexes. The mobile home park can only be accessed by this service drive loop, the eastern half of which navigates a steep wooded valley. Fertilizer Road connects to this steep segment and provides the only vehicular access to the small parking lot and trailhead for the James River Heritage Trail. The Heritage Trail runs along the river to the east and west. To the west, the trail spans the river via wood bridge to Percival’s Island and then further to downtown Lynchburg.

The existing CVTC campus does include sidewalks between most buildings and across the various green spaces and lawn quad areas. However, there is no real network of establish pedestrian routes to incorporate into a new neighborhood.





TOPOGRAPHY

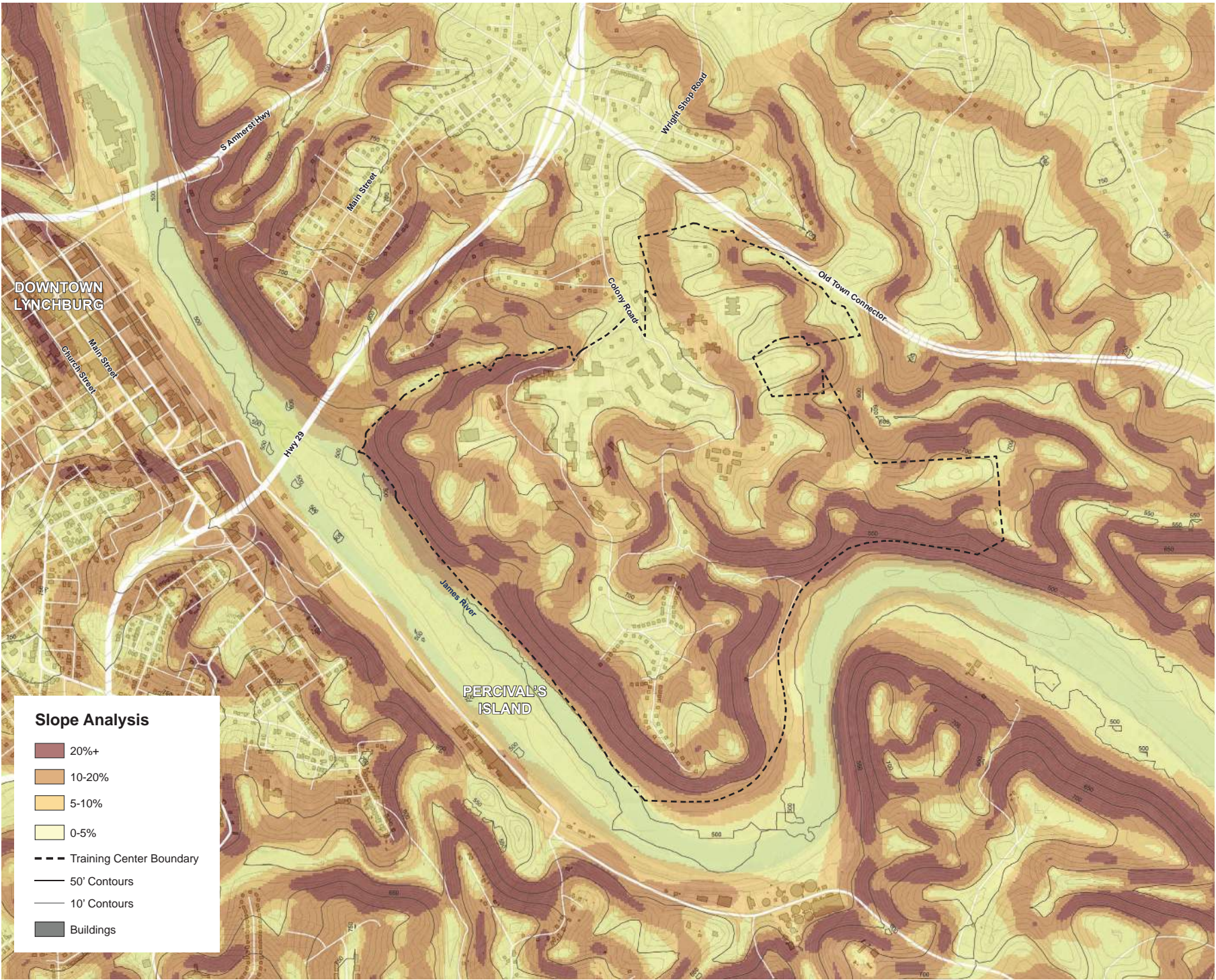
The James River has cut a deep and prominent swath through the natural woodland environment of the area. The various highpoints across the Site sit anywhere between 250’ and 350’ above the river below. This prominent position allows for grand vista views toward downtown Lynchburg across the river to the west, surrounding hills to the east and south, as well as the Blue Ridge Mountains to the far west.

The Site is punctuated by a number of wooded draws or ravines, creating a series of ridgelines that stem out toward the river valley. The location and orientation of these ridgelines and ravines directly impact any future redevelopment pattern, especially for a walkable neighborhood that emphasizes connectivity across its multiple districts.

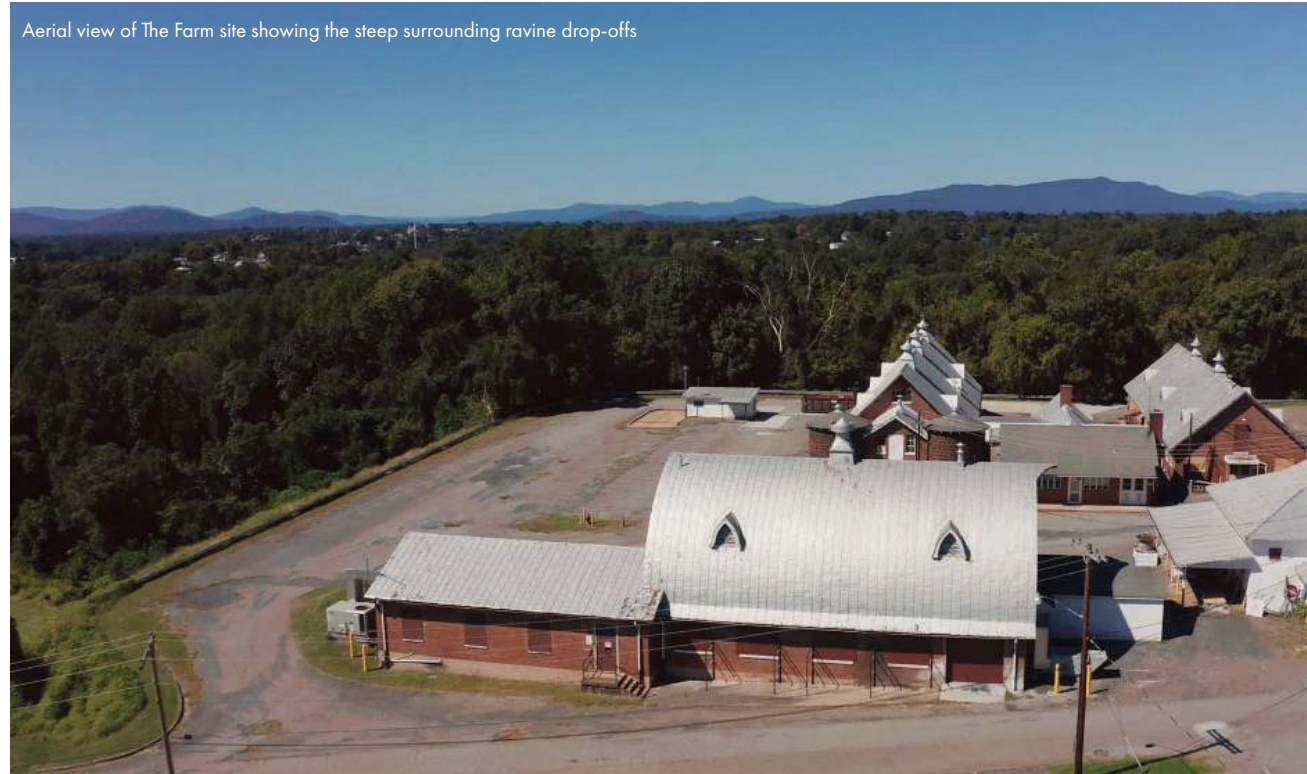
SLOPE ANALYSIS

Given the Site offers quite the challenging terrain, it was important to the Redevelopment Plan’s viability to employ a realistic threshold on developable slopes across the property. Typical practice within the construction industry designates any slope less than or equal to 10% in grade as being able to handle development with a reasonable amount of earthwork assumed. Any areas above this threshold quickly become cost-prohibitive to develop as well as pose a potential liability from future impacts/ events.

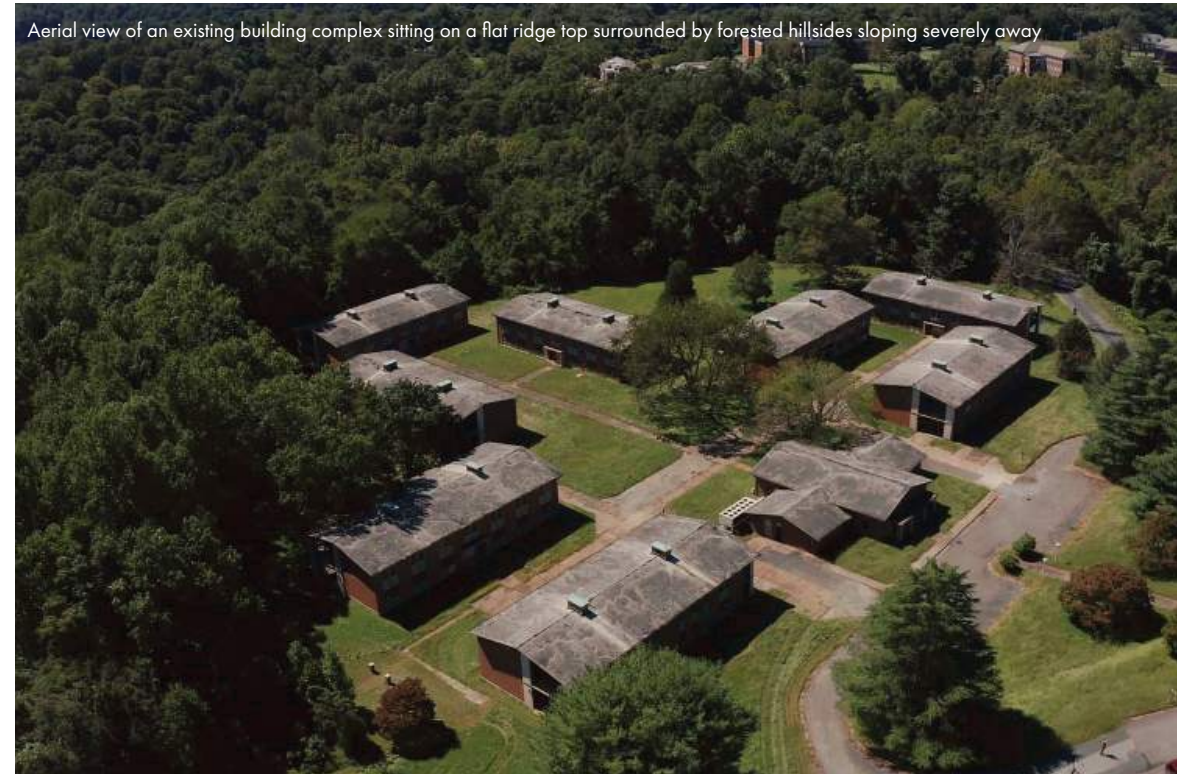
As the image to right shows, when this threshold is applied across the Training Center Site, huge swaths of the site, primarily the steep hillsides and ravines, are undevelopable. Several large, relatively flat areas across the CVTC campus where many of the existing buildings stand, offer the prime sites for broader redevelopment. Between these flatter areas are steps, or terraces, most notable running north from Colony Road toward Highway 210, that could potentially be re-graded to accommodate enhanced connectivity across the Site.



Aerial view of The Farm site showing the steep surrounding ravine drop-offs



Aerial view of an existing building complex sitting on a flat ridge top surrounded by forested hillsides sloping severely away



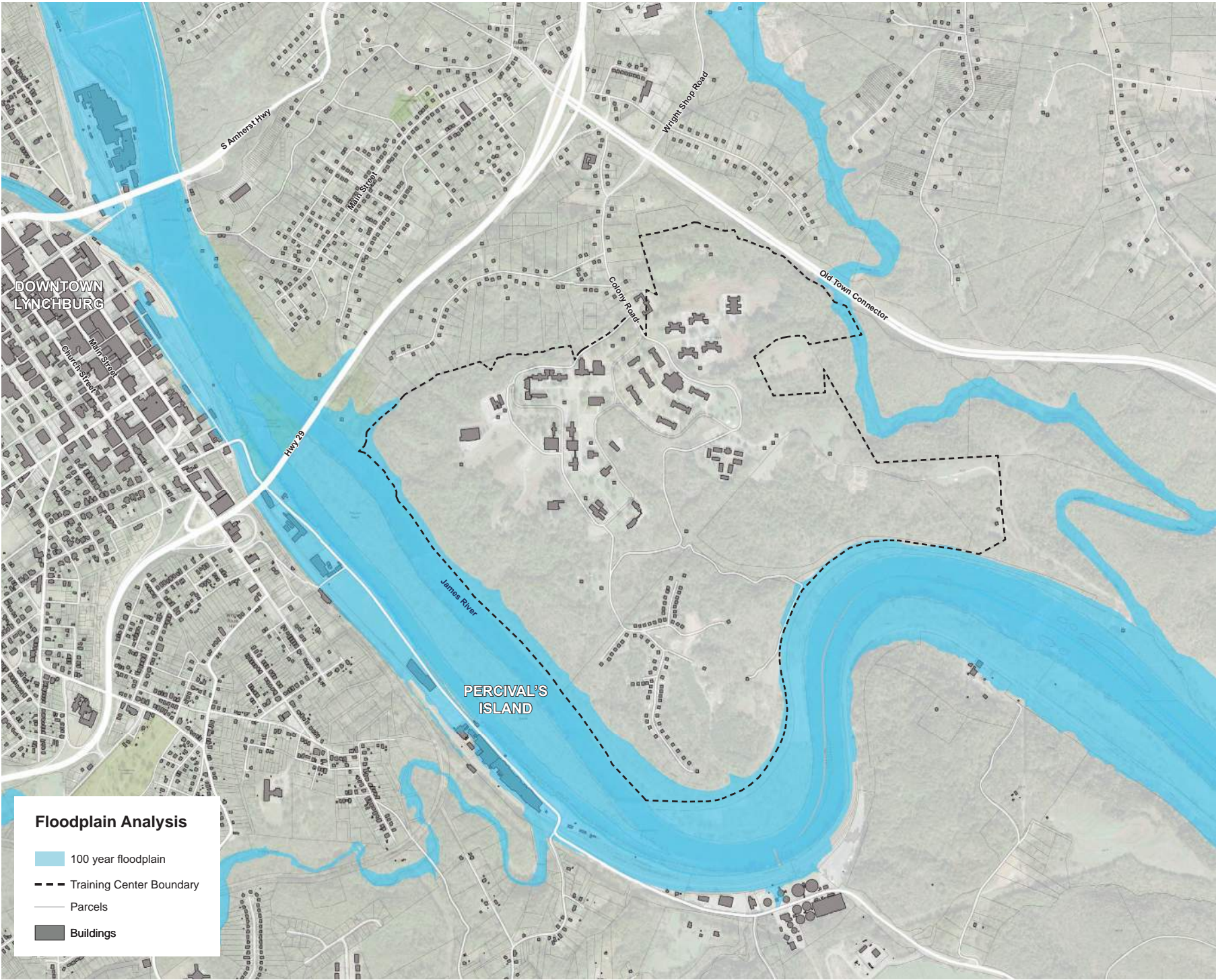
Aerial view looking west over the forested hillsides and the Site's ridgeline bluffs, with their various building sites, and downtown Lynchburg seen off to the west across the James River



FLOODPLAIN

With the Training Center Site’s primary developable areas lying on the ridgeline far above the James River, there are minimal floodplain impacts toward redevelopment. Along the riverfront, though, any proposed trail facilities, like shelters, bridge spans, or signage features, should reside above the 100-year floodline, emphasizing site resiliency. In addition, these facilities, along with the trail paving material, should be constructed of durable materials that could withstand the occasional flood event.

Williams Run, a small wooded draw, runs down a hillside, and then parallels Highway 210 along the Site’s north boundary for a short distance before crossing under the highway via a culvert. This small waterway and its associated floodplain, while not directly impacting developable area within the Site, does limit the span of Highway 210 frontage available for a possible connection.





UTILITIES

The CVTC campus was well-supplied with the standard set of utilities, including water, sanitary sewer, and electrical. Much like the overall layout of roads and buildings, the alignments of these existing utilities do not lend themselves for simple preservation in a redeveloped neighborhood. Their provision to the Site does, however, limit the amount of upfront costs other greenfield development projects must incur.

Utility improvements in and extensions to the VC Mobile Home Park area will need to be undertaken to allow for full future growth.

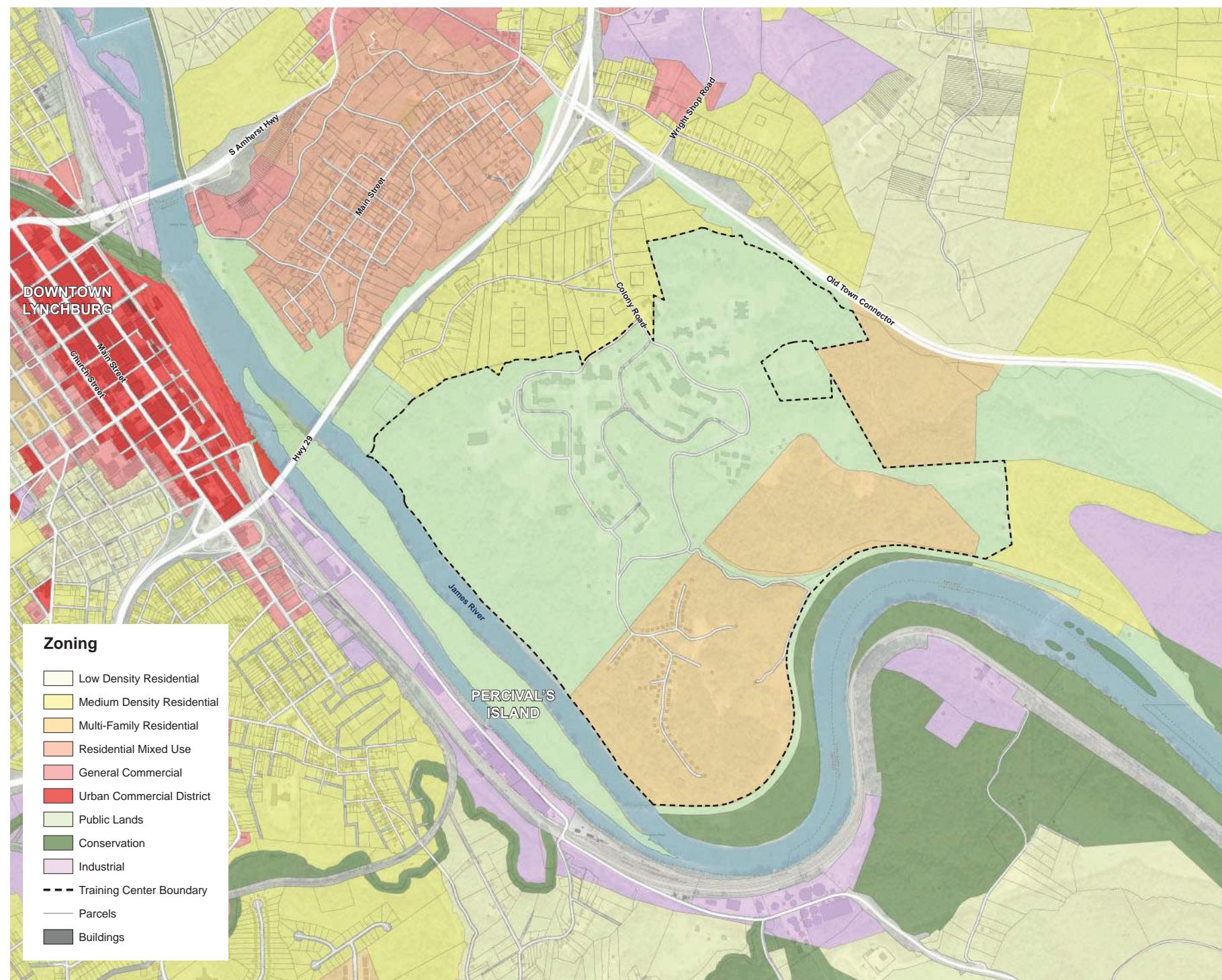
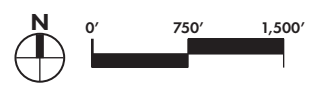


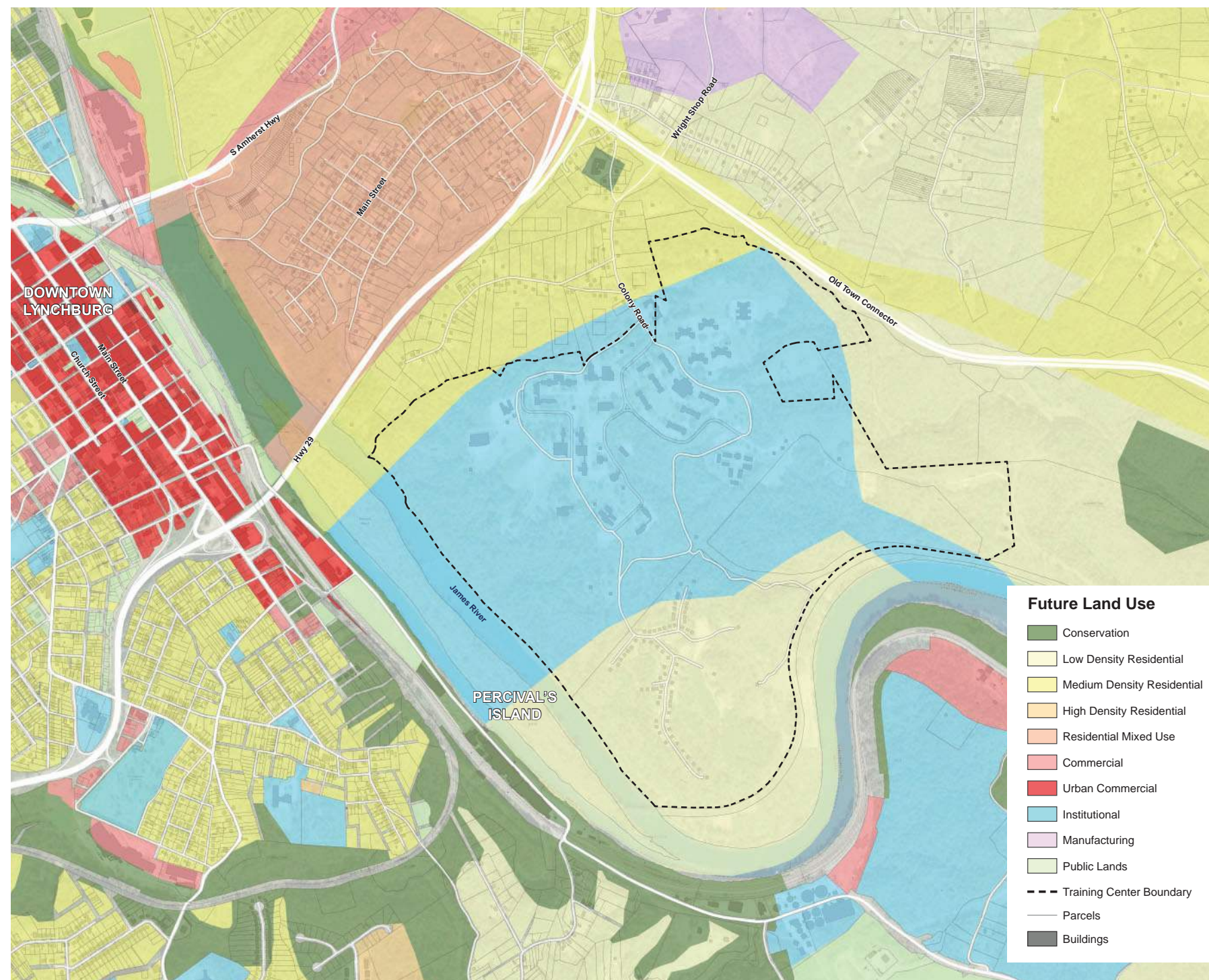
ZONING

Though on-site operations have ceased, the CVTC campus property is still owned by the Commonwealth of Virginia. Thus, the vast majority of the Site is zoned as Public Lands. To the Site’s immediate west, an area of Medium Density Residential follows Sunset Drive Colony Road toward the river. The VC Mobile Home Park property is zoned for Multi-Family Residential use, as are two parcels to its northeast across Fertilizer Road.

A swath of riverfront on the Site’s southeast boundary is designated as Conservation. Continuing east there is a Medium Density Residential parcel followed by an Industrial property representing the Amherst County Adult Detention Center.

To coincide with adoption of the proposed neighborhood’s Redevelopment Plan, the entire Site will need to be re-zoned in accordance to its development pattern and ownership.





FUTURE LAND USE

Similar to the Zoning designations, the proposed neighborhood's Redevelopment Plan would need to be incorporated into the jurisdiction's Future Land Use map. As highlighted to the left, the Institutional use originally associated with the CVTC campus will be replaced with a designation in-line with the mixed-use Master Plan.

The Future Land Use shows the mobile home property re-designated for less-dense residential use, which would be more fitting given it's location and means of access. Also to note, the large areas of Residential Mixed-use and Urban Commercial in close proximity to the Site, a factor that shows the potential to incorporate like-uses within the redeveloped neighborhood itself.



DEVELOPMENT POTENTIAL

By layering the preceding set of Analysis Maps over each other, a comprehensive snapshot of the various opportunities and challenges associated with the Training Center Site was created. This overall graphic, shown on the opposite page, captures the Development Potential of the property.

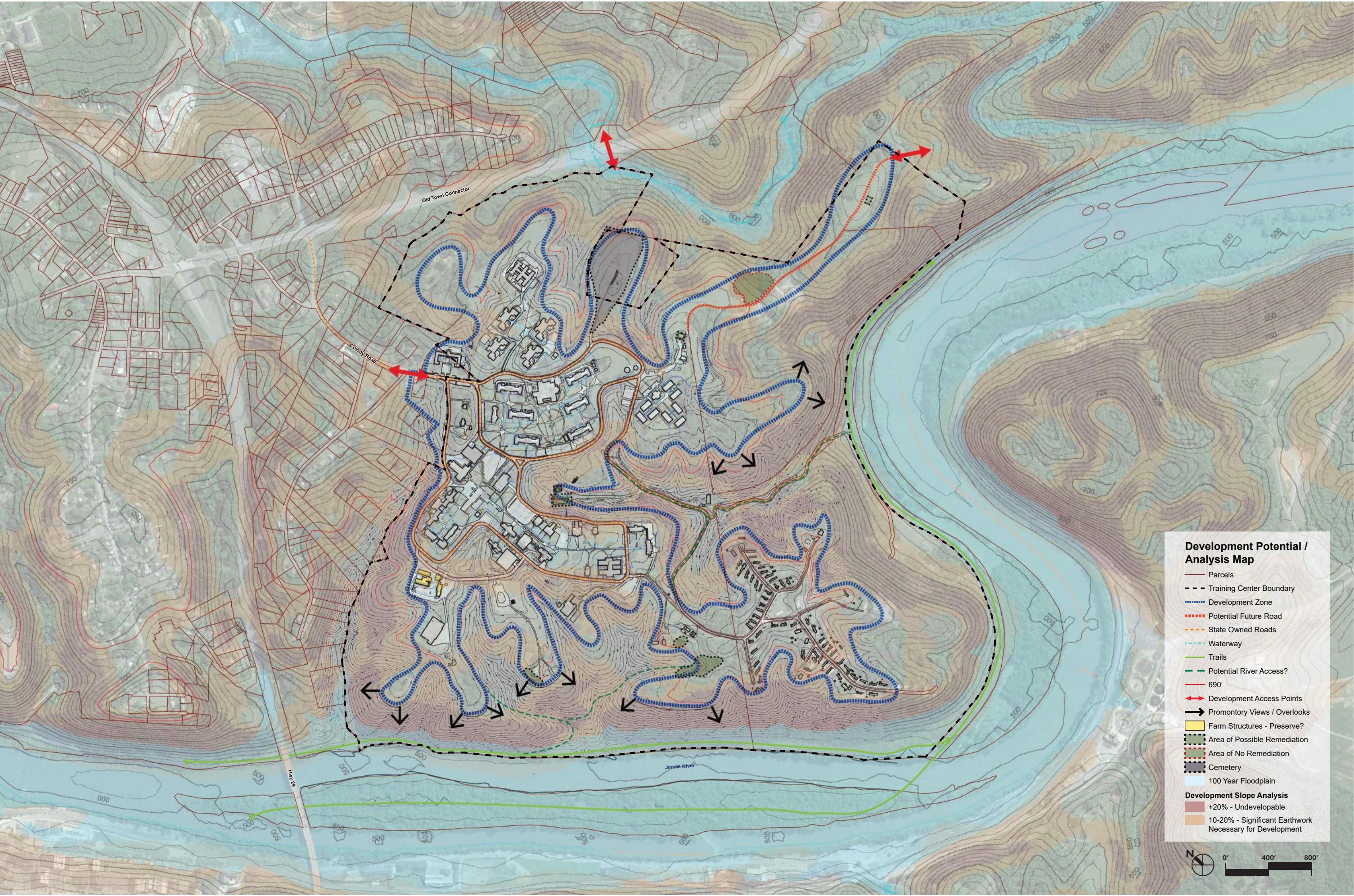
First to note, in response to the severe slopes that cover large areas of the Site and their constraints on construction, the actual developable area for the project is approximately 110 acres, much reduced from the 350-acre overall property size. The steep slopes of the ravines also provide opportunities for promontory views and overlooks from the ends of the various ridgelines that run through the Site.

To enhance connectivity to surrounding areas as well as to create the conditions for maximum mixed-use potential, the number of access ways into the Site must be increased. Most significantly, for any sort of commercial or office or dense residential use to succeed, **a direct connection to Highway 210 to supersede Colony Road is necessary**. In addition, the planned extension of Colony Road to the east from the Site to connect with future developments further down river would also prove beneficial.

The complex of buildings known as The Farm, on the far west ridgeline of the property, are identified as structures that could be preserved and renovated into a destination facility for the neighborhood. The existing cemeteries should be preserved and memorialized appropriately. Lastly, the areas to receive environmental remediation are delineated for reference.



Aerial view looking east over the existing campus buildings and green spaces



TREE SURVEY

As part of the physical site Inventory & Analysis phase, the Virginia Department of Forestry (Forestry) was engaged to conduct a survey of large specimen trees around the CVTC campus property. As part of the survey, the trees were identified with their species, caliper size, health condition, and maintenance recommendations. Forestry representative then compiled the data into table format and produced a geo-referenced map file.

The primary goal with this activity was to provide designers a reference tool that would allow them to identify then explore the viability for preservation into the Redevelopment Plan of as many of the great old trees that exist on-site today. If preserved, these stately trees could serve as historic icons or wayfinding elements within the neighborhood.



Large, healthy specimen deciduous tree ideal for preservation



Existing campus green space with large specimen trees scattered throughout

TREE ID	Species	DBH	Condition	Maintenance Recommendations	Field_Notes
948	Willow Oak	48	Good	Prune	rid of deadwood
949	American Sycamore	41	Good	Prune	
950	Elm (other)	54	Good	IPM	white on bark
951	Eastern Red Cedar	26	Good		healthy old cedar
952	Willow Oak	48	Good	Prune	prune deadwood
953	Southern Red Oak	60	Fair	Prune	prune for shape
954	Southern Red Oak	41	Fair	Prune	broken stem could be pruned
955	Flowering Dogwood	15	Good	Prune	
956	Maple (other)	14	Fair	Prune	
957	Willow Oak	60	Good	Prune	
960	Maple (other)	16	Good	Prune	prune dead from top
961	Maple (other)	18	Good	Prune	solid healthy tree
963	Red Maple	26	Good	Prune	expansive canopy
964	Oak (other)	60	Excellent	Prune	water oak more than 100 yrs
965	Willow Oak	70	Excellent	Prune	
966	Silver Maple	50	Good	Prune	
967		14	Good	IPM	hemlock
968		14	Good	IPM	hemlock
969	Silver Maple	24	Good	Prune	
970	American Holly	12	Good	IPM	line of hollies bordering admin
971	Willow Oak	60	Good	Prune	
972	Willow Oak	60	Good	Prune	
973	American Holly	8	Fair	IPM	10 hollies total in line
975	White Pine	30	Good		
976	Red Maple	24	Good	Prune	cleaning
977	Eastern Red Cedar	23	Good	IPM	
978	White Pine	42	Good	Prune	
979	Eastern Red Cedar	24	Good	Prune	
980	Eastern Red Cedar	20	Good	Prune	
981	Eastern Red Cedar	20	Good	Prune	
982	Sweetgum	48	Good	Prune	one of the lgst I've seen
983	American Holly	25	Good	Prune	
984	American Holly	25	Good	Prune	
985	Red Oak	32	Good	Prune	
986	Flowering Dogwood	7	Good		
988		16	Fair	IPM	Hemlock
989	Red Maple	36	Good	Prune	
990	Willow Oak	50	Good	Prune	
991		30	Fair	IPM	hemlock
992		30	Fair	IPM	hemlock
993		26	Fair	IPM	possible removal
994	Silver Maple	34	Good	Prune	
995	Willow Oak	50	Good	Prune	
996	Willow Oak	58	Fair	Prune	cleaning & correct tional
998	Red Oak	52	Fair	Prune	
999	Sweetgum	32	Fair	Prune	possible removal nxt to building
1000	Red Maple	18	Good	Prune	
1003	Oak (other)	5	Good	Prune	remove shrub
1006	Oak (other)	36	Fair	Prune	poss remove nxt to builing
1007	Red Oak	48	Good	Prune	poss removal nxt to building
1008	Eastern Red Cedar	18	Fair	Prune	
1011	Crepe Myrtle	12	Fair	Prune	
1012	Crepe Myrtle	12	Fair	Prune	
1013	Red Maple	18	Good	Prune	
1014	Elm (other)	28	Good	Prune	
1015	Oak (other)	25	Poor	IPM	
1016	Red Maple	13	Fair	Prune	
1017		12	Fair	IPM	hemlock
1018	White Pine	21	Good		
1020	Willow Oak	50	Good	Prune	
1021	Eastern Red Cedar	12	Fair		
1022	Willow Oak	48	Good		
1023	American Holly	12	Good		
1024	American Holly	12	Good		
1025	White Pine	30	Good		
1026	Eastern Red Cedar	12	Good		
1027	JUNI	8	Good		
1028	Eastern Red Cedar	14	Good		
1029	White Pine	15	Good		hillside of various healthy pines
1030	MAGR	38	Good		
1031	American Beech	32	Good	Prune	
1033	Eastern Red Cedar	12	Good		
1034	Eastern Red Cedar	12	Good		
1035	Eastern Red Cedar	12	Good		
1036	Flowering Dogwood	18	Fair	Prune	
1038	Eastern Red Cedar	10	Fair	Prune	
1039	Flowering Dogwood	8	Good		
1040		60	Good		deodor cedar
1041		38	Good		cedar
1042	Red Oak	50	Fair	Prune	
1043	Red Maple	20	Good	Prune	various mature maples
1044	Red Oak	50	Good	Prune	various mature oaks 8+
1045	Maple (other)	14	Fair	Prune	numerous mature maples 8+
1046	White Pine	10	Good		all trees in area healthy
1047		8	Good	IPM	hemlock
1048		8	Good	IPM	hemlock
1050	Maple (other)	20	Good	Prune	
1051	Willow Oak	40	Good	Prune	
1052	Willow Oak	40	Good	Prune	
1053	Sweetgum	15	Fair	Prune	
1054	Red Oak	18	Good	Prune	

Specimen Tree Survey - Results Table





3 | MARKET ASSESSMENT

OVERVIEW & METHODOLOGY

CONTEXT / DEMOGRAPHICS

RESIDENTIAL MARKET

RETAIL MARKET

OFFICE MARKET

INDUSTRIAL MARKET





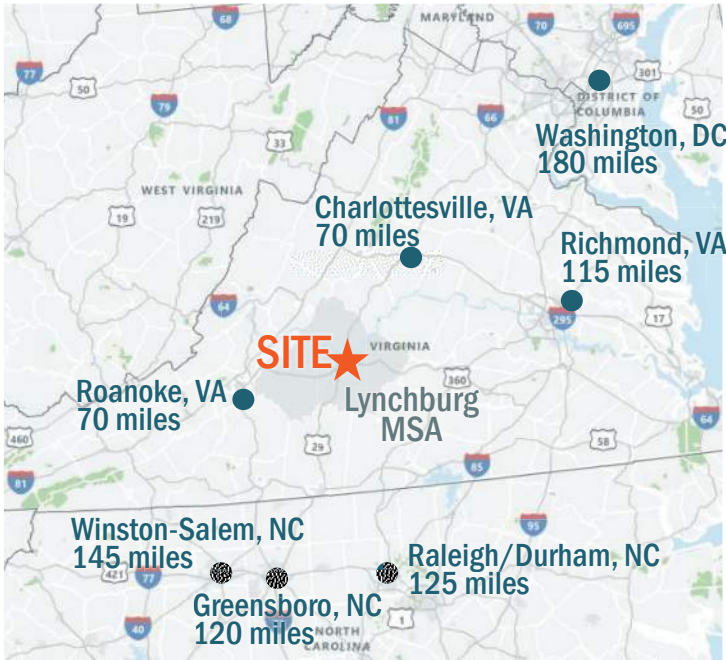
OVERVIEW & METHODOLOGY

The Training Center Redevelopment Plan presents a once-in-a-generation opportunity to envision and plan the redevelopment of the Site, consisting of the existing campus and mobile home property. The Consultant Team was engaged by LRBA to conduct a market analysis to inform redevelopment planning. The Team assessed the long-term market potential for residential, retail, office and industrial uses.

This preliminary market assessment of the Training Center Site’s development potential helps define a vision for the Site. This assessment is based on existing market conditions, ongoing development trends and local knowledge. The Team assessed competitive real estate markets in the State and surrounding states, evaluated the local market context, analyzed the Site, and interviewed key informants to arrive at these preliminary market findings.



CONTEXT / DEMOGRAPHICS



REGIONAL & LOCAL CONTEXT

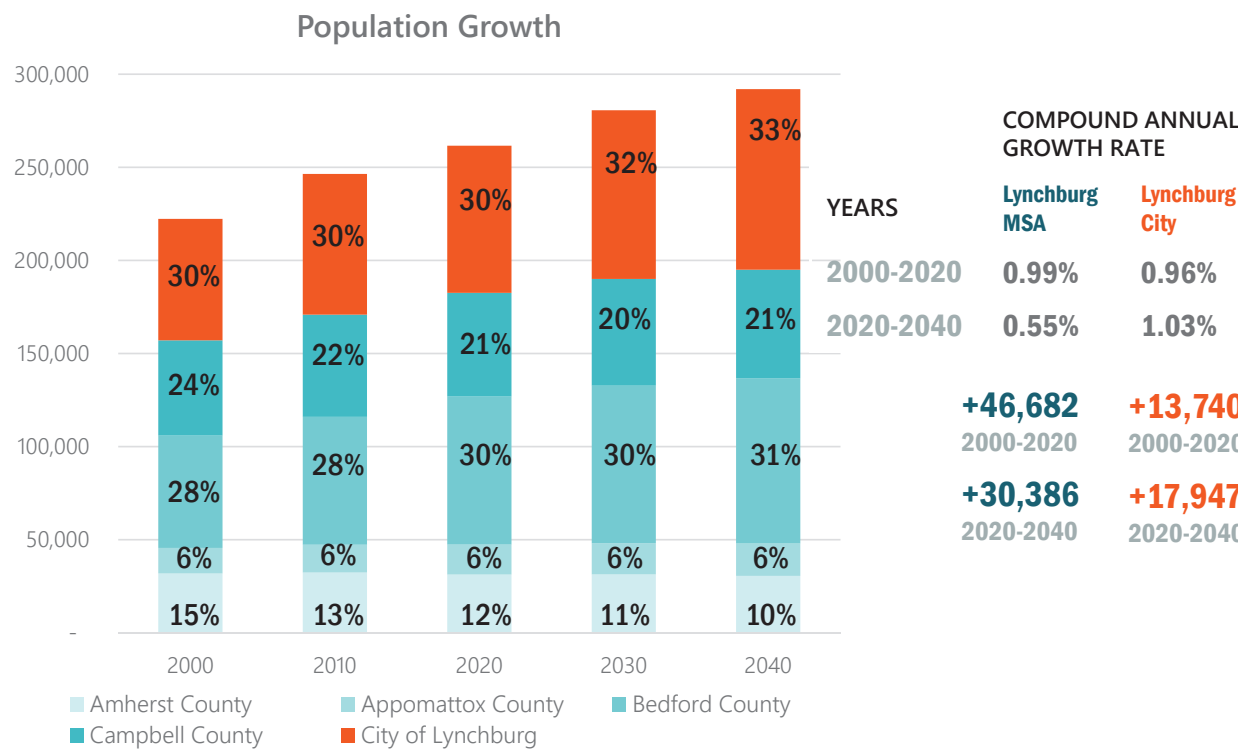
Overlooking the James River and adjacent to downtown Lynchburg, the Site presents a unique opportunity for redevelopment in the Lynchburg Metro area. The Site is in Madison Heights in Amherst County and includes approximately 350 acres of land. However, accounting for topography, existing tree cover and other considerations, the Team estimates that approximately 110 acres could be developable.

The majority of the Site was a state mental hospital. While overcoming the history of the CVTC campus itself presents a challenge, developers typically prefer “shovel-ready” sites that are clear of existing structures and utilities. At its peak operation, there were 98 buildings. The presence of existing CVTC structures creates a challenge for redevelopment. Building demolition, environmental remediation, and removal of old site infrastructure would all need to be addressed prior to private redevelopment.

Different land uses have varying location requirements in terms of visibility and access. The Site’s location atop a hill adjacent to the James River offers extraordinary views and natural beauty. However, visibility from the local road network is limited. Additionally, the Site is approximately half a mile from the entrance/exit at Highway 210 to US Route 29 Lynchburg Expressway. Currently, Colony Road is the only entrance into the Site. Additional access points may be required to support future redevelopment. However, the topography may create challenges to enhancing accessibility to the Site.

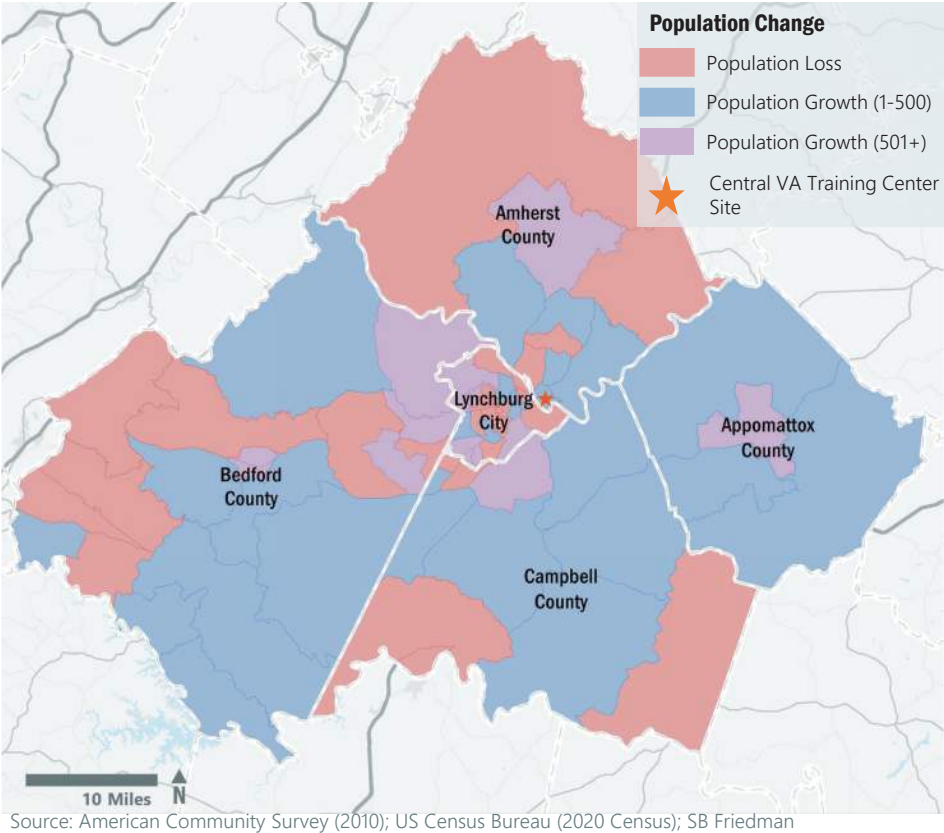
POPULATION TRENDS

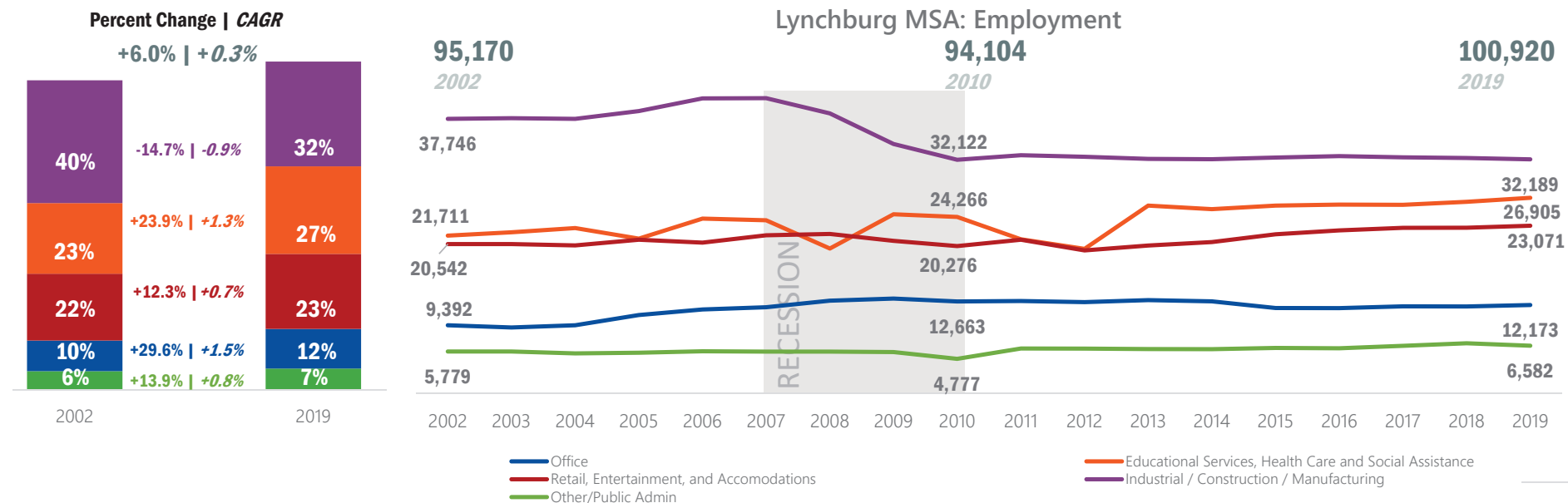
The redevelopment of the Site is a regional multi-generational project with the potential to attract people and businesses from the all over the Lynchburg Metropolitan Statistical Area ("MSA") consisting of Amherst County, Appomattox County, Campbell County, Bedford County, and the City of Lynchburg. Over the last 20 years, from 2000 to 2020, the Lynchburg MSA has seen population growth of nearly 50,000 people. Much of the growth in the region has occurred in the City of Lynchburg, Bedford County, and in census tracts near the City of Lynchburg. Looking forward, the Central Virginia Planning District Commission, the metropolitan planning organization ("MPO") forecasts that the region will continue to grow, albeit at a slower rate than the last two decades. Over the next 20 years, the MSA is projected to add approximately 30,000 residents. As evident from historic trends, it is anticipated that Bedford County and the City of Lynchburg will likely have the most population growth but given the Site's proximity to downtown Lynchburg, there is potential to capture some of the forecasted growth to support new residential and retail development on the Site.



Source: American Community Survey (2000 and 2010), Demographics Research Group of the Weldon Cooper Center for Public Service

Population Change (2010-2020) by Tract





EMPLOYMENT TRENDS

Overall employment in the MSA has recovered since the Great Recession. The number of educational and medical jobs has increased in the MSA, while the number of industrial jobs has decreased. New employment growth is the primary generator of new office and industrial development. Looking to the future, data provided by the MPO projects that regional employment is anticipated to remain relatively stable with about ±105,300 employees through 2030. Therefore, the limited regional employment growth points to the need to attract companies from outside the MSA. Target industries could include educational and medical sectors based on recent historic growth patterns.

DEMOGRAPHIC TAKEAWAYS

- The Lynchburg MSA is a small portion of the Commonwealth population and is projected to grow at a marginally slower pace than the Commonwealth over the next 20 years.
- Amherst County is projected to shrink slightly, while the City of Lynchburg and the larger MSA is projected to grow slightly over the next 20 years.
- Historically from 2010 to 2020, tracts surrounding the Site generally experienced population growth.
- The tracts surrounding the Site, including in Madison Heights and the City of Lynchburg, have relatively lower incomes compared to the more rural areas of the MSA. Wealthier areas of the MSA include parts of Bedford County and the City of Lynchburg where new residential growth has occurred.

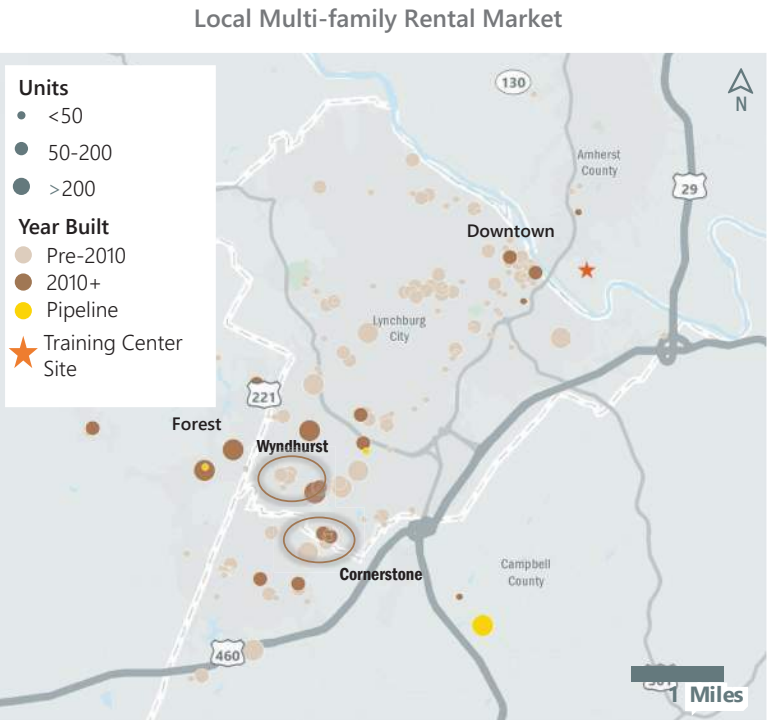


Enhanced streetscape and renovated building developments along downtown Lynchburg's waterfront

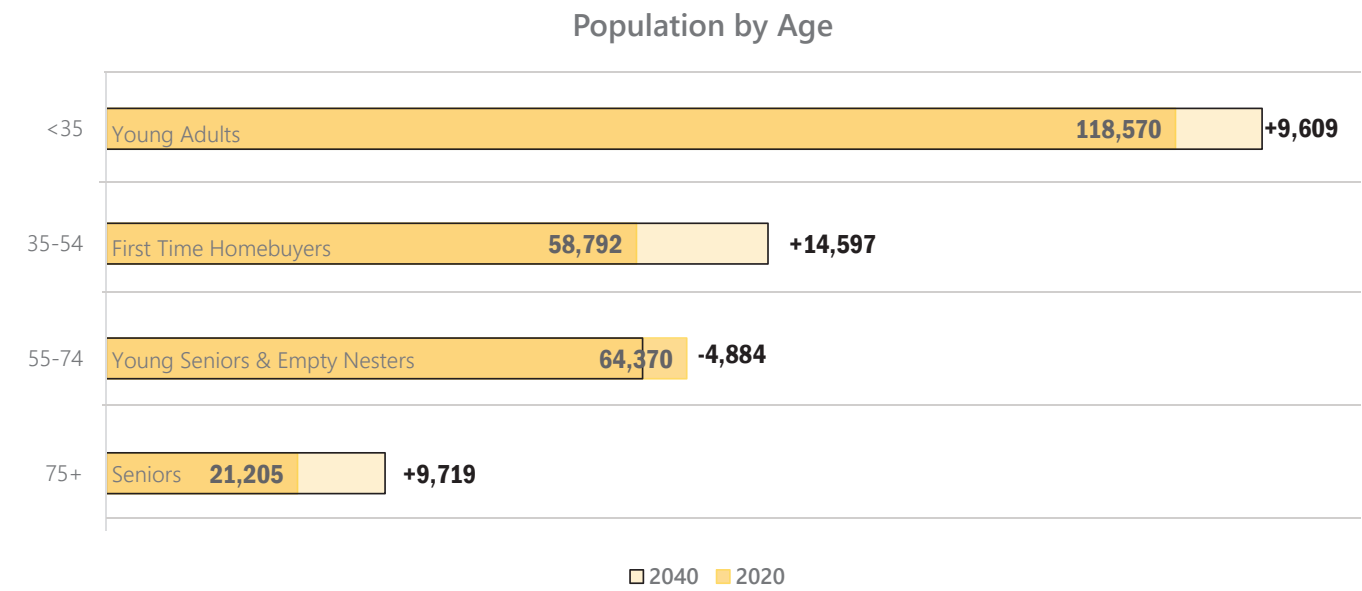
RESIDENTIAL MARKET

There are approximately 12,000 existing multifamily rental apartment units in the MSA, as of April 2020. Another 250 units are either under construction or planned. The multifamily market overall appears to have recovered post-recession. Since 2009, the MSA has permitted approximately 163 units, indicating a strong regional apartment market. During this period there has been a decrease in the number of annual building permits for new single-family homes, indicating a preference for new multifamily development. Recent development built since 2010 has primarily located in southwest Lynchburg and neighboring Forest in mixed-use neighborhoods that exhibit traditional neighborhood design characteristics such as enhanced walkability, wider mixes of uses, and community amenities.

Drivers for residential development in the Lynchburg MSA include population growth and householder age and preference. The population in the MSA is projected to grow which will result in demand for new residential development. Over the next 20 years, the MSA is expected to see population increases in all age cohorts except 55-to-74-year olds. Ongoing growth in young adult and senior population cohorts could continue to support additional multifamily development. Growth in the first-time homebuyers population segment (aged 35 to 54) could potentially support single-family residential development.



Source: CoStar (data pulled April 2020), Esri, SB Friedman



New (2010+) Construction Housing Preference [1]

Single Family	Multifamily
46%	54%
93%	7%
92%	8%
59%	41%

[1] PUMs data is not yet available for 2020. Housing preference data from American Community Survey 5-Year Estimates (2014-2018). Source: American Community Survey 5-Year Estimates (2014-2018, 2016-2020); Esri Business Analyst; SB Friedman

RETAIL MARKET

Downtown Retail



DOWNTOWN / EXPERIENTIAL

- Mixed-Use
- Ground-floor retail
- Walkable pedestrian environment

SIZE VARIES

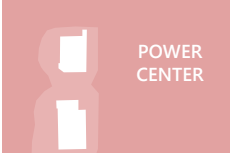
Regional Retail Clusters



REGIONAL OR SUPER-REGIONAL MALL

- Anchored by 2+ full-line department stores

~400,000-1,000,000+ SF



POWER CENTER

- 2+ category-dominant freestanding anchors of ~100,000+ SF
- General merchandise, home improvement

~1M+ SF

Local Retail Clusters



COMMUNITY CENTER

- 1+ category-dominant freestanding anchors of ~100,000+ SF

OR

- 1+ grocer anchors of ~50,000+ SF and additional category dominant retailers

~100,000-250,000 SF



NEIGHBORHOOD CENTER

- 1+ grocer anchors of ~50,000 SF +
- Additional supporting retail

~75,000-150,000 SF

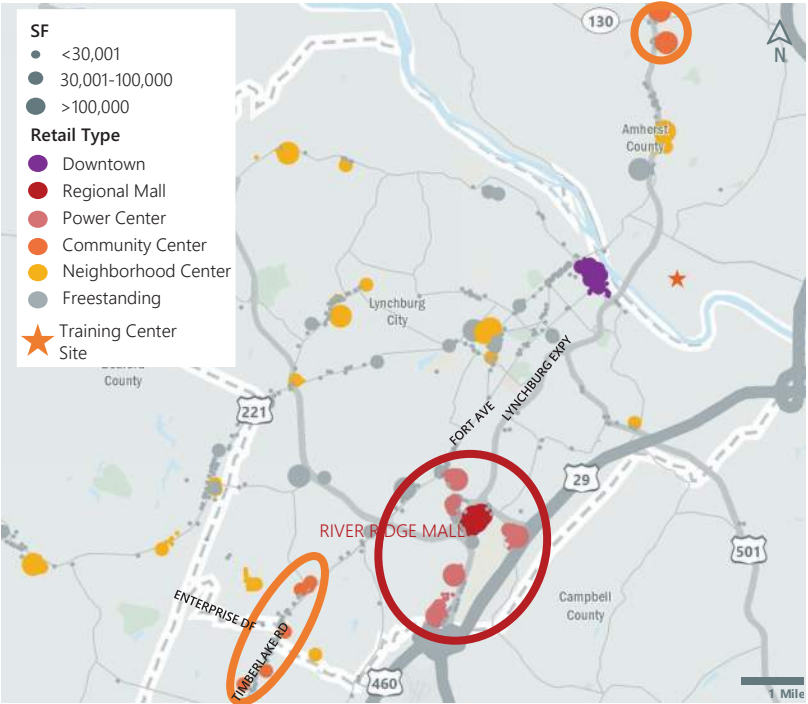


FREESTANDING/STRIP RETAIL

- Small convenience center with goods and services
- Limited trade area

~5,000-150,000 SF

Local Retail Clusters



The City of Lynchburg is the retail hub of the MSA, with 62% of the existing retail building square footage in the MSA. Much of the retail space in the Lynchburg MSA is located within Downtown or local-serving retail clusters. In addition to Downtown, the area around the River Ridge Mall is the primary regional retail cluster. Since 2010, there has been limited retail developments in the City of Lynchburg and Madison Heights. New retail has typically followed new residential development along highly accessible roads with visibility. Key retail developments were primarily grocery anchors in smaller neighborhood centers.

Even before the global COVID-19 pandemic, the retail sector was experiencing dramatic shifts with growth in e-commerce altering consumer behavior and the ways in which people shop. While there have been significant closures in big box, department stores and traditional retailers both nationally and locally, there has also been growth in convenience, value and experiential retail categories driving growth for new retail space. Other factors that impact demand for retail development include population growth and consumer spending. As residential development occurs on the Site, the resulting increase in population and consumer spending potential could translate into supportive retail space, including convenience-oriented retailers and/or experiential retail/dining.

OFFICE MARKET

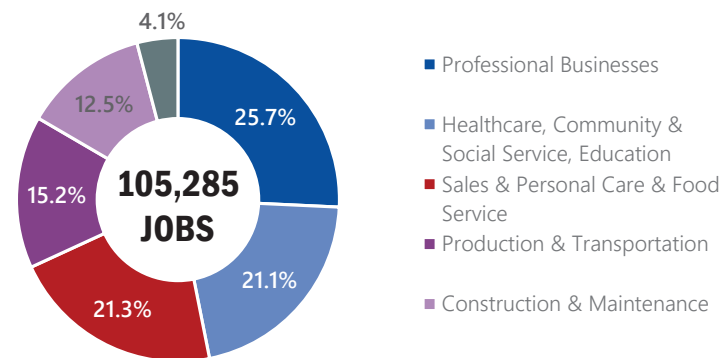
CORPORATE OFFICE DRIVERS



OFFICE PROSPECTS

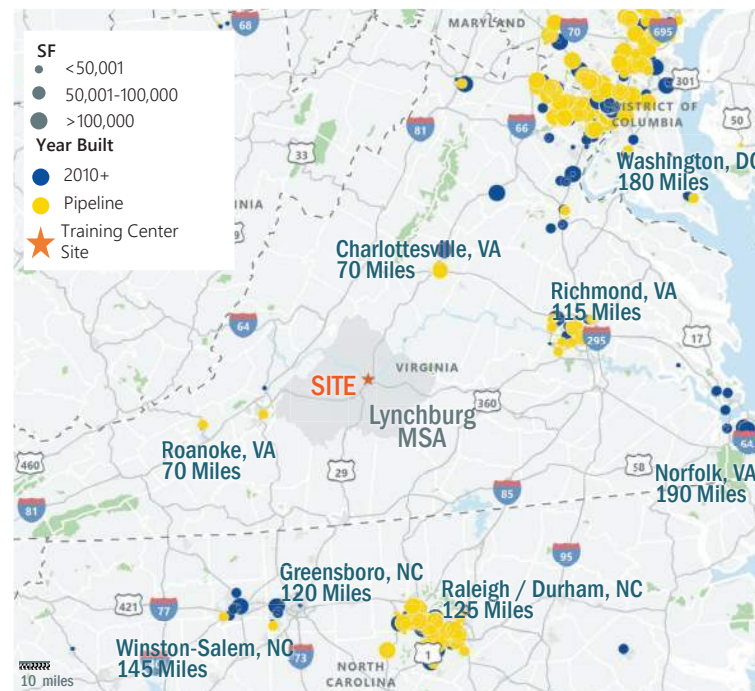


EMPLOYMENT SECTORS – LYNCHBURG MSA 2030



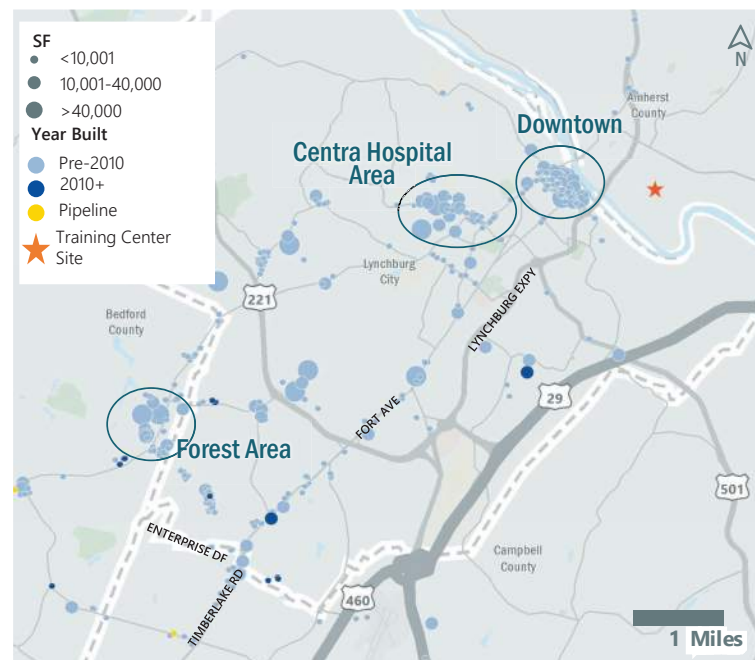
Source: Central Virginia Workforce Development Board; JobsEq; Lynchburg Regional Business Alliance; SB Friedman
SB Friedman Development Advisors

Regional Office Market



Source: CoStar (data pulled April 2020), Esri, SB Friedman

Local Office Market



Source: CoStar (data pulled April 2020), Esri, SB Friedman

New, under construction, and planned Class A office development throughout the State and surrounding states is occurring near larger metropolitan areas, such as Washington, DC, Richmond, and Raleigh-Durham. Nationally, employer location preferences drive evolving trends in office space location with trends shifting from car-oriented, single-use business parks to walkable, vibrant mixed-use places. Other key factors include location of executives, employment growth, access to talented workforce, and a mixed-use environment. Given this preference for larger metro areas, the Lynchburg MSA has attracted limited new, under construction or planned Class A office development. Recent office development in the MSA tends to be smaller and have professional office uses.

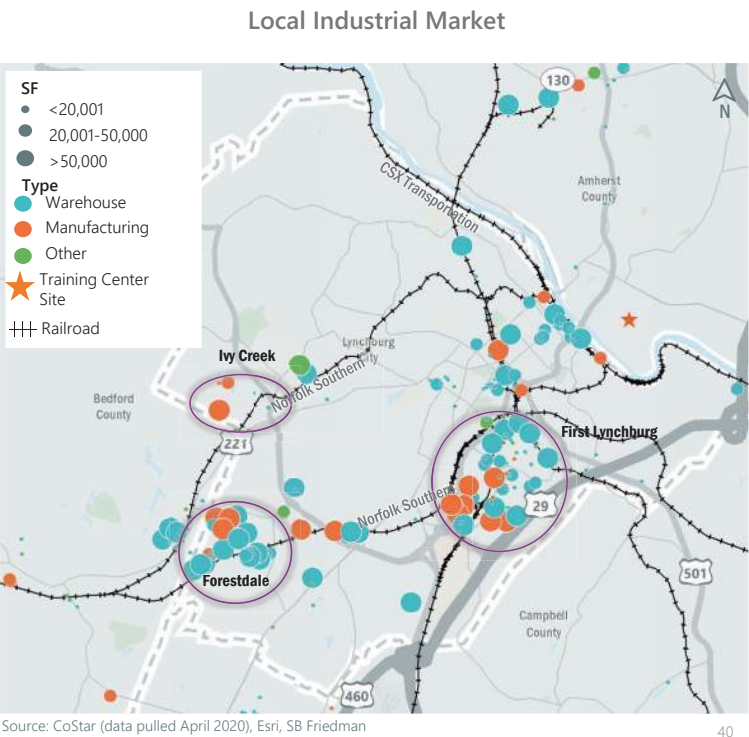
While there has been limited new building construction, several office tenants have considered Lynchburg. These include medical users as well as professional, financial services, and back-office/corporate support users. These prospective office tenants have expressed interest in modern office space ranging from 20,000 to 50,000 sf. The current office building profile in the MSA is older and smaller, indicating a mismatch between the current supply and demand for office space.

In addition to finding a suitable building, professional office tenants typically prefer areas with employment growth, access to a talented workforce, mixed-use environments, and a high quality of life. If professional office space was included as part of a mixed-use environment, the Site may be attractive to professional office users in the future. Additionally, as the MSA grows, Centra Lynchburg General Hospital, the primary healthcare network in the region, may expand facilities to enable the hospital to better serve the growing population. Depending on expansion needs, site configuration, access, and the level of population growth in the future, the Site may be attractive to medical office users in the future.

INDUSTRIAL MARKET

Overall, the transportation, distribution, and logistics (“TDL”) industrial sectors are driving the State’s industrial market. Similar to the Class A office market, new industrial development has been primarily located in proximity to larger metropolitan areas as well as along major transportation corridors and intermodal locations. This growth in TDL industrial development is primarily driven by growth in e-commerce which has drastically altered the movement of goods, warehouse and distribution operations, building specifications, and location requirements. Because the Lynchburg MSA is not served by an interstate highway, there has been very limited new industrial development in the last ten years.

Unlike most of the new TDL development occurring throughout the rest of the State, the industrial market in the MSA is geared more for smaller industrial users. Recent industrial prospects in the MSA include manufacturing and light industrial users as well as medical technology and medical manufacturing companies. These prospective tenants are in search of modern industrial space ranging from 20,000 to 150,000 sf. The current industrial building profile in the MSA is older, indicating a mismatch between the current supply and the desired industrial space. Prospective industrial users also indicated willingness to build new spaces, but typically prefer shovel-ready sites, approximately 5 to 20-acres. The desire for affordable shovel-ready sites may challenge the industrial development potential on the Site. Interviews indicated that industrial users may also prefer locations within publicly owned industrial parks due to the possibility of a write-down on the land value (with performance-based commitments).



TDL INDUSTRIAL DRIVERS



GROWTH IN
E-COMMERCE



GLOBAL TRADE
PATTERNS



TRANSPORTATION
NETWORKS



BUILDING
AVAILABILITY

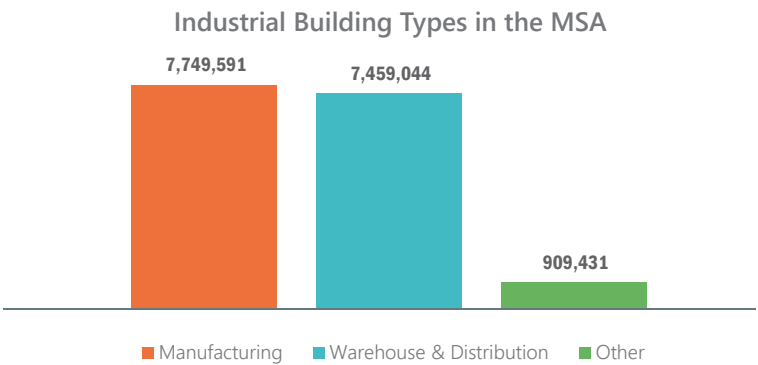
INDUSTRIAL PROSPECTS



MANUFACTURING/
LIGHT INDUSTRIAL



MEDICAL TECHNOLOGY/
MANUFACTURING





4 | VISIONING

OVERVIEW

STAKEHOLDER INTERVIEWS

VISIONING WORKSHOP





OVERVIEW

With the framework created by the Inventory & Analysis of the physical site conditions and the Market Assessment in-place, the next step in the master planning process was the Visioning phase. Given the Training Center Site's history, size, location, and overall development potential within the region, the establishment of a consensus-driven vision for the redevelopment of the Training Center Site was key. This vision was to be shaped by local officials, business leaders, community advocates, as well as the public at-large.

The Visioning process helped form the principles necessary to guide the master planning effort and was used as the basis of design during the Design Charrette. The process was comprised of two main components: Stakeholder Interviews and a Visioning Workshop. Due to the impacts of the COVID-19 pandemic, these activities were performed virtually via online meeting and website platforms. Fortunately, despite the lack of in-person interaction, participation via the online platforms was high and the in-depth feedback received proved valuable to the Team's design efforts.

On the following pages, Stakeholder Interview and Visioning Workshop processes are described, with the results of the exercises provided as well.



STAKEHOLDER INTERVIEWS



Aerial view looking east from over the Training Center Site up the James River Valley

Upon project commencement, a group of 50 individuals were selected to be part of the Training Center Target Advisory Council (Advisory Council). The members of the Advisory Council were invited to participate in the Stakeholder Interview process. To begin, participants were sent a digital Visualization Survey & Questionnaire. The Survey included key potential elements that the envisioned Redevelopment Plan might include while the Questionnaire solicited feedback on broad issues involving the current Site and its transformative future.

VISUALIZATION SURVEY

The following tabulation describes the Survey results. Twenty-six members of the Advisory Council ranked each of the elements below on a scale of 1 (least important) to 5 (most important) based on their importance to the creation of the Training Center Redevelopment Plan. The rankings were totaled for each element and the average score calculated to determine the most preferred and desirable features for the Site and key connections to surrounding areas.

	Avg Score	Master Planning Elements
<i>Most Important</i>	4.6	Views of Downtown Lynchburg, James River, Wooded Hills
	4.5	Parks, Greenways, and Trails
	4.4	Improved Mobility Network
	4.4	Direct Connection to the James River
	4.3	Attractive Streetscape Design
	4.2	Enhance Access to / from Hwy 210
	4.0	Corporate / Professional Office Uses
	4.0	Redevelopment of Adjacent Properties / Uses
	3.8	Town Center / Mixed-use Center
	3.7	Advanced Manufacturing / Technology
	3.4	Walkable Urban Neighborhood
	3.3	Preservation of Wooded Areas
	3.3	New Residential
	3.3	Central / Community Gathering Space
	3.3	Retail / Storefronts
	2.8	Entertainment Uses ("Things to do")
	2.8	Resort / Lifestyle Destination
	2.6	Civic Buildings
<i>Least Important</i>	2.5	Preserved Campus Landscaping
	2.2	Suburban Development Pattern
	2.2	Preservation of Existing Buildings

QUESTIONNAIRE

The following questions were posed to the twenty-six participants in conjunction with the Visualization Survey. The objective was to solicit insight from the local individuals into the issues and opportunities relating to the Training Center Site and its redevelopment. On the following pages, each question is listed with common responses provided and grouped in order to identify emphasis and priorities. The total number of individuals **(in bold)** who mentioned each response, are also included.

What is your long-range vision for the physical development of the Training Center site?

- Advanced Manufacturing / Research / High Tech / Industrial component **(11)**
- Mixed Use **(9)**
- Professional offices / Amenities **(9)**
- Corporate HQ Campus / Employment Center / Business Heavy **(8)**
- Nature / Views / Outdoor Recreation / Park / Greenway / Trails **(8)**
- Retail **(8)**
- Connection / Use / Views to James River **(6)**
- Connection to Downtown / Greenway / Amenities **(5)**
- Residential (varied density) **(4)**
- Walkable Community **(4)**
- Economic impact for the region / Revenue for the County / Job Creation **(3)**
- Amphitheater / Entertainment / Social Gatherings **(3)**
- Live/Work/Play **(2)**
- Retirement Community / Central Virginia Retirement **(2)**
- Preserve Historic Buildings / Demo Others **(2)**
- Nuclear Manufacturing **(2)**
- A version of Wyndhurst, but with more outdoor activities and businesses **(2)**
- Water Park / Amusement Park (use topography) **(2)**
- Research Park - Ex: VT's Corporate Research Park / UVA's Fontaine Research Park **(1)**
- Inclusive Housing / Affordable Housing **(1)**
- Educational Uses **(1)**
- Research Park - Ex: VT's Corporate Research Park / UVA's Fontaine Research Park **(1)**
- Educational Uses **(1)**
- Destination to attract visitors **(1)**
- Training Center **(1)**
- Restaurants / Outdoor Seating **(1)**
- Environmental Awareness **(1)**
- Medical Center **(1)**
- Charming Modern Destination **(1)**
- Open up to the community / Tell History - Ex: Endstation **(1)**

What do you believe are the most important issues that the development of the Training Center site will face during the next five years?

- Funding / Bond Issues / Infrastructure Costs **(9)**
- Removing buildings / Re-Purposing Buildings / History of Buildings **(7)**
- Environmental Issues / Site Clean-up / Brownfield Issues **(7)**
- Regional Cooperation / Acceptance / Community Enthusiasm & Engagement **(7)**
- Attracting top rate developers / finding the right developer **(6)**
- State Funding Participation / Assistance / Responsibility / Debt **(5)**
- Economic Recession / Market Forces **(4)**
- Adjacent Property Owner Cooperation **(3)**
- Marketing the New Development **(2)**
- VDOT Cooperation on Access **(1)**
- Topography **(1)**
- Complacency **(1)**
- Uncertainty of Ownership **(1)**
- Financial competitiveness with other local/regional needs **(1)**
- Honoring the residents that called CVTC home **(1)**
- Government Red Tape **(1)**
- Economic Development Partnerships **(1)**
- Further Neglect and Decay of Historic Fabric **(1)**

What is your favorite thing about the Training Center site?

- Location - **(17)**
 - Proximity to River **(12)**
 - Proximity to Downtown Lynchburg **(10)**
 - Easy Access to Highways / Transportation Access **(6)**
 - Near Natural Areas **(3)**
 - Views **(3)**
 - Central Location in Lynchburg Region **(2)**
- Large Plot of Land / Grand Opportunity / Potential **(7)**
- Existing Infrastructure (Roads / Sewer / Water) **(2)**
- Transformation of a Site with a Negative Past **(1)**

What is your least favorite thing about the Training Center site?

- Existing Buildings **(7)**
- History / Negative Perceptions of Facility **(5)**
- Environmental Issues / Cost of Addressing / Brownfields **(4)**
- State Bureaucracy / Lack of maintenance from State **(3)**
- Adjacent Properties **(3)**
- Access to Site **(3)**
- Lack of Attractive Gateways from Rte.210 & Neighborhood **(2)**
- Uncertainties about Redevelopment Potential / Unwillingness of Local Developers **(2)**
- Topography **(2)**
- Infrastructure Challenges **(1)**
- Bond Issue **(1)**
- Difficult Topography **(1)**
- Perception of Madison Heights **(1)**
- Displacement of Residents **(1)**

What do you believe are the greatest assets or strengths with regard to the physical Training Center site itself?

- Location - **(25)**
 - James River Access / Views **(14)**
 - Proximity to Downtown Lynchburg **(9)**
 - Nearby Highways **(6)**
 - Centrally Located in the Lynchburg Region **(2)**
 - Proximity to River Trail System **(1)**
- Size of Property / Open Space / County Open for Development **(7)**
- Natural Setting / Rural Feel / Urban Benefits **(6)**
- Natural Beauty **(4)**
- Architecture **(3)**
- Infrastructure **(2)**
- Outdoor Tourism Potential **(1)**
- Unique Site **(1)**
- Access to Personnel in Entire Region 2000 Area **(1)**

What do you believe are the greatest liabilities or weaknesses with regard to the physical Training Center site itself?

- Existing Buildings / Structures / Demolition Costs **(16)**
- Antiquated Infrastructure / Costs **(8)**
- Access / Connectivity to Surrounding Areas / Limited Ingress & Egress **(6)**
- Topography **(4)**
- History / Perceptions **(4)**
- Mobile Home Park / Adjacent Properties **(4)**
- Environmental Issues / Remediation Costs **(3)**
- Existing site conditions / Cleanup Cost **(2)**
- Bonds **(1)**
- State Ownership vs. Local Control Uncertainties **(1)**
- Cost of Redevelopment / Debt Burden **(1)**
- Narrow Roads **(1)**
- Cemeteries **(1)**
- Entrance is not Attractive **(1)**

What do you believe should be the most important physical development goals for the Training Center site during the next ten years?

- Selective Removal of Buildings / Gut Buildings / Good Quality New Buildings **(11)**
- New Infrastructure / Improve **(7)**
- Determine Best Access Route / Improve Site Access **(7)**
- Finish DEQ Remediation / Environmental Concerns Addressed **(5)**
- Maximize Local Tax Revenue / Regional Job Opportunities / Economic Impact **(3)**
- Gateway Entrance / Improve Entrances **(3)**
- Outdoor Recreation / Entertainment / Amphitheater **(3)**
- Mixed Use / Similar to Wyndhurst **(3)**
- Additional Development Sites / New Roads **(3)**
- Scrape the Property Clean & Start Over / Clean Slate **(2)**
- Trails / Parks **(2)**
- Highlight the Views / Visual Clean-Up **(2)**
- Find Developer **(1)**
- Property Sold and Maintained / County Can't Maintain **(1)**
- Broadband Upgrades **(1)**
- Site Planning **(1)**
- Public Parking **(1)**
- Upscale Winery Tasting Room / Restaurant **(1)**
- Advanced Tech Manufacturing Center **(1)**
- Maintained Vegetation **(1)**
- Open Up to Community **(1)**



Aerial view from Highway 210 overlooking the existing cemetery toward the rest of Training Center Site

What three specific actions or projects would you like to see accomplished on the Training Center site?

- Increase River Access / Utilize Waterfront / Highlight Views **(7)**
- Assess Buildings / Demolish Selective Buildings **(7)**
- Corporate / Industry Campus / Business Use / Anchor Businesses **(6)**
- Amphitheater / Entertainment Venues **(5)**
- Increased Lynchburg Access / New Connector Road / Connectivity **(4)**
- Restaurants **(4)**
- Improve Infrastructure **(3)**
- Redevelopment Plan Adopted & Built / Quality Developer **(3)**
- Walkable / Mixed-Use Development **(3)**
- Advanced Manufacturing Center Campus / R&D/ Tech Center / Nuclear, Graphene, Blockchain **(3)**
- Mix of Residential Densities & Typologies **(3)**
- Focus on Developing New Buildings **(2)**
- Attractive Tourism Point / Inviting Places **(2)**
- Conceptual Plan / Renderings **(2)**
- Cost Estimates for Redevelopment (Infrastructure & Demolition) **(2)**
- Expand the Black Water Creek Trail / Connect to River Trail System **(2)**
- Gateway Entrance **(2)**
- Retail **(2)**
- Retirement Community / Multiple Care Levels (ex: Westminster Canterbury, Cedarfield) **(2)**
- Documentation of Historic Campus / Structures **(2)**
- Maintain Lower Rapidan Buildings **(1)**
- Find Uses other than Hospitality and Retail **(1)**
- Amenities for Housing **(1)**
- Amusement / Water Park **(1)**
- Avoid Presence of Non-profits **(1)**
- Open Space / Park **(1)**
- Relief of the Debt Burden **(1)**
- Community Gathering Place / Central Square **(1)**
- Create Economic Activity & Tax Revenue **(1)**
- Preserve Slopes **(1)**
- Pedestrian Bridge / Trails **(1)**
- Recreational Use **(1)**
- Remediation Work **(1)**

What else should we be considering about the site and its development?

- Improved Access to the Major Roads / Access to Site / Connect to Greater Lynchburg Transit Routing **(4)**
- Focus on Finances / Lessen Debt / Economic Impact **(4)**
- Respectfully Honor the History / Memorialize History **(3)**
- Push-back from Amherst Citizens / Gain Public Support / Regional Cooperation **(3)**
- Connect with Madison Heights Master Plan / Current Lynchburg Plans **(3)**
- Working with the Adjacent Property Owners to Continue the Development **(3)**
- Development of Rte. 210 Corridor **(3)**
- Outdoor Market / Festivals / Events / Recreation **(2)**
- Development of US 29 Bypass **(2)**
- Development at 210 intersection with the US 29 Bypass **(2)**
- Time Frame for Development / Basic need first **(2)**
- Open-minded When Interest is Shown / Reach Out to New Partners (beyond Region 2000) **(2)**
- Riveredge Park & Trail **(1)**
- Vision Planning for Riverfront Recreation **(1)**
- Pedestrian Bridges **(1)**
- Improve Madison Heights Appearance **(1)**
- How Community Can Share Risk with Developer? **(1)**
- Define Success (tax revenues, regional employment opportunities, etc.) **(1)**
- Define Important Principles (environmentally sustainable, respectful of the history, minimizing local risk, walkable, etc.) **(1)**
- QR Codes to Public Development Site - Ex: Redevelopment of Lorton Prison in Fairfax County Website **(1)**
- Education About Events **(1)**
- Provide Site Data **(1)**
- Contact Regional and National Developers / Gauge Interest **(1)**
- Outdoor Mall-like experience - Ex: Charlottesville **(1)**
- Removal of Existing Structures **(1)**
- Improved Infrastructure **(1)**
- Ability to Change Zoning **(1)**

VISIONING WORKSHOP

Based on the feedback received during the Stakeholder Interviews, a virtual Visioning Workshop was developed. The Workshop was comprised of two parts: a SWOT Analysis and a Geographic Mapping Exercise. Both activities were presented on the Training Center Redevelopment Plan website and were opened to the public for participation. The online exercises were open for several weeks on the website to allow for the maximum number of response from those interested in the project.

SWOT ANALYSIS

The objective of the SWOT Analysis was to identify the top (S)trengths, (W)eaknesses, (O)pportunities, and (T)hreats associated with the Site and proposed Redevelopment Plan. For each of the four categories, participants were provided with a pre-selected list of responses based on the feedback from the Stakeholder Interviews. In each category, participants were asked to rank their top three selections.

The tabulations to the right show the results of the online analysis. The total number of individuals (**in bold**) who selected each response, are included.

STRENGTHS

- Size of Property **(58)**
- Proximity to Downtown Lynchburg **(54)**
- Access to the James River and Trails **(53)**
- Central Location within the Region **(46)**
- Wooded Setting and Natural Beauty **(37)**
- Unique Site and Great Views **(32)**
- Open Space **(19)**
- Adjacency to Route 210 **(18)**

WEAKNESSES

- Existing Buildings and Structures **(67)**
- Environmental Issues and Clean-up **(62)**
- Antiquated Roads and Infrastructure **(53)**
- History and Negative Perceptions of Facility **(49)**
- Limited Access to and from Property **(24)**
- Adjacent Properties **(18)**
- No Prominent Gateways **(18)**
- Challenging Topography **(13)**

OPPORTUNITIES

- Mixed-use Town Center **(49)**
- Connection to the River and Trails **(46)**
- Outdoor Event Amenities (i.e. Amphitheater) **(43)**
- Tech, Research, or Advanced Manufacturing Uses **(35)**
- Walkable Community **(33)**
- Outdoor Tourism and Recreation **(30)**
- Corporate or Professional Offices **(27)**
- Variety of Residential Typologies **(26)**
- Trails and Park Spaces **(22)**

THREATS

- Removal and Re-purposing of Existing Buildings **(79)**
- Environmental Issues and Remediation Costs **(57)**
- Funding Sources **(56)**
- Costs to Update Roads and Infrastructure **(37)**
- Attracting Developers **(32)**
- Gaining Public Support for the Project **(32)**
- Uncertainty of Long-term Ownership **(19)**
- Working with Adjacent Properties **(13)**

GEOGRAPHIC MAPPING EXERCISE

In conjunction with the SWOT Analysis, the public were invited to also provide input via the Geographic Mapping Exercise. In the activity, participants were presented with list of features that could be included in their ideal Redevelopment Plan. The features were grouped into four categories: Land Use, Mobility, Open Space, and Preservation.

The options listed for each represented a broad spectrum of possibilities for the Site’s transformation. After selecting their preferred choices (number of responses are provided **(in bold)** under each category over the following pages), participants were allowed to write specific comments regarding their selections via the website. Finally, individuals were given the chance to identify their preferred locations for the site features via an interactive online mapping platform.

The following pages document the public feedback collected from these virtual Visioning tools.

Land Use

- Mixed-use Town Center - Main Street **(24)**
- Commercial Retail **(4)**
- Entertainment **(3)**
- Civic **(2)**
- Professional Office **(1)**
- Residential - Estate Lots **(1)**
- Advanced Manufacturing / Light Industrial **(1)**

Land Use Public Comments

- Disc golf!!! The sport is growing and we have Paul McBeth who lives in Bedford County.
- I would like to see this area become a large high-density mixed-use business and residential center similar to Wyndhurst and Cornerstone of Lynchburg.
- A destination that helps the local economy.
- I would love to see a Costco as part of a community area here. You would attract people from all around the area.
- Cabela’s. I am pretty sure there would be a lot of business; you would create jobs for people in the area as well. I would couple this with outdoor activities such as a catch/ release fishing area (free Frisbee golf course; pickle-ball court.
- Just not big box retail, wide roads, massive apartment complexes.
- A Liberty University extension. The area grew exponentially to accommodate the LU extension and the students, teachers, parents, etc. that would be at the new LU campus.
- I could see this as sort of campus feel where you have some larger estate lots along with smaller homes. I like the idea of office space being available, too.
- I think the most tax-generating use and draw is to have the Monacan Nation get a casino license, build a casino with a music venue, a hotel and restaurant overlooking the James River and walking paths with an open air park.
- I can envision redeveloping the previously developed areas of the training center along the lines of Lynchburg’s Wyndhurst community. It’s proximity to downtown Lynchburg would be attractive.
- Please don’t get tricked into thinking we need more industrial space. There are industrial parks with room in them already within the county.



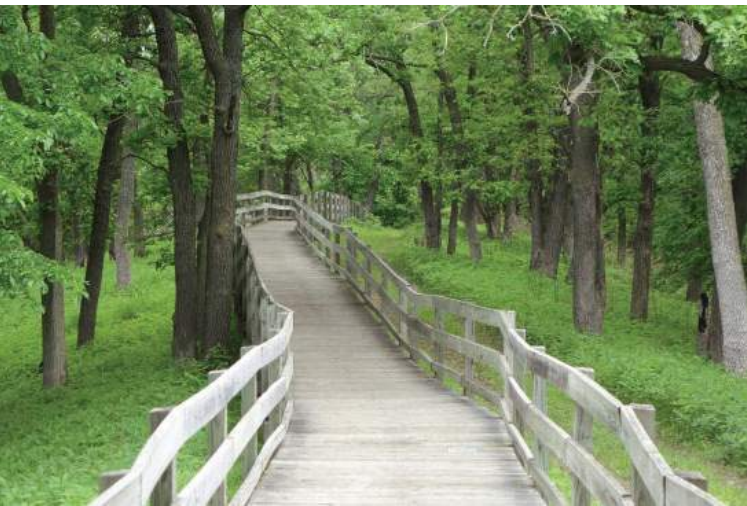
Reference images of land use/building typology examples provided to online participants

Mobility

- Vehicular Urban Streets **(9)**
- Vehicular Rural Drives **(8)**
- Bicycle Facilities **(7)**
- Regional Recreational Trails **(4)**
- Nature Trails **(3)**
- Pedestrian Sidewalks **(3)**
- Transit **(3)**

Mobility Public Comments

- Being close to Percival Island would give opportunity for an outdoor activity/venue/development.
- This would be a great place for an Amtrak station and bus station.
- With new development bike facilities can be incorporated with roadway and sidewalk development - separated bike or side path.
- Narrow streets should be utilized to accommodate both a rural feel and more “urban” movement but, supports lower speeds and community-friendly atmosphere.
- The John Lynch Memorial Bridge needs to turn its shoulder into a pedestrian walkway so Lynchburgers can cross over to Amherst’s Riveredge Park to enjoy boating and swimming.
- This is such beautiful land that it needs to be used for recreation and some development, but not an urban hub.
- Would like to see limited vehicle traffic with an emphasis on pedestrian friendly options to maneuver on the site.
- The Riveredge Park Trail needs to be connected to the James River Heritage Trail by crossing the Lee property.
- The access roads to the bottom-land below the Monacan Bridge need to be improved.
- Walking trails and bike trails will provide recreational opportunities. Currently there is access to the Riverwalk Trail via Fertilizer Road, however, the state-maintained road is a single-lane gravel road accessing a parking area is curvy and often has huge wash-outs from heavy rain events.
- GLTC once provided bus service with two bus stops. This service should be re-instated in the future redevelopment plans.
- Bring in a company that can provide more jobs that pay well and that would make the neighborhood in that area safer and also attract more business such as restaurants, retail stores, something similar to a putt-putt or a top golf so that families and younger people can have entertainment.



Reference images of mobility facility examples provided to online participants

Open Space

- Town Square (12)
- Recreational Facilities (8)
- Neighborhood Park/Play Areas (6)
- Central Green/Park (4)
- Native Meadows and Clearings (1)
- Water Feature (1)

Open Space Public Comments

- Amusement park or water park.
- Inclusive playground.
- Disc golf.
- This would be a great place for a sports complex including multiple baseball fields as Madison Heights is the host for the Dixie Youth baseball tournaments. If a civic center is put in, there could be opportunities for shared parking.
- Liberty University extension to the CVTC campus is the best alternative.
- I see this as more of a suburban rather than an urban area.
- The bottom land beneath the Monacan Bridge (29 Bypass) should be turned into a regional sports tournament grounds. Many different types of sports fields can be accommodated.
- The far eastern end could serve as an RV campground for the sports teams.
- The far western end could accommodate a drive-in movie theater with the screen mounted on the hillside above the bottom.
- The slight rapids in the James River adjacent to the Amherst Riveredge Park is ideal for the installation of a standing wave (whitewater feature).
- I think you always have to have entertainment for the children. Water features and play areas are important. Nature for the adults provides the best of all worlds.
- Greenspace with native plantings and limiting impervious surfaces is important.



Reference images of open space examples provided to online participants

Preservation

- Buildings or Structures **(13)**
- Open Lawns, Specimen Trees, Landscape Areas **(7)**
- Surrounding Woodlands, Natural Features/ Bluffs **(2)**

Preservation Comments

- Want to see graveyard saved. Also historical information about what was one time the largest institution for people with developmental disabilities in North America.
- The views would be great for hotels and conference center. Preserve some of the large trees on the grounds if possible.
- With the Central Virginia area having an issue with adequate mental health care and in patient treatment facilities, CVTC would be the perfect place to convert for this treatment.
- The presence of dozens of derelict buildings with public health and environmental hazards make their removal and replacement with new buildings and structures mandatory in the campus re-development. The other categories would all contribute to a successful extension of Liberty University to the CVTC campus.
- The hospital on CVTC should be preserved due to its beauty.
- Remove the old buildings that have a past associated and start over with a new, refreshed perspective.
- The buildings that are in good shape have historical value and should be preserved. Some buildings are probably not in good enough shape to renovate.
- The specimen trees (the very old trees that have been there as long as Lynchburg) and unique landscapes should be preserved for community members and visitors to enjoy.
- Because this site is so close to the James River, surrounding woodlands should be maintained in order to minimize impact from storm water runoff and to maintain habitat for the diversity of forest species that make this area special.



Images of existing areas or features around the Training Center Site that could be preserved



Public Comments on Geographic Mapping Exercise

Recreation Facilities

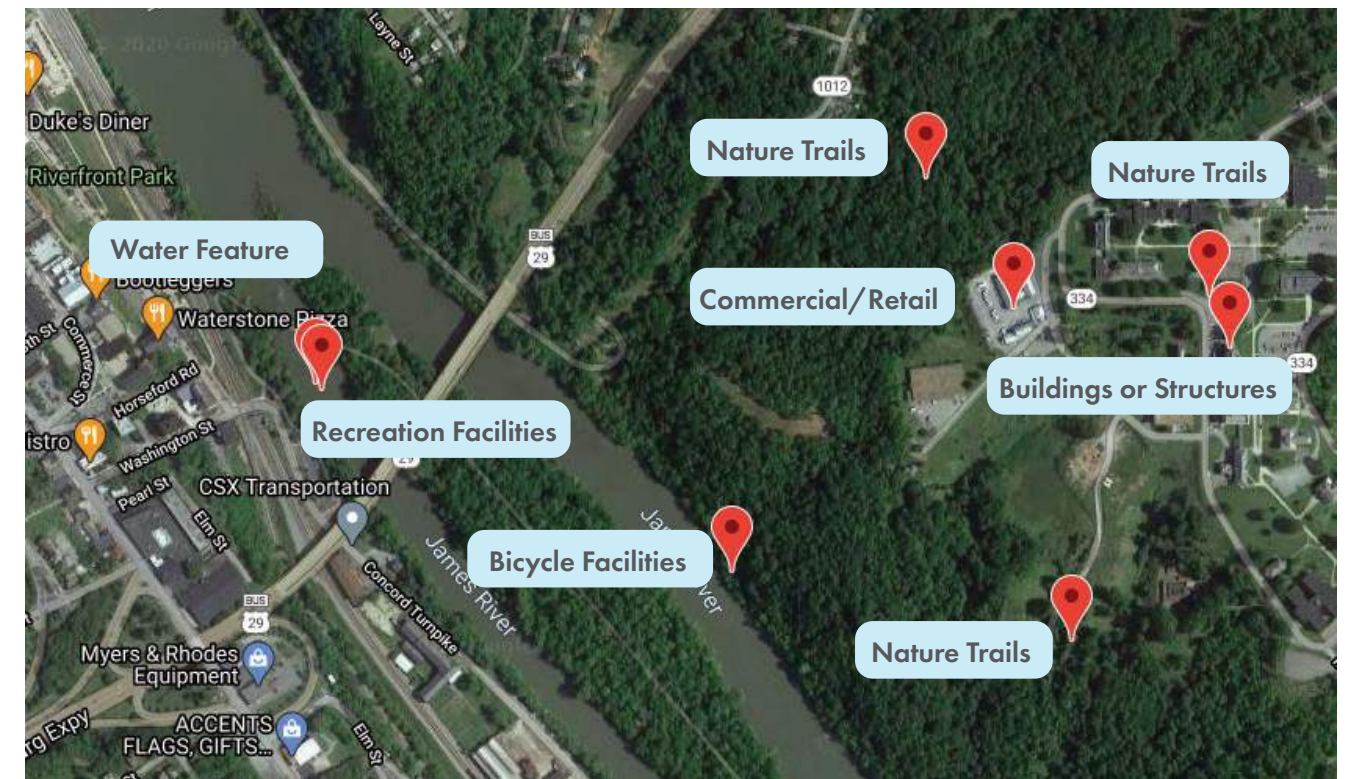
- A feasibility study has been completed that establishes this location as an ideal spot for the construction of a standing whitewater wave that would be available for public use.
- An engineering feasibility study has already been accomplished that determined this to be an ideal location for the construction of a standing whitewater wave feature for public recreation.

Pedestrian Sidewalks

- The shoulder of this bridge needs a pedestrian walkway.
- Need a sidewalk from the John Lynch Memorial Bridge landing that leads to the entrance of Riveredge Park.

Water Feature

- The Scotts Mill Dam should be breached in a fashion that allows fish to swim upstream and canoeists to paddle downstream without a portage. There is a 15 foot elevation drop that could be converted into many whitewater features.



Public Comments on Geographic Mapping Exercise

Commercial/Retail

- Place the Costco at the back of the lot so people drive around the facility to see other retailers.

Buildings or Structures

- This hospital is a beautiful structure and should be preserved.

Nature Trails

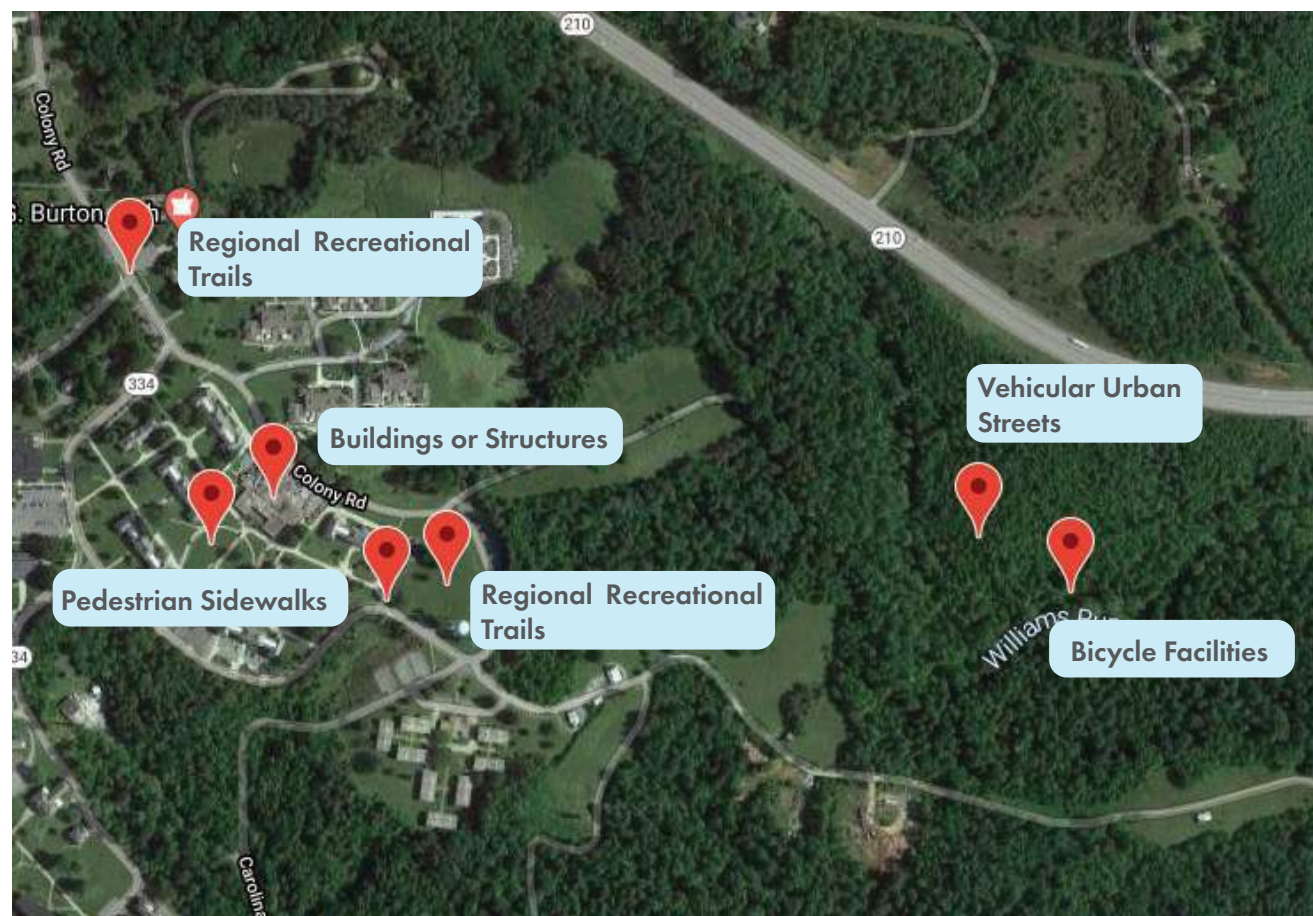
- Sell this area to a private developer with the stipulation it be developed primarily as an retirement housing development.

Bicycle Facilities

- The County should continue to pursue funding opportunities to complete the trail.

Water Feature and Recreation Facilities

- The channel along Percival's Island can be deepened and shaped to provide whitewater features and recreation.



Public Comments on Geographic Mapping Exercise

Buildings or Structures

- Mental Health Treatment Facilities

Regional Recreational Trails

- It might be a neat thing to make 334 and 210 through the campus as a course for a race.
- Design this area as a regional sand volleyball venue with a minimum of four courts with appropriate facilities to host regional and statewide events.

Pedestrian Sidewalks

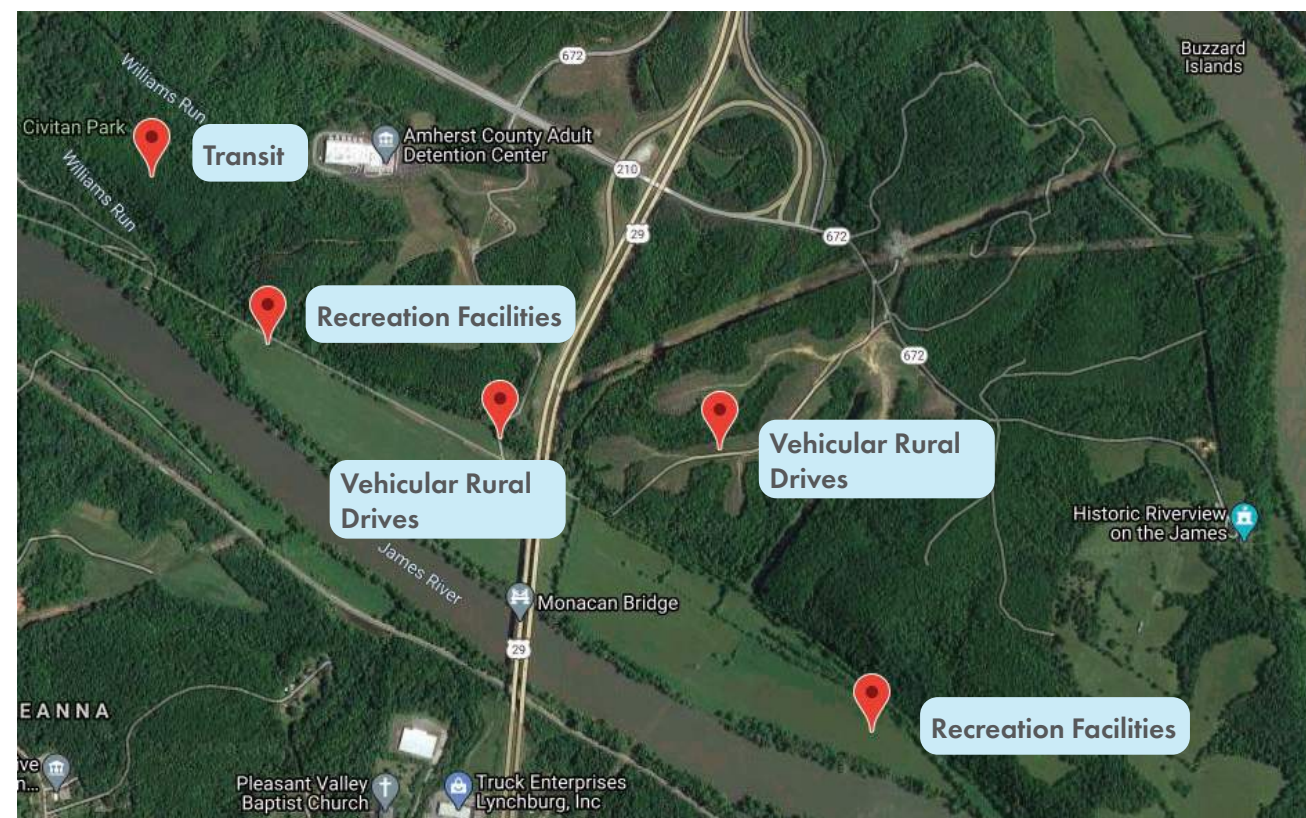
- Use this area as an open air park/facilities for people to use for leisure activities.

Bicycle Facilities

- Casino? If Danville can, why not us?

Vehicular Urban Streets

- An access roadway is needed south of the 210 Connector to allow development of the properties between the Connector and the river.



Public Comments on Geographic Mapping Exercise

Transit

- Trails designed to allow people of all ages to investigate and enjoy the outdoors.

Recreation Facilities

- A drive-in movie theater could situate here. The cars would park on the bottomland and the screen could be mounted on the hillside.
- RV Campground to serve the regional tournament grounds.

Vehicular Rural Drives

- This dirt road needs to be improved and paved. It could serve as one-way traffic going down the hill.

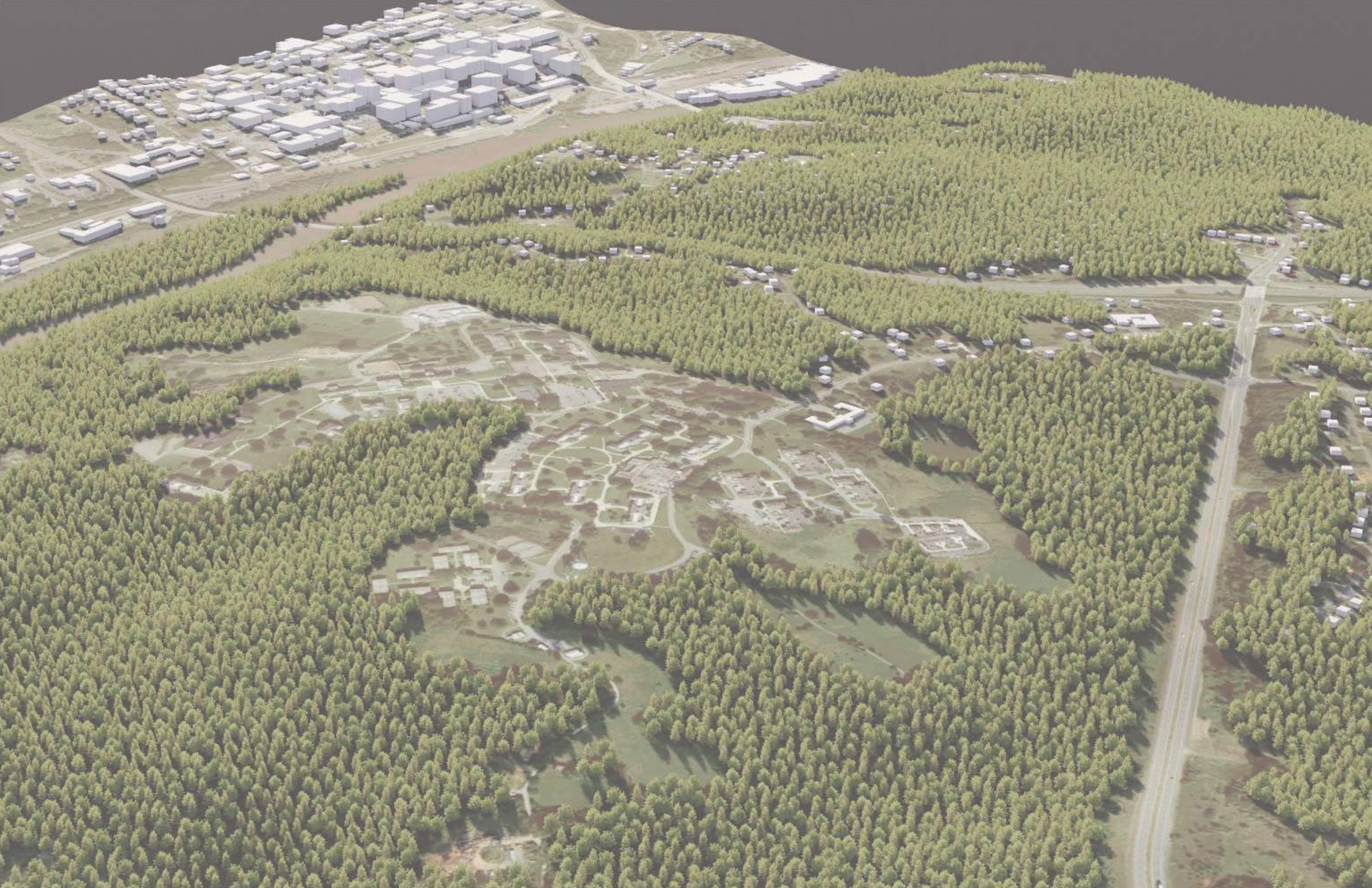


Aerial view looking south over the various building sites and open spaces of the Training Center



5 | DEVELOPMENT STRATEGY

DEVELOPMENT PROGRAM
MARKET POTENTIAL



DEVELOPMENT PROGRAM

Based directly on the data collected in the Market Assessment, a specific Development Program was created ahead of the design phases of the master planning process. This Program identifies key land use typologies feasible and advisable for inclusion in the Training Center Redevelopment Plan. The Program also includes full build-out metrics for the proposed typologies.





The goal of the Market Assessment is to inform a vision for redevelopment of the Site that is grounded in market realities while recognizing that market dynamics can change over time. The Development Program outlined serves as the foundation for what will be a flexible plan that could accommodate various types of new development in the future.

By taking advantage of the proximity to downtown Lynchburg, access to walking trails and open space, and the growing population in the region, the market could likely support new residential development in a variety of formats including rental apartments, town homes and single-family homes in a mixed-use environment. For planning purposes there is potential for up to 100,000 sf of retail space and 120,000 sf of office space. Additionally, depending on site layout, it may also be possible to include some industrial development on the Site. However, if an interested party, such as a large corporate office user, were to express interest in the Site, the redevelopment on the Site could be a business park, industrial park or other use.

A summary table graphic of the market-feasible uses for the redeveloped Site is shown on the opposite page. Summaries of the market potentials of the individual use typologies are provided on the remaining pages of this section.



Aerial photo of the existing Training Center Site

		EXISTING CONDITIONS	POTENTIAL	SPECIFICATIONS
RESIDENTIAL		<ul style="list-style-type: none"> - Post-recession there has been a greater share of multifamily permits in the MSA. - New multifamily development is primarily located in southwest Lynchburg and in neighboring Forest, VA in mixed-use traditional neighborhoods. 	<ul style="list-style-type: none"> - Residential development in a mixed-use setting 	<ul style="list-style-type: none"> - Variety of residential product (single-family, townhomes, multifamily) - Community center, accessible walking trails
RETAIL		<ul style="list-style-type: none"> - There is limited retail development in the pipeline in the MSA. - Retail typically follows residential development in smaller neighborhood centers to provide supportive uses (grocery, restaurants, etc.). 	<ul style="list-style-type: none"> - Supportive retail in a mixed-use setting - Unlikely to be a freestanding retail center 	<ul style="list-style-type: none"> - Up to 100,000 sf neighborhood center - Typical tenants: grocery, fast casual restaurants, restaurants, personal care services, fitness centers, and smaller-scale general merchandise. - Some retail space may be occupied by other professional office users
OFFICE		<ul style="list-style-type: none"> - There are few large corporate office buildings in the MSA. - Recent office development in the MSA tends to be smaller and professional office uses. - Prospective office tenants are primarily professional/financial and medical office users seeking 20-50,000 sf spaces. 	<ul style="list-style-type: none"> - Professional office space in a mixed-use setting 	<ul style="list-style-type: none"> - Up to 120,000 sf of office, or about 3 buildings - Low rise, 1 to 3 stories, 20,000 sf floorplate in mixed-use setting
INDUSTRIAL		<ul style="list-style-type: none"> - Industrial development is primarily occurring at interstate locations adjacent to intermodal locations or large metropolitan areas. - There are clusters of industrial manufacturing and warehouse space in the MSA, but they are older and appear to driven by rail access. 	<ul style="list-style-type: none"> - Smaller-scale manufacturing/light industrial space - Would require buffering between land uses 	<ul style="list-style-type: none"> - Up to 150,000 sf depending on available land (up to 10 acres) - 1-story building with ceiling heights up to 40 feet

DEVELOPMENT PROGRAM: Market-feasible Land Use Typologies for the Site

MARKET POTENTIAL

RESIDENTIAL

The projected population increase could likely support new residential development on the Site in a mixed-use setting with a variety of housing options (single-family detached, town homes and multifamily rental apartments). These new units would help accommodate households with varying housing preferences. While the total number of housing units that could be supported on the Site will vary based on a variety of factors including unit mix and layout, it is anticipated that the first phase of development would likely include garden-style apartments with approximately 200 units per project and later phases could include town homes and single-family developments at varying densities, ranging from 6 to 9 units/acre for single-family development and 14 to 16 units/acre for town homes.

Building on the traditional neighborhood design principles, a walkable, mixed-use environment could include supportive commercial space for neighborhood-serving retail and professional office uses as well as a community center, access to walking trails, and other amenities.

RESIDENTIAL DRIVERS



POPULATION
GROWTH



HOUSEHOLDER AGE &
PREFERENCE



MIXED-USE ENVIRONMENT /
TRADITIONAL NEIGHBORHOOD
DEVELOPMENT

TAKEAWAYS: A mixed-use residential neighborhood could potentially be developed on the Site.

The projected population increase could likely support new residential development on the Site in a mixed-use setting with a variety of housing options (single-family detached, townhomes, and multi-family). This would help accommodate varying preferences as residents desire to age in place. Development considerations include:

- The total number of units could vary based on site yield and layout.
- First phase of residential development would likely include garden-style apartments.
 - Approximately 200 units/project.
- Typical for-sale densities could range from:
 - 6 to 9 units/acre for single-family development.
 - 14 to 16 units/acre for townhomes.
- Mixed-use environment could include supportive commercial space for neighborhood-serving retail and professional office uses (up to 100,000 sf), community center, access to walking trails and other amenities.

RETAIL

Although COVID-19 will likely continue to accelerate ongoing retail trends, value-oriented, convenience-focused, and experiential retail sectors are expected to recover more quickly post-pandemic. If there were to be residential development on the Site, some supportive neighborhood-serving retail of up to 100,000 square feet (sf) of space may be feasible as part of mixed-use project. A smaller grocery store (30,000 sf) may be market feasible with residential development. Other tenants that typically locate as part of a mixed-use development often cater to convenience-oriented options including coffee shops, fast casual restaurants, personal care services, fitness centers and smaller-scale general merchandise. Depending on the phasing of development, it may be feasible to include smaller strip retail development near a more visible and accessible area of the Site as part of the Redevelopment Plan.

RETAIL DRIVERS



TAKEAWAYS: There is likely potential for supportive retail development on the Site as part of a mixed-use setting.

Although COVID-19 will continue to accelerate ongoing retail trends, value-oriented, convenience-focused, and experiential retail sectors are expected to recover post-pandemic.

If there were to be residential development on the Site, some supportive neighborhood-serving retail space may be feasible as part of mixed-use project.

- Typical neighborhood center retail typically supports up to 100,000 sf of retail space.
- Depending on surrounding population, a smaller grocery store use may be supportable (30,000 sf).
- Other tenants that typically locate as part of mixed-use development often cater to convenience-oriented options including coffee shops, fast casual restaurants, personal care services, fitness centers and smaller-scale general merchandise.
- A portion of the retail space may be occupied by other professional office users.

OFFICE

There appears to be some potential for smaller scale professional office development at the Site. While there is a mismatch between the current building supply and the desired office space, the Site could attract tenants if there is modern office space that meets the desired requirements. For planning purposes, the development program could include up to 120,000 sf of office space, or approximately 3 low-rise office buildings. Since there has been limited recent development, it is anticipated that building sizes could be phased over time. For example, the first building could be smaller to help prove the market, and then building sizes could potentially increase over time.

Although Class A office development in the region has been primarily occurring near larger metro areas, there has been limited new Class A office development within the Lynchburg MSA in the last decade. Thus, there could be potential for a larger, corporate “wildcard” user on the Site. A flexible site plan could help accommodate a potential “wildcard” user.

PROFESSIONAL OFFICE DRIVERS



EMPLOYMENT
GROWTH



ACCESS TO TALENTED
WORKFORCE



MIXED-USE
ENVIRONMENT



QUALITY OF
LIFE

MEDICAL OFFICE DRIVERS



PROXIMITY TO HOSPITALS &
MEDICAL CLUSTERS



POPULATION
GROWTH



ACCESS

TAKEAWAYS: There appears to be some potential for smaller-scale professional office development at the Site.

Professional and medical office tenants have expressed interest for 20,000 to 50,000 sf modern office space in the MSA. While there is a mismatch between the current building supply and the desired office space, the location of the site could attract tenants if there is modern office space that meets the desired requirements.

The development program could include up to 120,000 sf of office space, or approximately 3 office buildings.

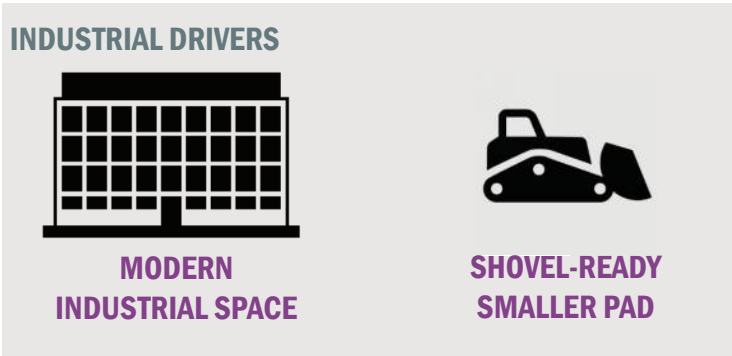
- Desired building requirements: low-rise building, 1 to 3 stories, 20,000 sf floorplate in mixed-use setting.
- For planning purposes, building sizes could be phased over time (e.g., first building could be 20,000 sf to help prove the market, followed by a 40,000 sf building and 60,000 sf building).

Although Class A office development in the region is occurring near larger metro areas and there has been limited new Class A office development within the Lynchburg MSA in the last decade, there could be potential for a larger, corporate “wildcard” user on the Site.

60

INDUSTRIAL

There appears to be limited potential for industrial development on the Site. While there does not appear to be demand to suggest clearing the entire Site for an industrial park, there may be limited potential for a manufacturing/light industrial user for a portion of the Site. However, land use conflicts would need to be managed when planning for the build-out of the entire Site. The development program on the Site could include up to 150,000 sf of industrial space on up to 10 acres of land.



TAKEAWAYS: There appears to be limited potential for an industrial user for a portion of the Site.

While there does not appear to be demand to suggest clearing the entire Site for an industrial park, there may be limited potential for a manufacturing/light industrial user for a portion of the Site. However, land use conflicts would need to be managed when planning for the build-out of the entire Site.

The development program on the Site could include up to 150,000 sf of industrial space on up to 10 acres of land. Prospective industrial users are in search of modern industrial buildings or relatively shovel-ready sites.

- Desired building requirements: 1-story building with 20,000 to 150,000 sf and ceiling heights up to 40 feet.
- Desired land requirements: 1 to 10 acres of flat land, shovel-ready.

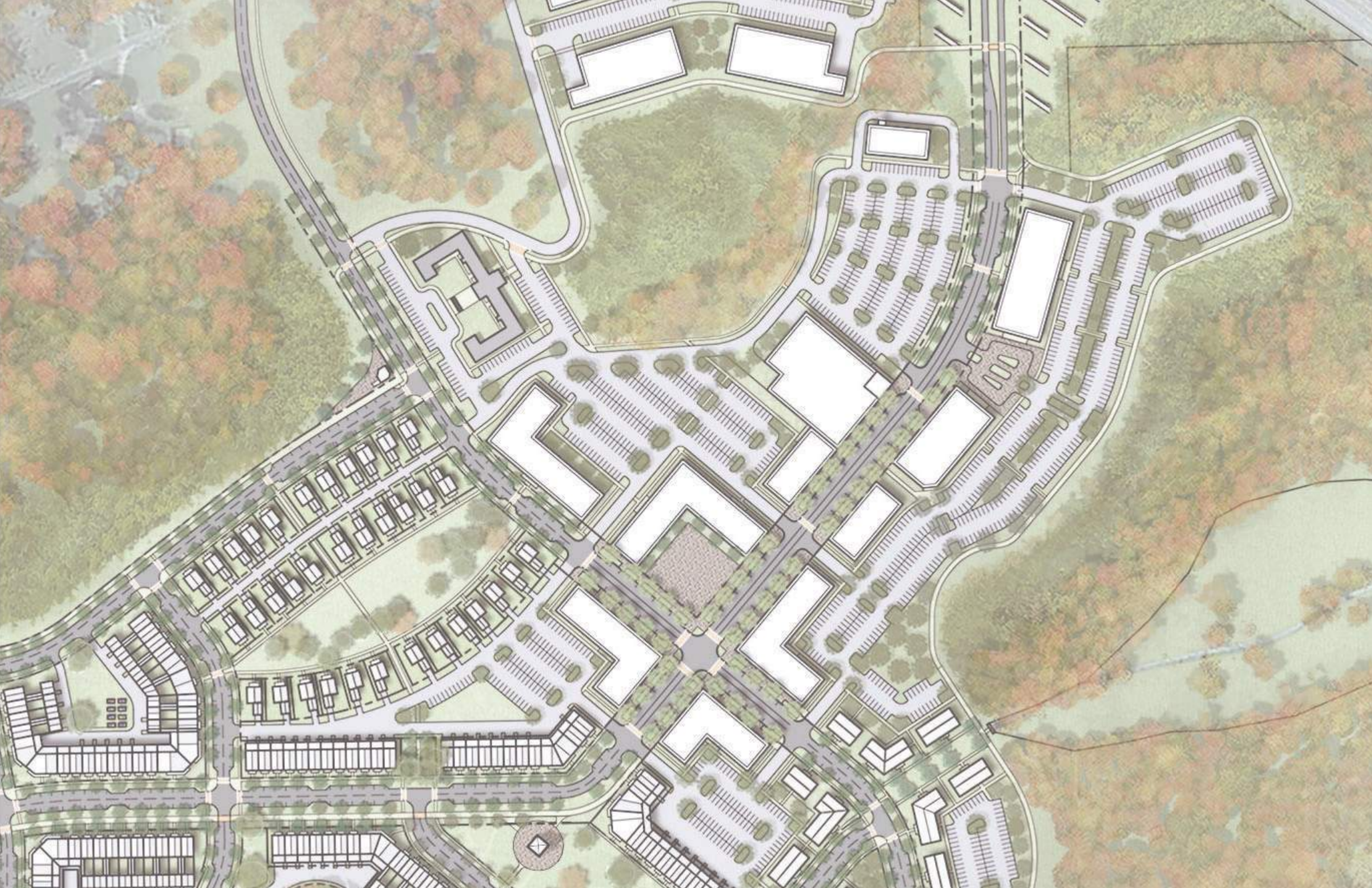
The Site is unlikely to attract larger TDL industrial users that typically prefer locations along interstates near intermodal locations or larger metro areas.



6 | REDEVELOPMENT PLAN

DESIGN CHARRETTE
THE PLAN





DESIGN CHARRETTE

With the conclusions and reference material developed in the earlier phases of the project in-hand, the Team led a five-day iterative Design Charrette in downtown Lynchburg from November 9-13, 2020. The benefits of hosting the open-to-the-public Charrette in-person at the LRBA offices were immense. The opportunity allowed stakeholders and community members to voice their opinions on the various ideas and plan concepts to the Team in real-time.

The Charrette process was an immersive experience, as the multi-disciplinary Team, consisting of planners, landscape architects, urban designers, architects, and strategic communications professional, relocated their design studio to Lynchburg. Over the course of the five days, the Team developed a number of concepts for the overall Redevelopment Plan. Each evening, the concepts were presented during public presentations, attended by people in-person and virtually via Zoom. Feedback received during these presentations helped inform refinements to the concepts the following day. The refinement process began in the mornings, as the Training Center Leadership Committee, made up of 16 stakeholders from the Advisory Council, provided additional direction to guide that day’s work.

As the overall Redevelopment Plan concept was refined by Day Five to a preferred option, other graphics, including detailed sections, hand-drawn perspectives, digital vignettes of buildings and site features, 3D computer site models, and diagrams, were developed in support. By the end of the Charrette, the refined conceptual Redevelopment Plan had been created, with its design intent and vision for implementation established through the direct feedback provided by stakeholders and the public at-large.



Evening presentation to the public during the Design Charrette



3D Model View of the Proposed Master Plan developed during the Design Charrette



Day One concept development within the Design Studio

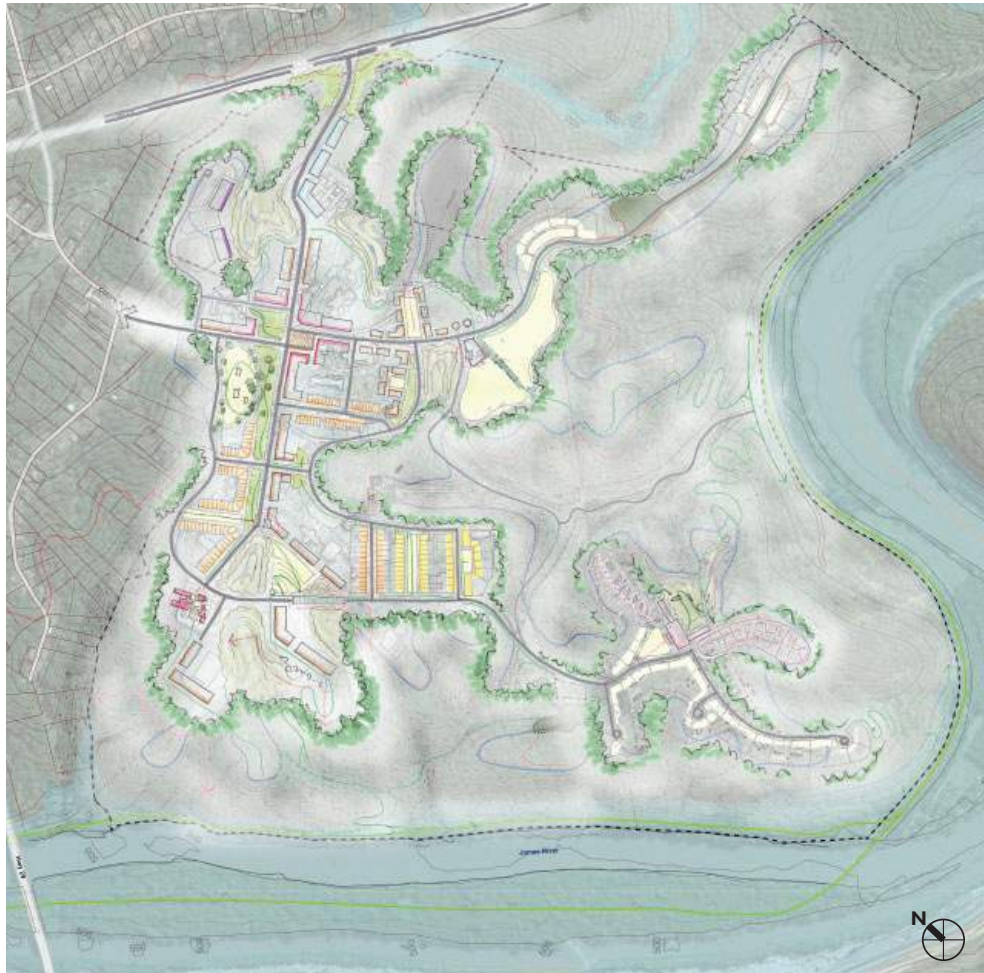
DAY ONE

Day One of the Design Charrette began in the morning with a tour of the Training Center Site, surrounding amenity areas, and trail connection along the James River just outside downtown Lynchburg. The tour provided opportunities to photo-document the existing conditions with a perspective toward its capacity for redevelopment.

With tour notes and photos in-hand, concept alternatives were developed in the afternoon in the Design Studio. Using base maps created ahead of the Charrette, six hand-drawn concepts of the overall Site were developed in advance of the evening public presentation. These plans are included and described on the following two pages. In addition to the plan concepts, an overview of the Inventory, Market and Visioning phases of work were presented.



Photos taken during the Site Tour



CONCEPT A

This concept proposes a central “Main Street” corridor around which the neighborhood is framed. The street extends from a new intersection with Highway 210 to the western reaches of the blufftop, where it would split, allowing multiple development sites to open up to the panoramic views to downtown Lynchburg and the Blue Ridge Mountains beyond. Land uses along the spine are primarily mixed-use, with retail space on the ground levels and multi-family upper floors. Office buildings are included near the highway, while industrial and lower-density residential districts are located in further-removed parts of the Site. On the mobile home park area, a combination of large home lots and a resort are proposed.



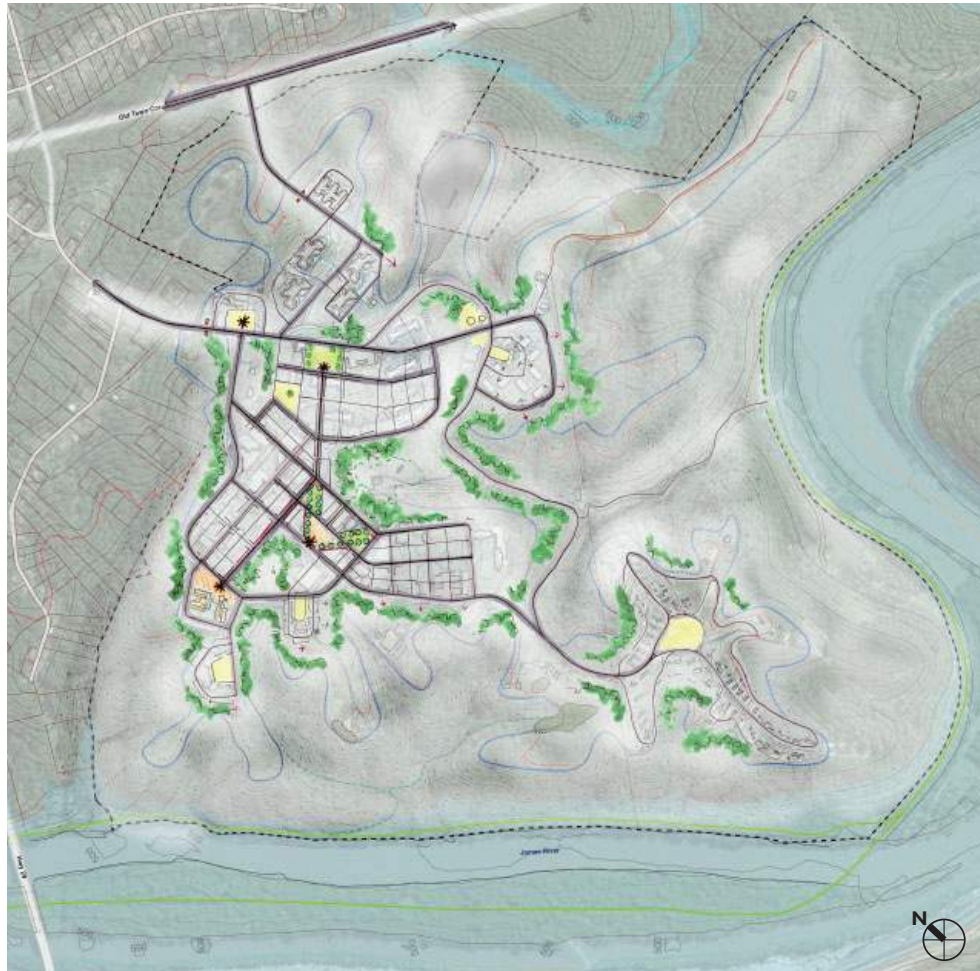
CONCEPT B

Like Concept A, the second plan proposes a central spine through the heart of the Site. Dense mixed-use blocks front onto the corridor, which includes a widened greenway on one side. This greenway, which includes a multi-use trail and accompanying landscape area, terminates in a large park space enclosed by multi-storied buildings. As the development spreads away from this multi-modal corridor, land uses transition to primarily residential. A strong street grid is established, promoting the sense of connectivity across the entire Training Center Site.



CONCEPT C

The mobility pattern of Concept C is unique, as the hierarchy of streets is gradual, with no true central spine proposed. Instead, developments are spread more even across several blocks on the Site's east end. A mixed-use core is found along Colony Road, where a central green space is attached to two office buildings. From this core, multi-family residential buildings follow the street grid. The western portions of the Training Center Site are primarily single-family residential, with a naturalized green space proposed to follow one of the existing ravines down to the river valley.



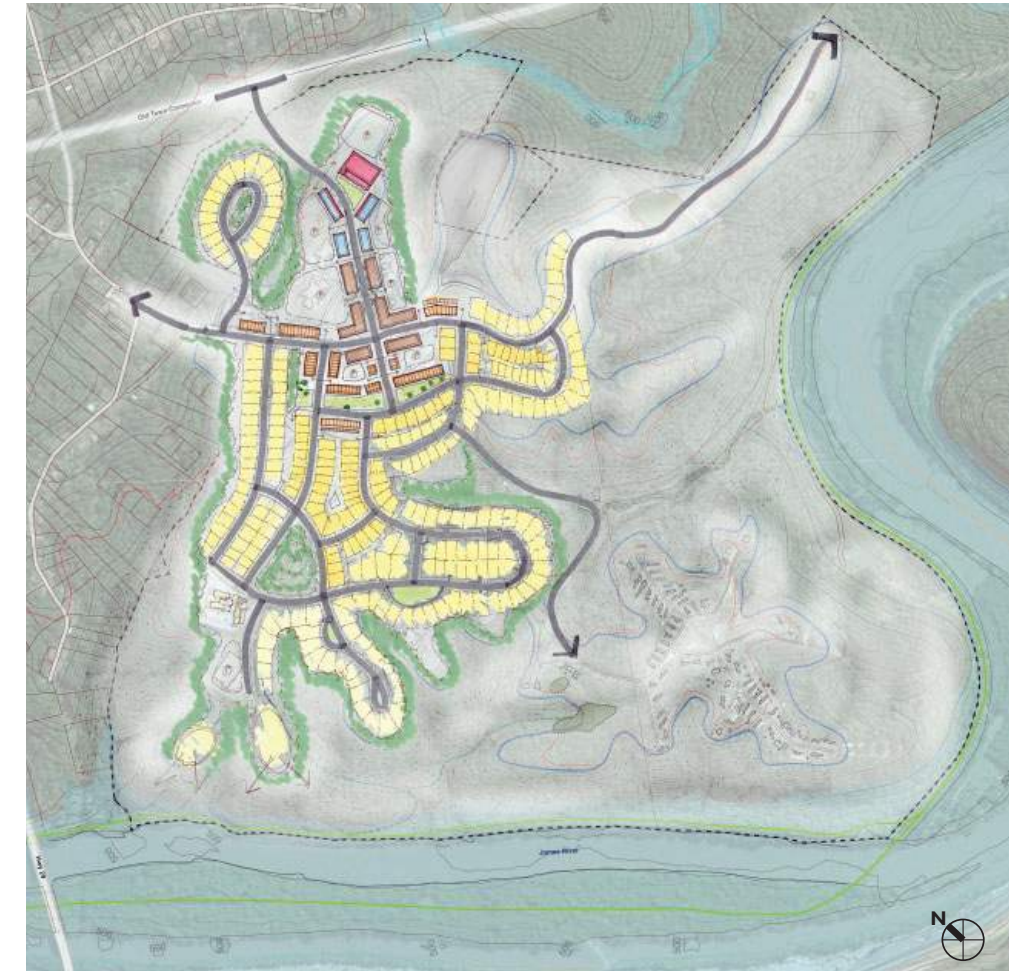
CONCEPT D

Concept D includes the preservation of the more recently-constructed CVTC buildings on the Site's north side when aligning its new entrance road from Highway 210. West of Colony Road, a robust development pattern is proposed, with embedded green spaces strategically located across the many blocks. Large, monumental pieces of art are proposed in several green spaces along key streets, providing important wayfinding opportunities.



CONCEPT E

This concept again focuses development along a central spine from the new intersection with Highway 210. A mixed-use urban square is proposed at the intersection of this entrance drive with Colony Road. Further to the west, the divided boulevard section terminates at large rounded green space with development fronting on entirely around it. The spine then continues further west, culminating at a Funicular station, a public transit option that would connect the neighborhood directly to the James River waterfront and regional trail system. Single-family residential districts are proposed on several of the remaining ridgelines.



CONCEPT F

The mobility pattern of Concept F is a combination of the preceding ones. A central spine extends from Highway 210, intersecting with Colony Road at a dense development core. On the west side of this core, a linear green space, reminiscent of a "quad" on the existing CVTC campus, provides a large public green space to the neighborhood. West of Colony Road, the development pattern is more circuitous in nature, allowing for multiple paths of travel for users. These western blocks are primarily single-family residential, as several follow the existing ridgelines to their termini.

DAY TWO

On Day Two, the number of overall Redevelopment Plan concepts was narrowed from six to three based on the preferred development patterns, street networks, and proposed open space areas. The three revised concepts advanced to show more detail in their arrangements and proposed land uses.

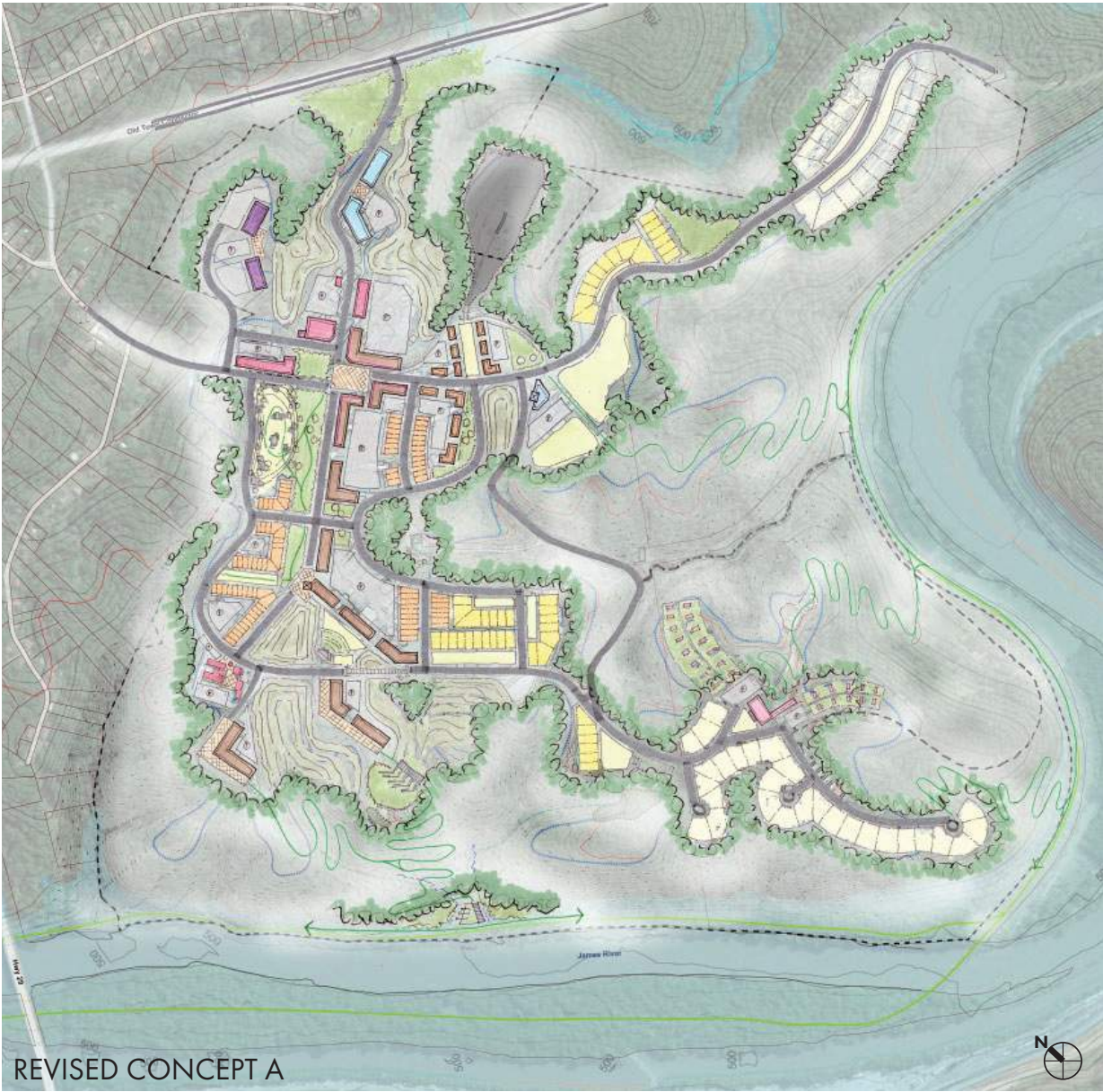
Concurrent with the revised concept plans, additional supporting design studies and graphics began to be developed. Vignettes of what an adaptive re-use of The Farm structures were created. Re-use options included a learning/discovery center and a destination brewery/ winery/distillery. Also, a hand-drawn perspective was made of a concept for the restoration of the cupola, currently on top of the Bradford building, into a monument feature in one of the neighborhood’s open spaces.



Public review and comment session following the Day Two presentation



Public comment notes provided on the Day Two concept plans



This overall plan reinforces the concept of a mixed-use spine spanning the entire neighborhood. An urban plaza or square marks the intersection of the spine street with Colony Road. As the street extends west, dense multi-family residential building front the corridor, which runs along a very wide greenway. The spine turns off a building node and leads to The Farm destination complex. A large amphitheater provides additional amenities for the area. The mobile home park property and several open area along an eastern extension of Colony Road are illustrated with low-density estate homes. A civic building site is shown on Colony Road east of the urban square.



REVISED CONCEPT B

Revised Concept B too proposes a central spine street corridor. Two public open spaces mark the two ends of the main section of the corridor. On the east, an urban square is enclosed by mixed-use buildings. On the west end, a circular green is wrapped by dense residential developments. Side streets branch out from the spine, with land uses transitioning to lower-density residential. Large estate lots comprise the proposed mobile home park property redevelopment. A large civic or community building is planned along the east extension of Colony Road.



REVISED CONCEPT C

The third concept is laid out across a more dispersed street network. The main entrance corridor from Highway 210 terminates at Colony Road. This intersection is the multi-family residential core for the neighborhood. A triangular green space is proposed near the highway adjacent to a large grocery store. West of Colony Road, traffic is spread across several secondary streets. A large green quad space represents the concept's major open space. On the Site's west end, The Farm is enhanced with an outdoor plaza space and connects to a more naturalized open space along existing ridgelines. The mobile home park property includes a robust development of larger estate homes.



Hand-drawn rendering of the proposed Cupola Monument feature



Digital renderings of concepts for the adaptive re-use of The Farm structures



DAY THREE

Input received from the previous evening's presentation allowed the overall Redevelopment Plan concepts to be narrowed down to a single alternative on Day Three. The central spine layout was deemed the most favorable, with several "bends" to its alignment added to provide both visual interest to the path and additional development opportunities for the Site. The rectangular quad green space just west of the large urban plaza was also preferred. A more defined transect in residential typologies was created, as more dense residential transitioned gradually the farther away from the central spine one travels. The Funicular was also included as a primary mobility connection down the existing hillside to the riverfront.

More supporting graphics and studies were produced in support of the plan, including vignette of a proposed stormwater chain and pedestrian bridge spanning an existing ravine.



Public review and comment session following the Day Three presentation



Day Three presentation



Digital vignette of the pedestrian bridge over the proposed stormwater chain feature



Refined digital renderings of the outdoor event space at The Farm



Hand-drawn rendering of the refined Cupola Monument and plaza looking down the main street from the Village Square

DAY FOUR

Day Four saw refinements to the overall Redevelopment Plan concept incorporated. The individual neighborhood blocks were studied in more detail, allowing this refined concept to reflect more optimal development layouts. The proposed neighborhood street network was also revised to incorporate greater residential capacity along the Site’s western ridgelines. The urban plaza space was re-designed as an attached square off an L-shaped mixed-use building. The main entrance drive is lined not only with small retail buildings, but in addition office buildings and a neighborhood-scale grocery store.

Day Four saw additional production in supporting graphics along with further detail added to older vignettes. New drawings produced included digital perspective views of the attached square and conceptual models of the Funicular.

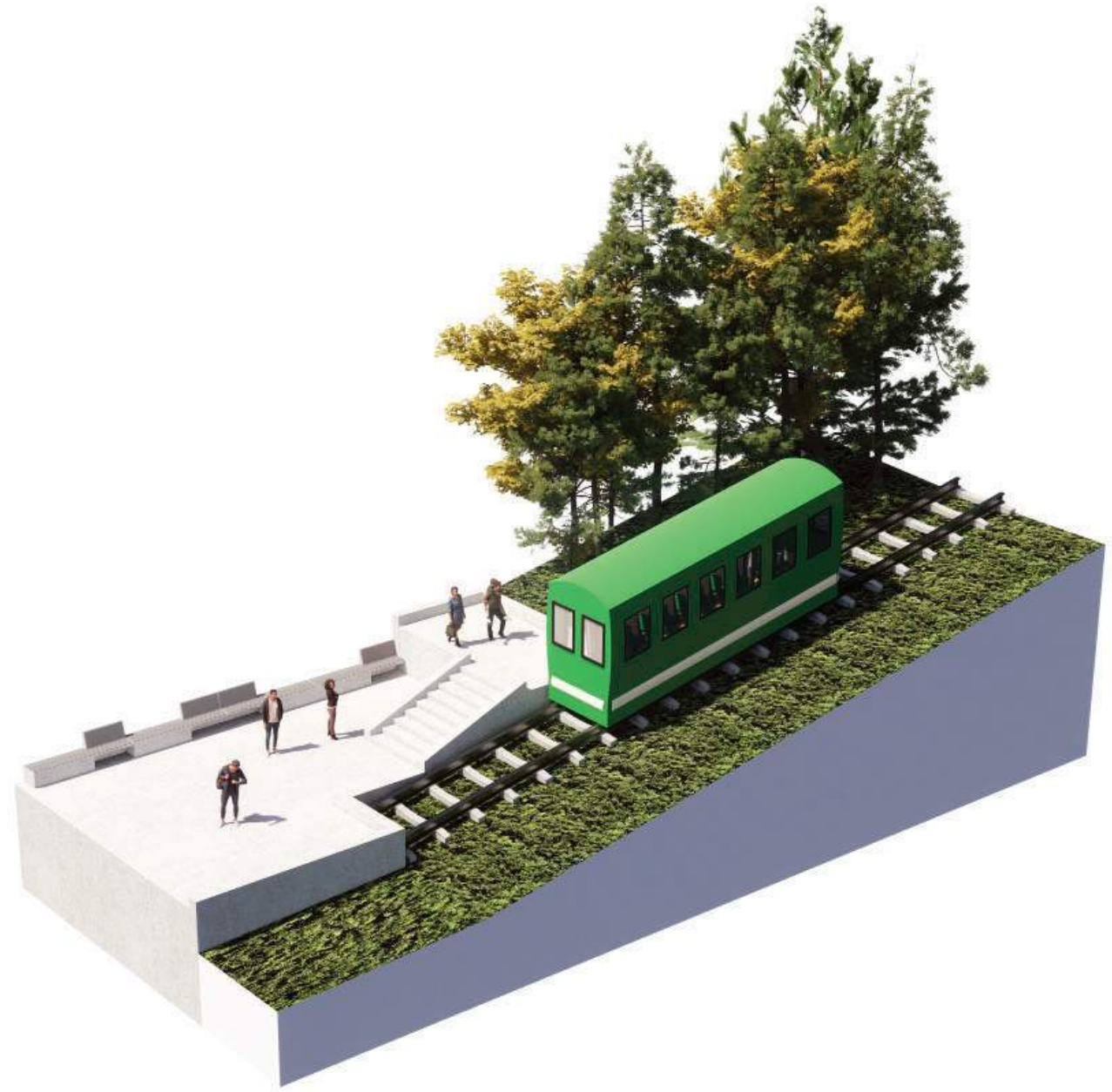


Public review and comment session following the Day Four presentation





Refined digital renderings of the Village Square



Digital vignette of the proposed Funicular Stop and plaza at the bottom of the hillside near the James River

DAY FIVE

On Day Five, minor revisions were made to the overall concept plan. A series of neighborhood-wide diagrams were created to reinforce the development intent and primary framework elements that made up the Redevelopment Plan concept. In addition, high-level grading and yield analyses were performed, confirming the viability of the final concept.

An overall 3D digital model was updated to reflect the final concept plan. Detailed vignettes were further advanced and refined, with new renderings examining specific building typologies, including mixed-use, office, and the neighborhood grocery store. Illustrative street sections were also produced to show the mobility enhancements proposed throughout the corridor.

The evening presentation to the public summarized the process and advancements made over the course of the week-long Charrette. Also discussed were detail of the upcoming refinement process along with an overview of the remaining project schedule up to plan adoption by Amherst County.



Discussions of next steps with the public following the Day Five presentation





GENERAL GRADING DIAGRAM

The image to the left shows the hand-sketch grading diagram produced on the final day of the Charrette. The street network was studied with proposed grades assigned to the routes. Based on ranges acceptable to standards of newer mixed-use developments, assumptions for the feasibility of the plan's prospective grading were made. While several street sections traversing maximum-allowed grades, and a few development sites requiring significant earthwork from existing grades, overall the Redevelopment Plan concept is viable from a grading standpoint.



YIELD DIAGRAM

The questions regarding the intensity of development which the Redevelopment Plan concept illustrates led to a yield analysis to be performed on Day Five. As the image to left shows, the individual development blocks were studied, with parking ratios and footprint sizes used to establish the number of levels achievable for each of the neighborhood's buildings. The study was high-level and broad in scope, knowing that a more detailed Yield Analysis would be included with the final Redevelopment Plan after refinements.

In general summary, the Day Five plan included over 1,000 new residential units across multiple typologies. In addition, approximately 100,000 SF of commercial, 120,000 SF of office, and 110,000 SF of industrial space were shown on the plan.



Day Five work within the Design Studio



Public review and comment session following the Day Five presentation



Digital rendering of the Greenway Street section & plan diagram



Digital vignette of the proposed Grocery Store and liner retail buildings along the development's entrance street



Digital rendering of an office building within the proposed development



Digital rendering of a typical mixed-use building within the proposed development



Master Plan diagrams - (top) Open Space; (bottom) Phasing Options

3D Model Views of the Proposed Master Plan neighborhood - (top) looking southeast; (bottom) looking northwest

THE PLAN

Following the Design Charrette, the hand-drawn Redevelopment Plan concept from the final day was scanned and then drafted into the digital CAD base plan for the Training Center Site. Based on the accuracies of the CAD file, minor revisions were made to the overall plan to best fit the proposed neighborhood and the existing conditions of the Site. The final CAD linework was then rendered to produce the illustrative plan rendering shown on the opposite page.

In its final form, the Redevelopment Plan has created an urban, mixed-use walkable neighborhood on the Training Center Site. The viability of the mixed-use neighborhood core is ensured via the new connection/entrance off Highway 210 designated as Hillside Drive. The new gateway feature provides the necessary direct vehicular link and view corridors into the development to make the proposed retail and office uses achievable. The terraced retaining walls, monument features, and reclaimed native landscape truly do provide a grand sense of arrival into the neighborhood.

The Village Square is the major public space in the neighborhood’s north section. The urban plaza-type space is located at the prime intersection of the Hillside Drive and Colony Road. Mixed-use buildings front onto the intersection, as “Missing Middle” housing and senior living buildings located a half-block off the Square. The proposed extension of Colony Road east provides the opportunity for a large, single-developer type apartment complex to occur. A community church site provides an anchor to the east side district, with three groupings of village homes located further down Colony. Colony Road eventually navigates down the existing terrain and turns back west along the James River, providing improved access to the existing Heritage Trail parking area and trailhead.

As Hillside Drive continues west through the Village Square, a greenway and shared-use path are introduced on its south side. The path extends past the Cupola Quad green space, which includes a monument with the reclaimed cupola from the CVTC’s Bradford building. Townhomes primarily line the Greenway Street as it follows an existing ridgeline, passing The Farm site, which after renovation becomes an event space and brewery/winery/distillery outfit. A destination restaurant and Funicular Station reside on the Site’s far western high point. The Funicular and Grand Stair provide mobility options for those looking to connect into the riverfront trails system.

Near The Farm, an iconic pedestrian bridge spans a re-vegetated ravine. The bridge runs to a podium apartment development site as well as an amphitheater and playground complex, both sitting just off adjacent ravines. Secondary streets run southeast from this amenity core, with village homes transitioning to larger estate homes on the mobile home park property. Both of these residential enclaves include community green spaces where residents are encouraged to gather and interact. Much of the forested hillsides remain, with nature paths meandering throughout, connecting the various amenity sites. Both known on-site cemeteries remain, with appropriate ceremonial enhancements made to honor the spaces.

Over the course of the remaining sections of this Summary Document, the major framework elements, plan features, and development opportunities will be illustrated and described in-detail.

LEGEND

OPEN SPACE

1

VILLAGE SQUARE

2

HILLSIDE ENTRANCE FEATURES & VIEW CORRIDOR

3

EXISTING RAVINE; RE-PLANTED WITH NATIVE VEGETATION

4

EXISTING MEMORIAL GARDENS CEMETERY

5

FORMAL RESIDENT LAWN

6

WATER TOWERS GARDENS

7

TRAILHEAD

8

COMMUNITY GREEN WITH LARGE, PRESERVED TREES

9

CUPOLA MONUMENT

10

CUPOLA GREEN / QUAD

11

SMOKESTACK PLAZA

12

VILLAGE HOME PATIO / "HANGOUT"

13

THE FARM: EVENT SPACE & BREWERY/WINERY/DISTILLERY

14

RIVER OVERLOOK

15

GRAND STAIR

16

FUNICULAR BASE PLAZA

17

NEW TRAIL BRIDGE (TO LYNCHBURG)

18

STORMWATER CHAIN

19

PEDESTRIAN BRIDGE

20

AMPHITHEATER & DESTINATION PLAYGROUND

21

COMMUNITY GARDEN

22

RECLAIMED MEMORIAL CEMETERY SITE

23

ESTATE HOME NEIGHBORHOOD PARK

24

CONVERTED FERTILIZER ROAD TO TRAIL-ONLY

25

JAMES RIVER HERITAGE TRAIL ACCESS & PARKING AREA

26

CIVIL WAR HISTORIC SITE & OVERLOOK

27

PROPOSED ROAD EXTENSION TO TRAIL ACCESS AREA

LAND USE

28

MIXED-USE BUILDINGS

29

OFFICE

30

URBAN-FORMAT NEIGHBORHOOD GROCERY

31

LINER RETAIL

32

TECH INDUSTRIAL

33

THE INN - RENOVATED HOTEL

34

MULTI-FAMILY RESIDENTIAL

35

MISSING MIDDLE HOUSING

36

TOWNHOMES

37

COTTAGE HOMES / POCKET NEIGHBORHOOD

38

VILLAGE HOMES

39

ESTATE HOMES

40

ICONIC CANOPY & STAGE

41

RENOVATED FARM BUILDINGS; BREWERY & MARKET

42

DESTINATION RESTAURANT

43

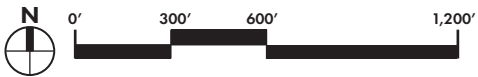
FUNICULAR STATION

44

COMMUNITY CHURCH

45

SENIOR LIVING







7

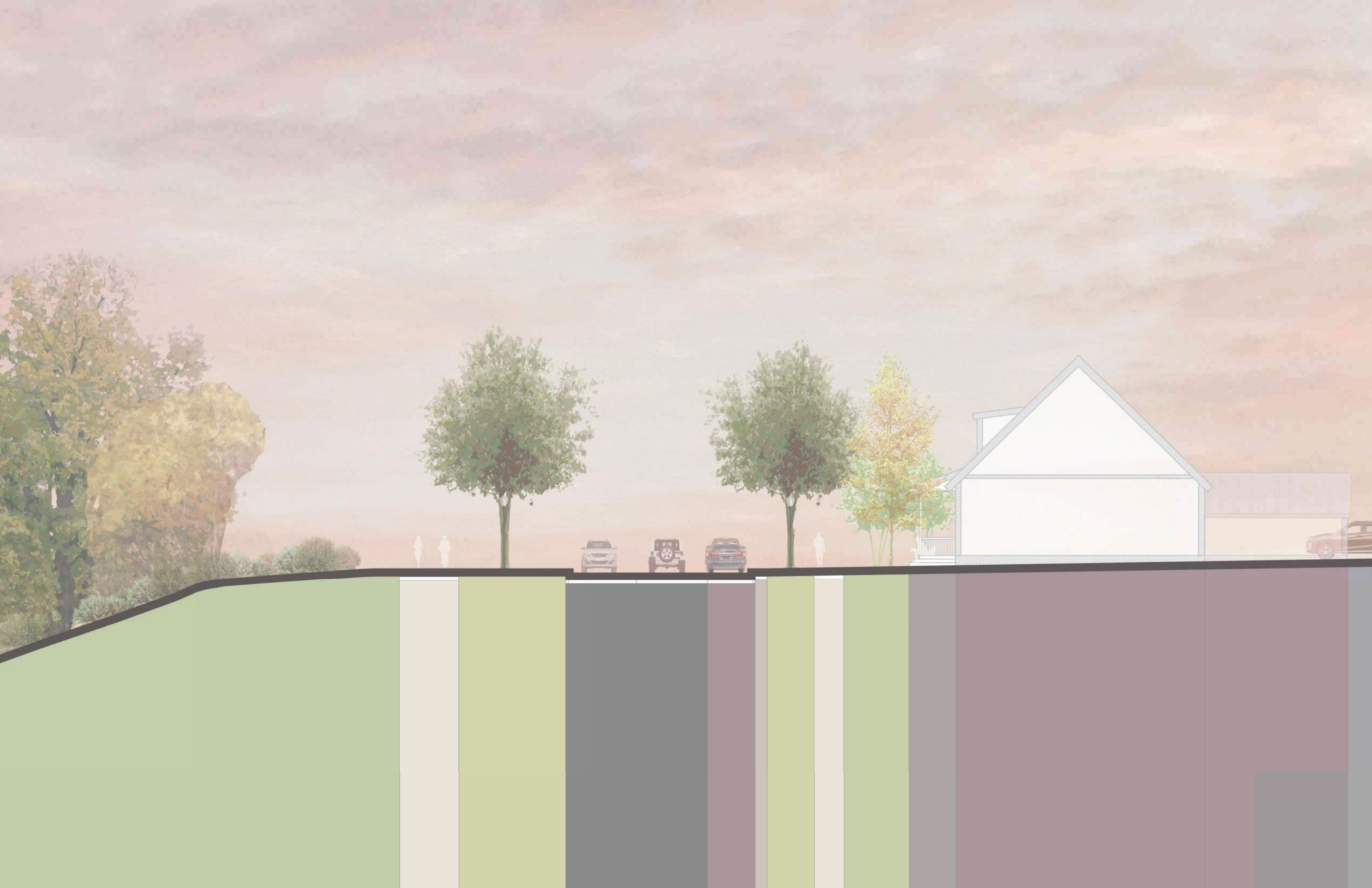
FRAMEWORK ELEMENTS

OVERVIEW

WALKABLE URBANISM

PRESERVATION

SITE DEMOLITION & PREPARATION



OVERVIEW

Over the course of the master planning process, equal consideration was given to both the Training Center Site’s future potential as well as its influential past. Two primary focus areas made these necessary ties and laid the framework around which the Redevelopment Plan grew: **Walkable Urbanism and Preservation.**

The walkable, mixed-use neighborhood defined within the Redevelopment Plan can only be established if certain design initiatives and principles are applied throughout the development. This foundation of urban design thought pushes past typical development standards. Thus, the neighborhood can be ground-breaking, offering a once-in-a-lifetime opportunity for Madison Heights and the region as a whole to transform its built environment and shape its future.

In conjunction, with such a large catalog of existing buildings, specimen trees, and large wayfinding elements on the CVTC campus, opportunities to preserve and incorporate strategic site elements drove many design decision throughout the master planning process. While the vast majority of the campus building were deemed not salvageable, several are proposed to be adaptively re-used. Many of the neighborhood’s public street corridors and open spaces are oriented around preserved site features.

Over the following pages in this section, these the manner in which these two framework elements shaped the Redevelopment Plan will be explored in more detail.



Features of walkable urbanism (left) and preservation (right) similar to what is envisioned to occur within the Site’s redevelopment

WALKABLE URBANISM

A walkable, mixed-use environment is predicated on the activation of the public realm. Ground-level activity is key to drawing use of any development. Thus, a plan’s buildings must interact with the adjacent streets and streetscapes. The pedestrian environment must be interesting. Pedestrians need to have their attention engaged by what they see along the public corridors. They must be encourage to explore and provided with multiple options around which to move. At its most basic level, this can be achieved through the employment of four key design elements.

FOUR KEY DESIGN ELEMENTS

1) Build to the sidewalk.

Design street or open space frontages with as small a setback as advisable. Pushing a building close to the pedestrian space provides a sense of enclose and scale as one moves through a space.

2) Make the building fronts “permeable.”

The ground-level of buildings should be design as transparent as possible. Limiting the amount of blank walls facing a pedestrian is important in portraying a comfortable walking environment. Glass as a building material allows the activity occurring within a building to help spur activity on the exterior as well.

3) Prohibit parking lots in front of the building.

Surface parking lots, whether full of cars or not, is devoid of activity and any sort of urban frontage. Pedestrians faced with these conditions want to pass by as quickly as possible.

4) Create an interconnected network of mobility options.

By giving equal attention to pedestrians, cyclists, and transit users as vehicles within a given street corridor, the design encourages interaction among the uses. Routes through a given area are also diversified.



Elements of walkable urbanism - ground-level, active storefront (left), well-detailed streetscape (middle), multi-use trail (right)



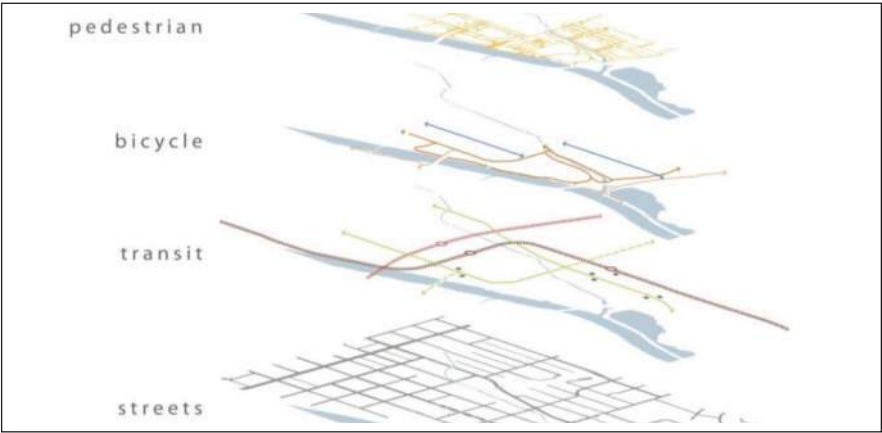
1) Build to the sidewalk.



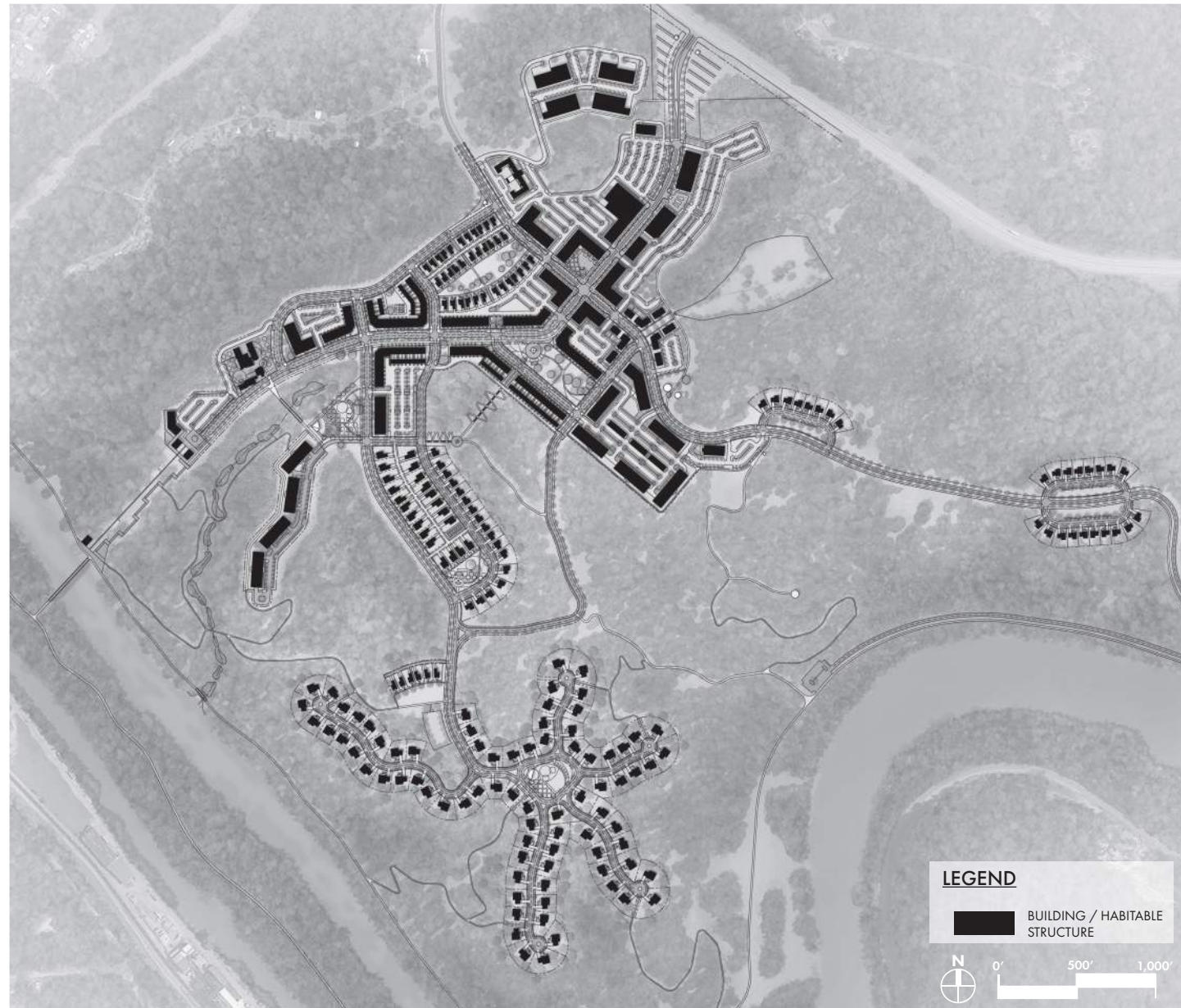
3) Prohibit parking lots in front of the building.



2) Make building fronts “permeable.”



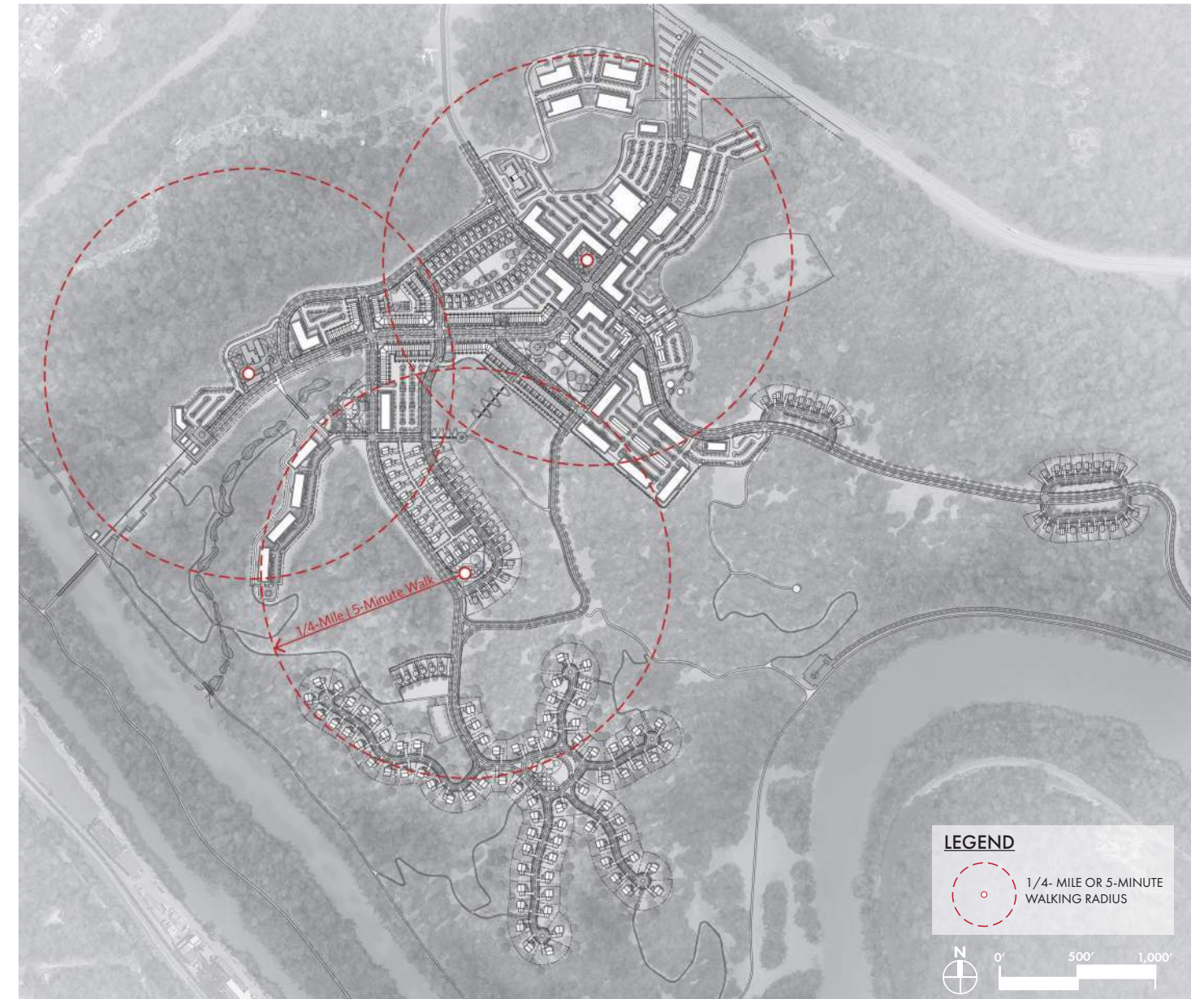
4) Create an interconnected network of mobility options.



BUILT FORM

As the diagram above illustrates, all of the Redevelopment Plan's buildings front onto streets or public open spaces. Users of the public realm, whether they be motorists, pedestrians, or cyclists, are engaged along the buildings' ground levels. Setbacks have been minimized and are consistent along a given corridor. All surface parking lots are located to interior of development blocks, shielding the expanses of hardscape from the pedestrian environment with buildings.

The neighborhood's green spaces are enclosed by adjacent buildings. In addition to shaping forms, these active frontages ensure there are always eyes and ears on the open spaces, influencing the sense of safety and security of users.



PEDESTRIAN WALKSHEDS

In a walkable urban neighborhood, it is encouraged to space high-activity nodes roughly a 1/4-mile or 1/2-mile apart. These distances, corresponding to a 5-minute and 10-minute walk respectively, can be covered by the majority of pedestrians at a comfortable pace. Thus, movement through a well-planned development is enhanced at the most basic design level. The three Redevelopment Plan nodes identified above, the Village Square, The Farm, and the Village Home Patio/"Hangout" are spaced apart within this threshold. Nearly all areas of the Site can be accessed via a 5-minute walk from each nodes, with multiple routing options available throughout.



Bird's-eye perspective of the overall proposed neighborhood of the Training Center Site looking southeast.

PRESERVATION

In its heyday, the CVTC campus would have presented a stately, picturesque prominence to visitors. The unified building materials and large expanses of manicured lawn promote a picture of an ideal campus environment. Unfortunately, many of the buildings, roads, and site features have deteriorated over time. Big areas of the campus grounds have not been maintained to previous standards, with overgrowth and health issues affecting many landscaped areas.

The decision not to invest in the restoration of the vast majority of existing buildings is well-founded from an environmental, market, and implementation perspective. However, there are several buildings and site features that can be restored and possibly re-used for relatively minor financial impact on the neighborhood development.

On the following pages, the buildings, site features, and natural elements identified in the Redevelopment Plan for preservation are highlighted with design precedents included. The overall plan diagram on the opposite page illustrates the locations of these initiatives.



Existing structures & specimen trees that were studied for preservation



Site features presevred and enhanced similar to those proposed within the Site: large industrial facility (left), barn structure (top right), and panoramic overlook (bottom right)





**PRESERVATION
DIAGRAM**

- LEGEND**
- KEY BUILDINGS
 - KEY SITE FEATURES
 - CEMETERY
 - SPECIMEN TREE
 - HISTORIC OVERLOOK
 - RE-PLANTED RAVINE





Existing building identified for re-use as The Inn



Precedents of historic hotel structures

KEY BUILDINGS

THE INN

At the current Training Center Site entrance on Colony Road, adjacent to CVTC campus monument sign, lies The Inn, a former dormitory building. The structure appears in rather good condition. The assumed floor plan layout lends itself to potential re-use as a boutique hotel for visitors the proposed neighborhood. The location just north and west from the Village Square is ideal for a typical guest looking to explore the activity of the walkable district. The Inn's property could accommodate additional guest parking lots with minimal site impacts. In addition, the exiting courtyard off the buildings main entrance can be re-imagined into an incredible amenity area for the hospitality use.

THE FARM

Sitting at the end of an existing ridgeline, the former farm complex of buildings lie in an advantageous location within the proposed neighborhood. With investment in restoration of materials and renovation of the building interiors, the complex can be re-imagined as The Farm, a dynamic event space and brewery/winery/distillery outfit on-site. New facades can be constructed for the building sides facing the communal exterior space, which is envisioned to transform active plaza setting. Specialty paving, ornamental lighting, decorative site furnishings, and colorful landscape areas together could transform the former utilitarian space into a vibrant, active place.



Existing Farm complex



Precedents of adaptive re-use of farm structures for commercial or entertainment uses



Precedent of an artistic surface treatment on a preserved water tower

KEY SITE FEATURES

THE WATER TOWERS

The two existing water towers on the CVTC campus are monumental icons within the landscape. These features can easily be preserved in the new neighborhood with minimal cost impact. The Redevelopment Plan proposes creating a small garden-style park space around the base of the towers. An adjacent parking lot provides parking for neighborhood trail users, establishing the site as a potential trailhead location. Basic in design, simple artistic detailing, through lighting or mural-type paintwork, could transform the utilitarian structures into dynamic wayfinding elements.



Aerial rendering of the Water Towers open space and surrounding development

THE CUPOLA

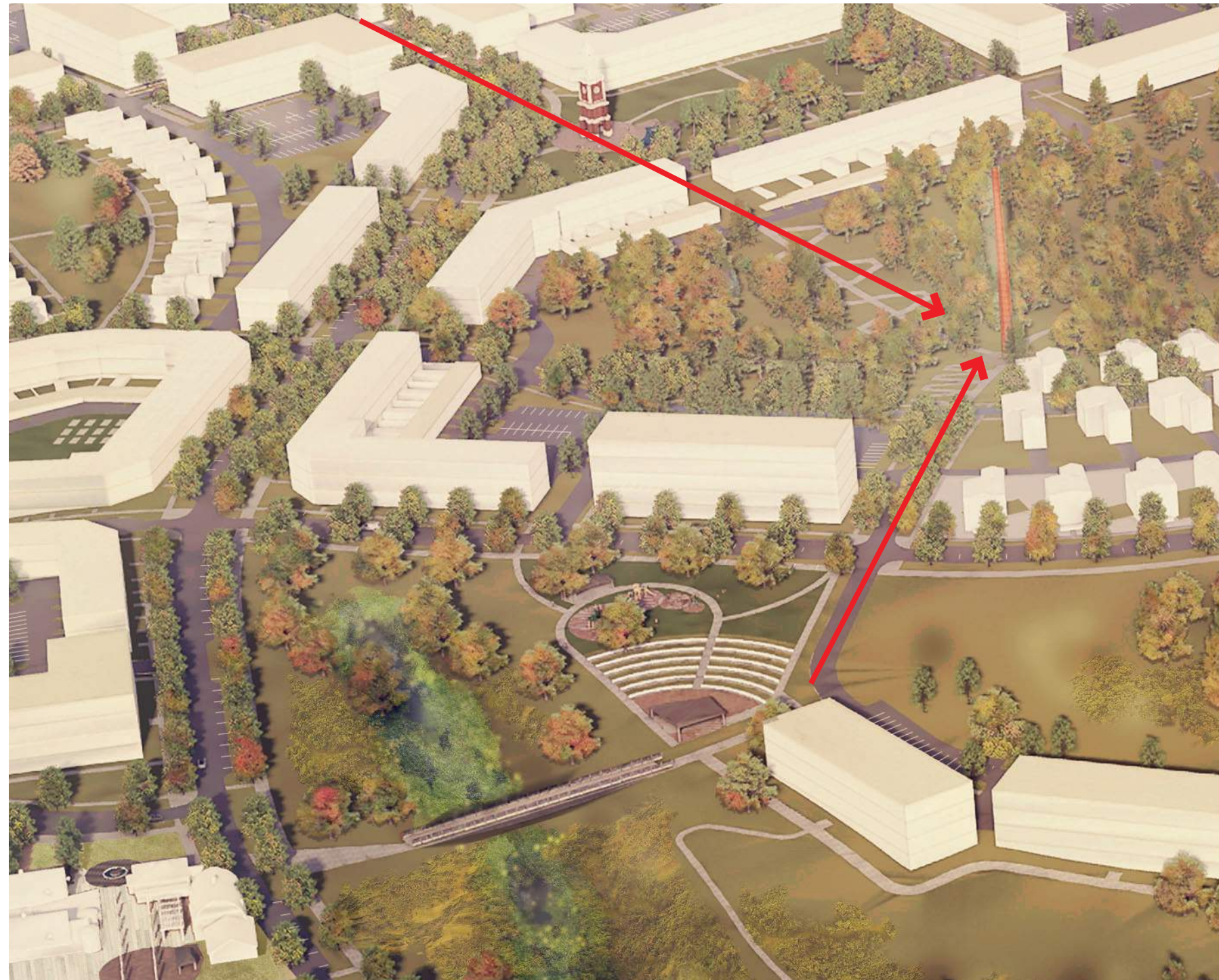
The cupola structure on top of the Bradford building may be the most recognizable piece of architecture on the CVTC campus. While re-use of the building itself within the Redevelopment Plan was not feasible, preservation of the cupola and reclaiming the feature into a monument should be achievable. As highlighted in the image below, the cupola is proposed to be placed atop a brick-faced structure, creating a large monument within the neighborhood's largest "quad" green space. Designated the Cupola Quad, the public open space is aligned around the monument, which when set in a plaza space just off the greenway side path and with a water veneer feature in close proximity, becomes an important icon within a high-activity center in the neighborhood.



Precedents of a detailed cupola (top) and monument features within a public space (bottom)



Vignette showing scale and materiality of the Cupola Monument



Aerial rendering showing the preserved Smokestack as a major wayfinding feature, with axial views to it from the surrounding neighborhood

THE SMOKESTACK

Rising out of a deep, forested ravine in the center of the Training Center Site, at the location of the former CVTC campus power plant, the smokestack is a prominent visual marker currently. The Redevelopment Plan further emphasizes its role in wayfinding, as both the Greenway Street and the secondary street running from the amphitheater/playground/pedestrian bridge amenity area are aligned to the smokestack. Two sets of grand stairs and accessibility ramps provide access down to the base of the structure, where a small plaza can be imagined to contain a number of historic or interpretive elements in its design. From the base plaza, pedestrians are provided direct access to multi-use trails and nature paths meander through the forested ravines nearby.



Aerial photo of the existing Smokestack set down within the forested ravine



Large specimen trees set within an open lawn space on the existing CVTC campus

NATURAL ELEMENTS

SPECIMEN TREES

As the tree survey prepared during the Inventory & Analysis phase showcased, the Site is littered with large, mature-growth trees. The Redevelopment Plan has emphasized the preservation of as many of these historic specimens as the neighborhood layout would allow. Several of the neighborhood’s public green spaces, like the Cupola Quad, the green in the pocket neighborhood, the Village Home Patio/”Hangout,” and the destination playground near the amphitheater were designed around individual or groupings of these trees. The trees will provide instant visual impact to the new neighborhood districts upon constriction. The trees will provide an important sense of scale and context within the environment as well.

The selected trees could be found not only in open lawn areas of the existing Site, but also in close proximity to several buildings. Thus, careful tree protection measure will need to be employed at times of building demolition and site preparation to ensure the healthy preservation of these important natural site elements.



Precedents of new park space (left) and building sites (middle & right) that incorporate preseverd specimen tree or tree stands into the final design

Site Section showing development across the Site's ridgetops with the re-vegetated ravines between being preserved





FORESTED HILLSIDES / RAVINES

As covered previously, much of the steep, forested hillsides around the perimeter of the Training Center Site were deemed not viable for redevelopment. Thus, the Redevelopment Plan grew around the idea of using these significant site features as naturalized amenities in and of themselves. Proposed neighborhood development sites were pushed right up the drop-offs of the numerous ravines on the Site's west side. This edge condition, as shown in the site section to the left, will be quite incredible visually. The Redevelopment Plan encourages the ravine areas with no tree cover be re-established with understory and meadow-type native plantings. Certain ravines will be able to be traversed via nature paths, or spanned by the "ravine" pedestrian bridge, or enhanced with an innovative Stormwater Chain.



Two examples of contextual, preserved landscapes set along steep hillsides



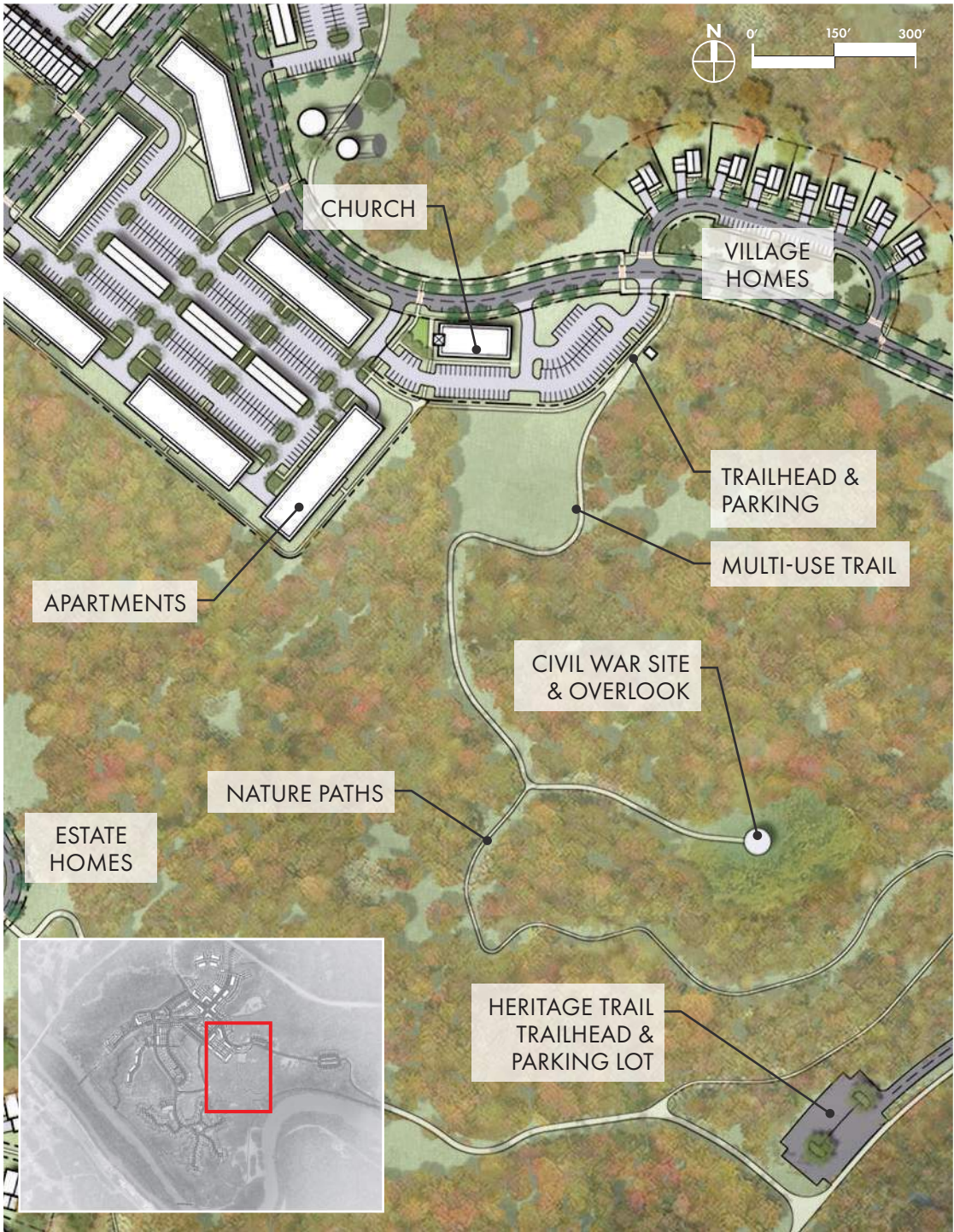
Existing buildings sit atop the various ridgelines above forested James River Valley

PROMONTORY VIEWS / OVERLOOKS

Tied to the preservation of the Site’s many natural ravines will be the promotion of enhanced overlooks at key locations over the James River Valley. Whether development sites or nature paths through naturalized landscape run up to a given overlook, the viewing space itself should be well-design with context-sensitive materials. Any plant overgrowth blocking strategic views should be cleared. Interpretive signage should also be incorporated at most overlooks to better introduce users to the Site’s past, environmental setting, or transformational future.



Open area leading from the Training Center to the Civil War site set within the wooded area above the river



Plan enlargement of the trailhead and enhanced trail connections, to the Civil War historic site



Precedents of preserved Civil War sites enhanced for the visitor experience

THE CIVIL WAR SITE

At the far southeast end of the Training Center Site, nestled on a heavily-wooded promontory point, is a historic marker identifying the location of Civil War event. The site can be accessed via an unmarked, unpaved trail. The Redevelopment Plan, rightly, proposes significant enhancements to the historic site itself as well as the access route to it. From the trailhead parking lot near the proposed community church, a paved pedestrian trail will run through an open meadow into the existing woodlands. The trail will terminate at the Civil War site and overlook. The space will be deigned with appropriate materials and interpretive signage explaining the site’s history and significance. Additional means of access will be provided via nature paths from the Heritage Trail along the riverfront below, tying two cultural assets together.

CEMETERIES

As historic sites with deep, emotional roots in the CVTC campus’s past, the two cemeteries in the Site need to be preserved and honored as best feasible. The most prominent of the two, the Memorial Gardens cemetery on the Site’s north end is currently marked by a metal gate. The Redevelopment Plan proposes the gateway be enhanced with a context-sensitive aesthetic. The multi-use trail that runs throughout the neighborhood passes right by the gate, encourage visitors looking to experience the space. The Missing Middle green opens from the street onto the gate, further elevating the site’s visibility.

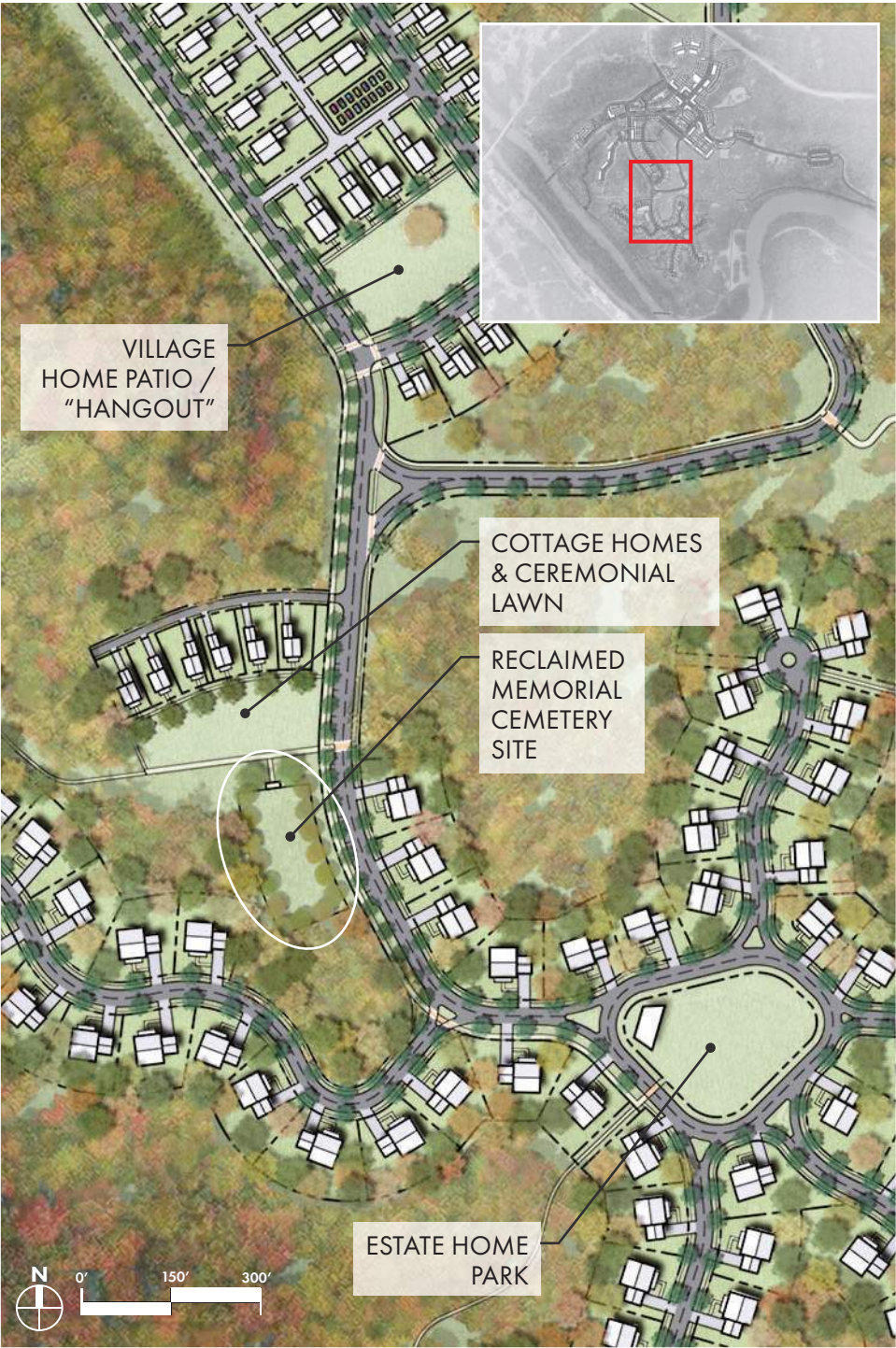
Conversely, the second cemetery has thus far not been honored as it should. Just north of the mobile home park, this cemetery, assumed to be the resting places of African-American who died at the CTVC, is currently overgrown with woodland. Significant landscape cleanup is required, along with the creation of a memorial lawn space and construction of a gate and fenceline surrounding the site. On-street parking stalls and a pedestrian promenade, linked to the nature path system, will provide easy access for those wishing to experience and honor the site.



Memorial Gardens Cemetery (light blue) and gate/entrance (orange) as preserved within the proposed neighborhood



Photos of the gate (left, to be preserved & enhanced) and tombstones/plots set in lawn (right) of the Memorial Gardens Cemetery



Plan enlargement of the trailhead and enhanced trail connections, to the Civil War historic site

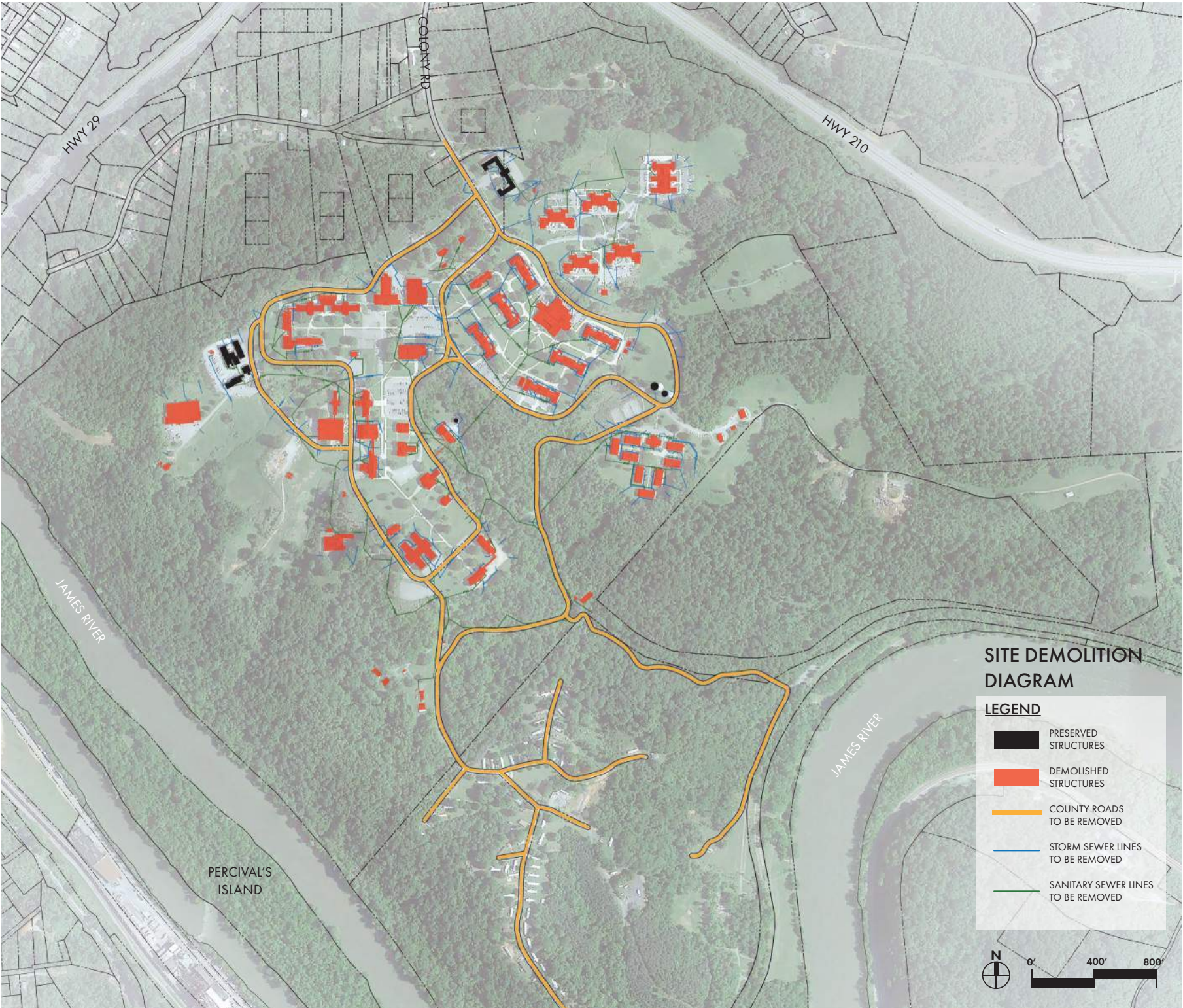
SITE DEMOLITION & PREPARATION

Given its large land footprint and the complexity of its existing facilities and utilities, the demolition of the Training Center Site and grounds, along with the preparation of the Site for redevelopment, will be an immense process. Based on the phasing or implementation strategy established by the governing entity or selected developer(s), demolition and site preparation could occur all at once or incrementally on a block-by-block or per-district basis. Cost drivers as well as industry regulations and developer preference will determine the most optimal path forward.

While the majority of the details will be determined upon further investigation as part of a comprehensive planning and design effort for the Site, the general overviews provided on the following pages are for specific on-site issues factored into the Redevelopment Plan’s framework.



Large-scale site earthwork operations





Demolition of existing infrastructure (left) and the installation of proposed utilities to a building site (right)

INFRASTRUCTURE

Most of the existing utilities on the CVTC campus will be marked for demolition, either due to locational conflicts with the Redevelopment Plan or a lack of expected capacity. Though the fact that service is provided will save on upfront development costs associated with connection to surrounding networks, significant investment will need to be made toward demolition work on-site.

Existing roadways and parking areas will follow suit with the utilities. Demolition of the paved areas will require large amounts of material to be hauled off-site. However, the innovative re-use of the demolished paving materials into new construction sites should be explored. Re-grading once these areas have been removed will be intensive, as the overall area of pavement was large and the fact that many of the campus's roads abutted major slopes and ravines.

BUILDINGS

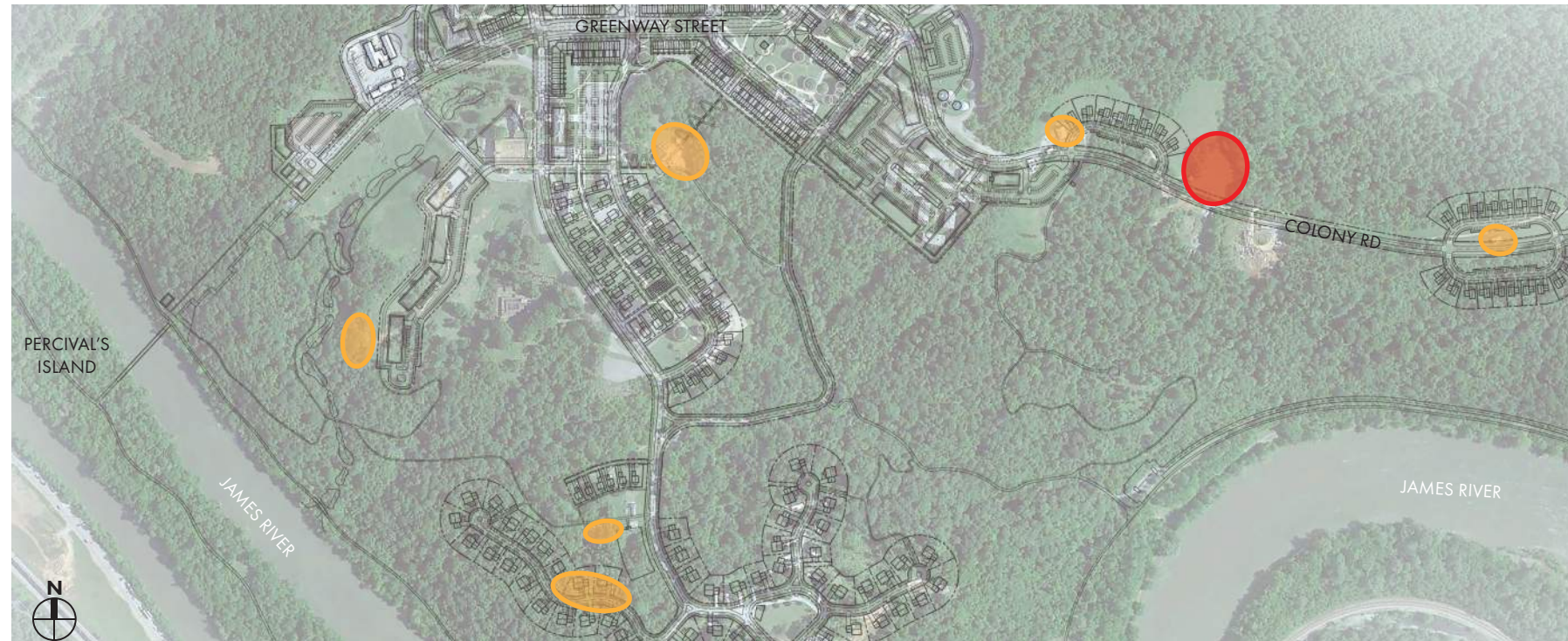
The interiors of most of the buildings on the CVTC campus that are slated for demolition per the Redevelopment Plan contain large amounts of hazardous materials, such as asbestos. Demolition, then, of these structures must follow strict environmental guidelines. Cleared material will need to be hauled off-site per regulations. The former building sites, once cleared, must then be rough graded and prepared for redevelopment. Given most of the CVTC buildings resided on flatter areas of campus, re-grading the pad sites should not involve major earthwork.

Given the condition of the facade brick on most buildings appears to be good, efforts should be made to explore options for preserving and restoring the building material in different treatments throughout the park, whether they be in new structures or as specialty pavers in a public green space or plaza.



Stages of building demolition ahead of site preparation





Site aerial with the master plan linework overlaid, with areas to be remediated highlighted. Those in orange can be remediated for redevelopment. The area in red should remain open space after remediation.

ENVIRONMENTAL SITE REMEDIATION

Prior to the master planning process commencing, an Environmental Conditions Assessment (ECA), a Phase II Environmental Site Assessment (ESA) report, and a Supplemental Phase II ESA were completed for the CVTC campus property. These assessments identified environmentally-sensitive areas that were negatively impacted by past site activities. The CVTC campus was then required to follow a Voluntary Remediation Program (VRP), which included monitoring reports on the most hazardous contaminated areas.

The image to the left shows the seven locations with the most potential to affect site operations in accordance to the Redevelopment Plan. Six of the sites, following remediation, could allow for development. The seventh, an old sanitary landfill location, was deemed unsuited for development even after remediation. Per plan, this area is to remain an open vegetated field.



Former sanitary landfill site



Former landfill area that cannot be remediated for development can be seen by the reddish color of its groundcover

BALANCE THE SITE

Implementation of the Redevelopment Plan over the existing Site will require extensive earthwork activities. To best control costs, individual development projects should attempt to achieving as near a balance between the amount of cut and fill earthwork material required as possible. A more detailed, site-by-site or block-by-block analysis was not possible as part of this effort. Generally speaking, the layout of the neighborhood has been determined to be feasible from a grading standpoint.

In terms of earthwork balance, on the Redevelopment Plan scale, two major areas of the Site are highlighted in the figure to the left. The small hill just south of Colony Road near the existing property entrance is proposed to be leveled off as part of redevelopment. Conversely, a portion of an existing ravine is proposed to be filled in to allow for the apartment complex included in the Redevelopment Plan.



Existing Site topography showing areas that will receive major amounts of cut (red) and fill (blue) earthwork material



Cut (red) and fill (blue) areas in relation to proposed Redevelopment Plan



8 | MOBILITY

OVERVIEW

HIGHWAY 210 ENTRANCE / ACCESS

STREET HIERARCHY

THE FUNICULAR

ACTIVE MOBILITY NETWORK





OVERVIEW

As described in the preceding section, one of the main principles of walkable urbanism is the establishment of an interconnected network of mobility options. Thus, in analyzing the Redevelopment Plan from a mobility standpoint, its not sufficient to simply look at the layout of the neighborhood’s streets or trails, but to also consider the number and diversity of facilities provided. The ease of movement for not only motorists, but cyclists and pedestrians as well, was emphasized.

In this section, the proposed neighborhood’s mobility framework will be detailed in-depth. The cross sections of the major street typologies will be illustrated. The diverse set of trail and pedestrian routes running throughout the Redevelopment Plan will be identified. In addition, several unique mobility solutions will be highlighted.

In total, the complete set of mobility enhancements proposed within the Redevelopment Plan ensures the successful promotion of a walkable environment. As the following pages describe, the mobility network is multi-faceted and presents residents and visitors alike with a number of options within which to experience the various areas of the neighborhood.



Street and trail treatments, across varying contexts, similar in nature to those proposed for the Site

HIGHWAY 210 ENTRANCE / ACCESS

Perhaps the mobility initiative with the most significance to overall viability of the Redevelopment Plan is the new connection to Highway 210. Termed the “Old Town Connector,” Highway 210 is an important link between US Highway 29 and the Highway 29 business route through Madison Heights and then on into downtown Lynchburg. For any sort of mixed-use neighborhood core to succeed on the Site, a more direct and visually-prominent entrance is necessary ahead of the existing Colony Road access.

Coordination with VDOT established the frontage span within which a connection would be allowable given their requirements and standards. Given the zone was covered significant forest cover, the new entrance would require clear-cutting of exiting woodlands to allow for construction of the new signalized intersection and Hillside Drive entrance road into the neighborhood.

The images on the following pages illustrate the design details and precedents for the gateway entrance drive.



Aerial view from over the Training Center Site looking northeast toward Highway 210



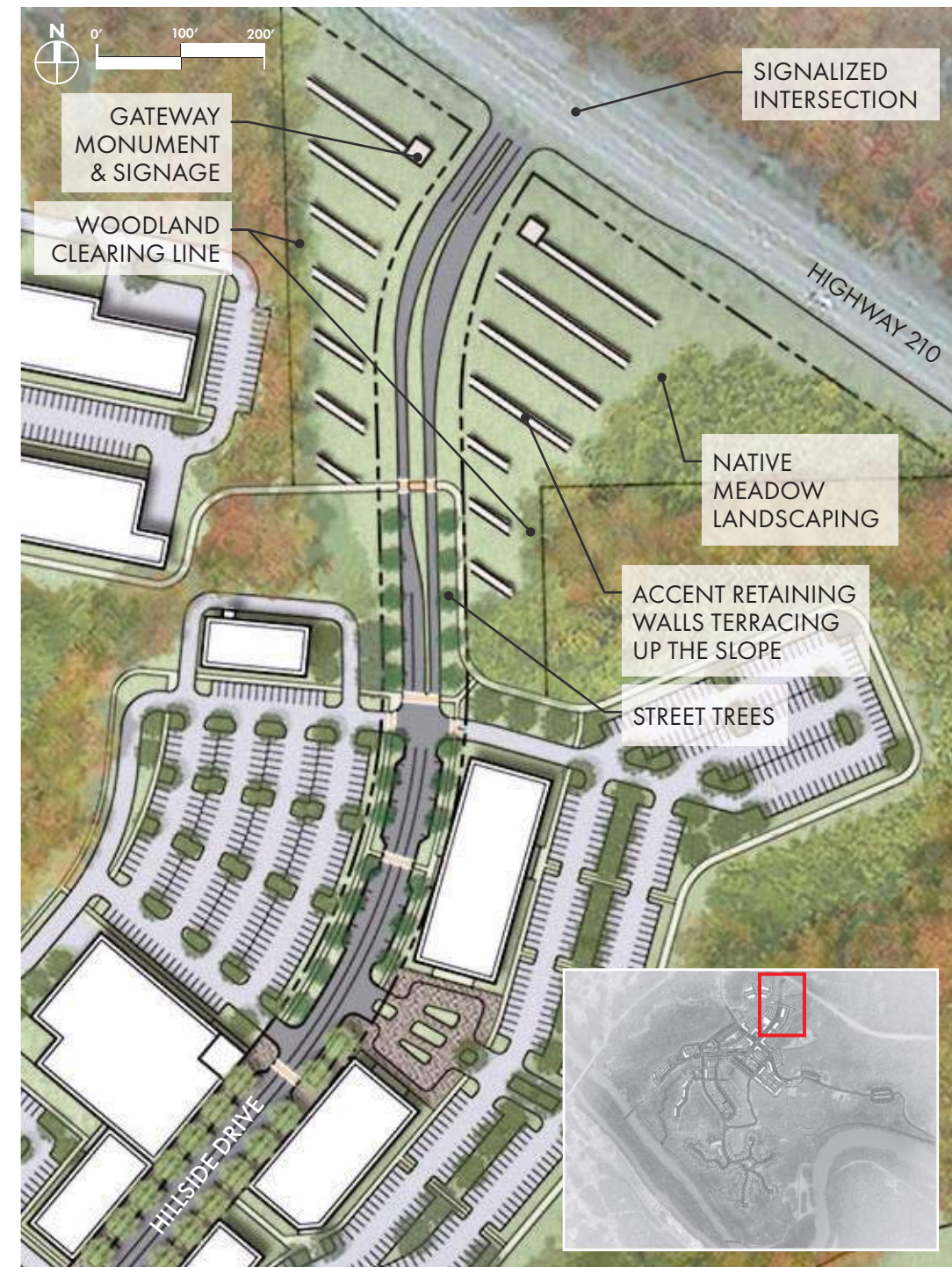
Colony Road, which enters the CVTC campus from the north, is currently the only access route to the Training Center site



Existing buildings in the north portion of the Site through which the proposed entrance drive will run, connecting the neighborhood to Highway 210



Precedents of gateway monuments accentuated with landform and native landscaping



Plan enlargement of the entrance gateway and Hillside Drive intersection off Highway 210



Aerial rendering of the proposed main neighborhood entrance and Hillside Drive intersection off Highway 210, with the accent walls, gateway monuments, and woodland clearing highlighted

STREET HIERARCHY

To concentrate development at intended locations and to encourage circulation through the high-activity nodes of the neighborhood, the Redevelopment Plan establishes a hierarchy of street typologies. The proposed development, then, is comprised of ‘A,’ ‘B,’ and ‘C’/Residential streets.

‘A’ streets represent the civic corridors with highly-detailed streetscapes that connect high-activity areas and important destination within an area. ‘A’ streets also typically include wider pedestrian zones in urban districts and trails or side paths in less-dense areas. ‘B’ streets are secondary streets that while still nicely landscaped with building frontages, are smaller in cross section width and do not link between major activity hubs. ‘C’ streets in most urban areas are generally service- or access-oriented routes. In mixed-use neighborhoods like that proposed in the Redevelopment Plan, ‘C’ streets can also be designated as residential streets, as they are typically found in lower-density residential areas that see lower volumes of traffic and pedestrian use.

As the diagram on the opposite page shows, the Hillside Drive/Greenway Street shared corridor and the central section of the enhanced Colony Road are the neighborhood’s ‘A’ streets. The secondary ‘B’ streets that run out from these two primary corridors connect to the many public green spaces and naturalized edge areas around the neighborhood. The ‘C’/Residential streets provide linkages to the periphery residential areas as well as more functional, though secondary, access routes to the neighborhood’s destination sites. Colony Road itself, as its proposed extension east ultimately ends at the James River Heritage Trail parking area and trailhead, steps down in classification given the decreasing levels of service the further away from the neighborhood it runs.



‘A’ Street precedents



‘B’ Street precedents



‘C’ Street precedents

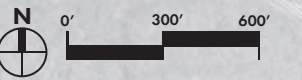




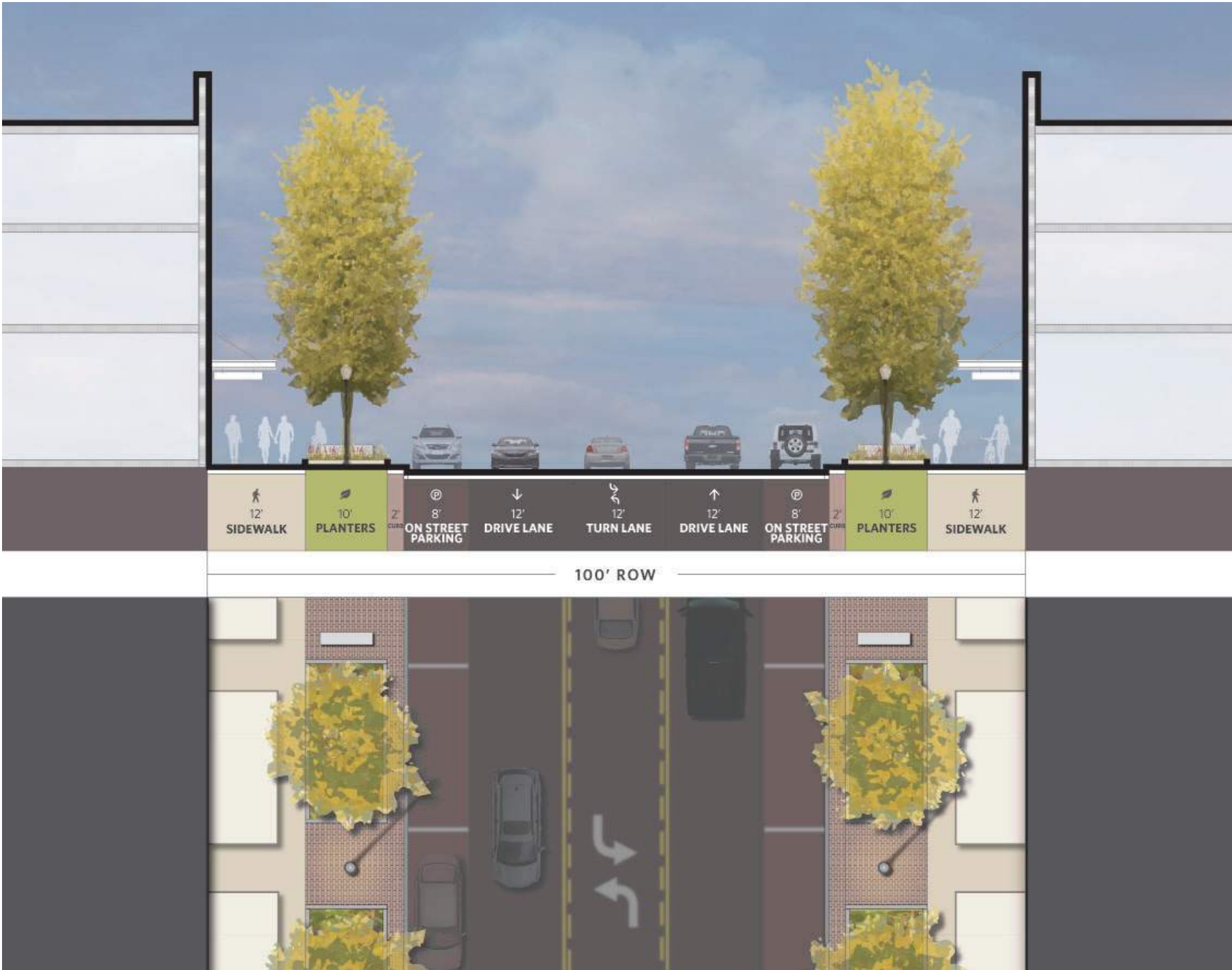
**STREET HIERARCHY
DIAGRAM**

LEGEND

- HIGHWAY
- 'A' STREET
- 'B' STREET
- 'C' STREET /
RESIDENTIAL STREET
- EXISTING LOCAL STREET



NEW STREET SECTIONS



HILLSIDE DRIVE

As Hillside Drive runs from its intersection with Highway 210, the corridor consists of a typical boulevard cross section, with a landscaped median dividing travel lanes and wide parkways and street trees lining the outer curb lines. Once it enters the neighborhood, Hillside Drive assumes the character of a traditional mixed-use street.

Two 12-ft-wide travel lanes are bisected by a continuous center turn lane, allowing easy movements into the driveways of the office and retail blocks of the area. On-street parallel parking stalls are provided on both sides of the street. 10-ft-wide urban landscape planters with street trees line the section, softening the vertical environment dominated by the mixed-use building facades.

Decorative light poles fall within the same amenity zone as the planters and site furnishings, like ornamental benches, litter receptacles, bike racks, and public art features. Outside of these areas, the pedestrian zones consist of widened sidewalks or promenades free of obstructions, allowing easy access into and out of the mixed-use buildings that front the street.



GREENWAY STREET

Just west of where Hillside Drive intersects with Colony Road, near the Village Square, the corridor’s cross section changes significantly. The widened promenades on both sides of the mixed-use section make way for a shared-use side path on the street’s south side. The side path runs down the center of a proposed greenway within the right-of-way. This new Greenway Street becomes a key linkage between several of the neighborhood’s key destinations, like the Cupola Quad, The Farm, and the Funicular Station.

The side path is proposed to be 12-feet-wide, allowing for comfortable two-way use between cyclists and pedestrians. 14-ft-wide greenway strips provide landscape buffers for the path. In the street itself, the center turn lane of Hillside Drive is removed. The curb-to-curb section simply includes two travel lanes and on-street parallel parking stalls on both sides. On the corridor’s north side, a 10-ft-wide parkway strip contains street trees, with a standard 6-ft-wide sidewalk provided for connectivity. The parkway strips on the outside of both curb lines also include decorative roadway light poles and fixtures.



VILLAGE HOME STREET

As traffic volumes and pedestrian usage decrease on the secondary streets branching away from the central spine of Hillside Drive/Greenway Street, the rights-of-way narrow and the cross sections simplify for these primarily residential-oriented corridors.

The residential streets align with a standard yield street. On these segments, no designated on-street parking stalls are provided. The two widened travel lanes, in this case 14-feet-wide each, allows for on-street parking along the curbs with room still present for two-way traffic given one car yields to another. This treatment is a “best fit” to the village home areas within the Redevelopment Plan neighborhood. The district includes both front- (i.e. street-) loaded and alley-loaded lots. The driveways of the front-loaded lots would make on-street stalls inefficient.

Both sides of the village home street are lined with street trees set within 10-ft-wide parkway strips. Decorative pedestrian-scale light poles are aligned between the street trees. Sidewalks parallel the street on either side as well. One specific village home street is lined with lots on its east side and a ravine on its west. Along the west side, a multi-use trail lies in-place of the sidewalk outside of the parkway strip.





ESTATE HOME DRIVE

A unique street condition occurs within the estate home development on the current mobile home park property. The proposed streets follow similar paths as the gravel drives of the park community, running along existing ridge centerlines. The estate home lots, while bigger than the mobile home parcels, similarly fall steeply away in grade from the roadway. Thus, the roadway cross section does not include curbs and gutters, as runoff is allowed to enter native vegetation bioswales along the edge of pavements, which then allow for natural permeation into the subsoil further down the side slopes.

Pedestrian light poles and fixtures line the road, while on-street parking is allowed via yield movements like the village home street. Yet longer front driveways associated with the larger lots provide more room for visitor parking off-street. The main estate home street that enters the district includes a 10-ft-wide trail on its north side, as illustrated in the section to the left. Underdrains are provided along both the trail and sidewalks where necessary to allow excess water storage in the bioswales to pass down the side slopes without impacting the public walkways.



THE FUNICULAR

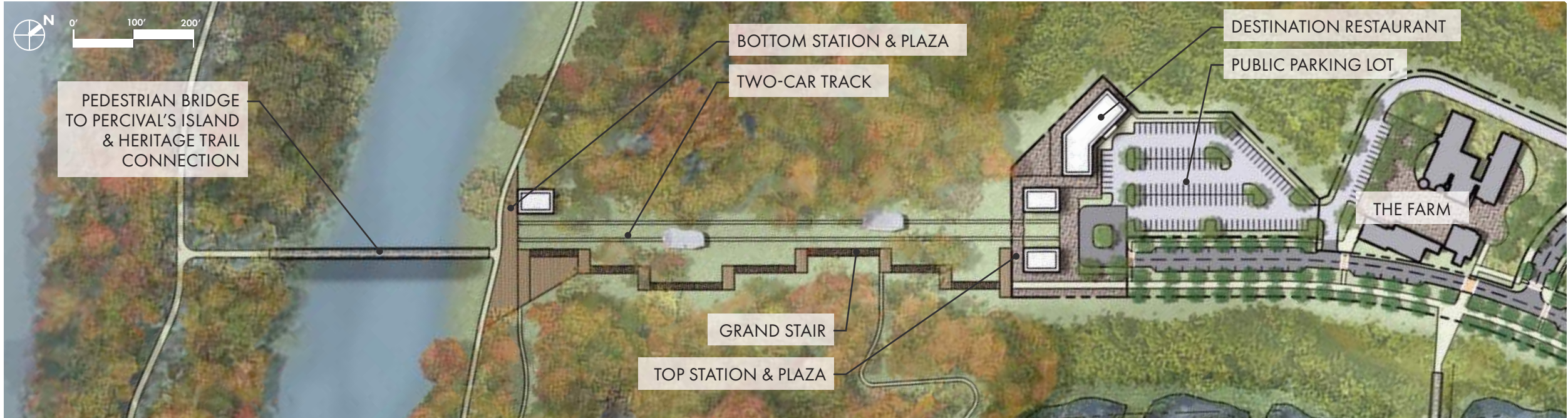


Precedents of Funiculars set within a forested hillside



At the western terminus of the Greenway Street lies the Funicular Station. The Funicular itself, an inclined railway, would accommodate users looking for a zero-effort descension or ascension over the existing hillside between the neighborhood and the James River waterfront. Similar features at other metropolitan areas have proven to be quite successful public- or private-transit options.

At the top Station, a surface parking lot would accommodate park-and-ride users of the Funicular. The system could be designed with two tracks to allow for shorter wait times between departures/arrivals. At the base of the Funicular lies a plaza, which allows for easy on- and off-boarding of the cars as well as transport of bikes or other user equipment from the riverfront trails. A proposed pedestrian bridge spans the river to Percival’s Island, providing a more direct link for commuters looking to travel to/from downtown Lynchburg.



Plan enlargement of the Funicular and mobility connections typing the neighborhood to the regional trail network



Vignettes of Funicular station & plaza with connection to the proposed riverfront trail



ACTIVE MOBILITY NETWORK

In parallel with the hierarchy of streets provided throughout the neighborhood, a diverse set of pedestrian- and bike-oriented facilities comprises the Redevelopment Plan's active mobility network. The network was developed with the understanding that all areas of the Training Center Site would be accessible by some pedestrian route. The individual facilities were selected for specific routes with context for the immediate surroundings and the expected levels of usage in front-of-mind.

As the overall plan diagram on the opposite page highlights, the diversity in path types mirrors the variety in settings found across the Site. Hillside Drive and Greenway Street include mixed-use pedestrian zones and a shared-use side path respectively. Multi-use trails traverse most all areas of the neighborhood, providing a number of contiguous loop routes for users to enjoy. These trails transition to nature paths once the routes reach the steep, forested ravines and draws that encircle the neighborhood on its south and west sides.

With the James River Heritage Trail running along the toe of these hillsides, trail connections to the regional path were emphasized. Most notably, Fertilizer Road is proposed to be converted from a shared roadway to a bike/ped-only path.

Among the special facilities within the Redevelopment Plan are three sets of Grand Stairs, three pedestrian bridges, and a number of promenades that provide important mid-block connections within the neighborhood, but also ceremonial entrances to sites of remembrance, most prominently the two cemeteries within the Site.



Precedents of pedestrian and bicycle facilities through varying contexts similar to those proposed for the Site



ACTIVE MOBILITY DIAGRAM

LEGEND

 JAMES RIVER HERITAGE TRAIL	 PEDESTRIAN BRIDGE
 MULTI-USE TRAIL	 GRAND STAIR / RAMP
 NATURE PATH	 MIXED-USE STREETSCAPE
 GREENWAY SIDE PATH	 SIDEWALK
 PROMENADE	





ENHANCED MIXED-USE STREETSAPES

The segments of both Hillside Drive and Colony Road that extend directly past the Village Square are fronted by either mixed-use or retail/commercial liner buildings. The building typologies are characterized by active ground-levels of storefronts, gallery bays, or lobby/atrium entrances. The pedestrian zones that run along these ground-level active spaces need to accommodate easy access to/from the streets while also allowing for potential tenant fit-out areas, like outdoor dining bays or display sections.

Thus, the sidewalks in these areas are typically widened and accompanied with detailed streetscapes that include specialty paving areas, seating areas with ornamental site furnishings, decorative lighting, landscape planters, and street trees. Here, ease of circulation through a corridor is less the focus than is engagement with active ground-levels of the adjacent buildings while stopping to enjoy the scene.



Precedents of detailed streetscapes in a traditional aesthetic, with specialty paving, decorative lighting, site furnishings, public art, and landscaping in front of ground-level storefronts

TRAIL NETWORK

Outside of the neighborhood’s mixed-use core, a robust system of trail typologies provide various routes for cyclists and pedestrians to follow to all corners of the Site. In selecting the right “fit” for typology to a given location, the ideal facility would minimize the impact to the surroundings from construction activities or visual encumbrance, sync with environment’s aesthetic character, and accommodate its expected level of usage. This decision-making process offers a fine balance, as under- or over-sizing a trail, or designing a path way out of character within a well-defined area could be quite detrimental.

The images to the right showcase precedents for the various trail typologies proposed within the Redevelopment Plan.



Precedents of trails through a native prairie or meadow (left) and a forested hillside (right)

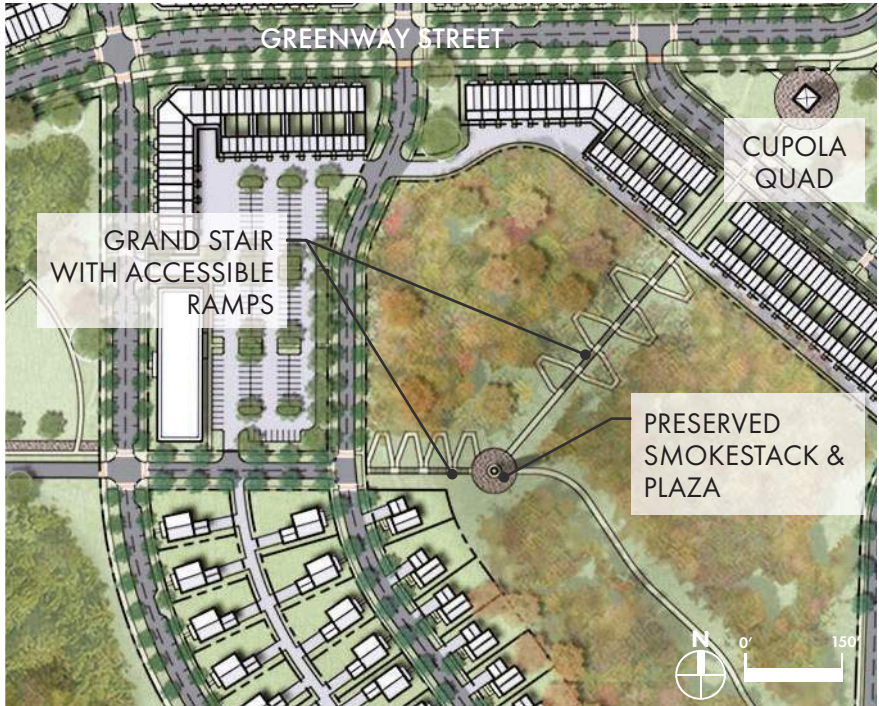
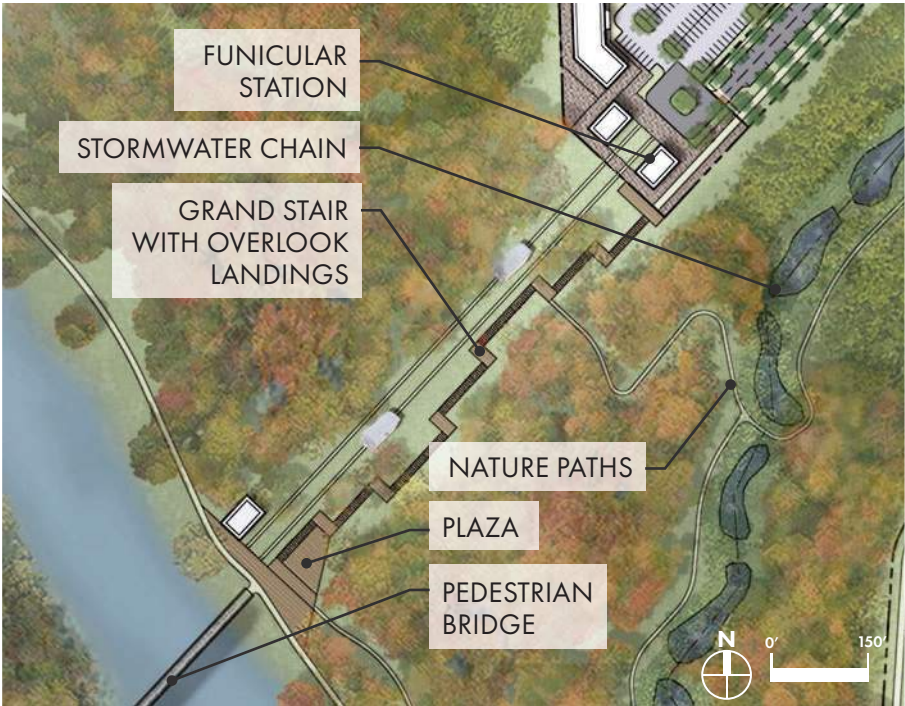


Precedents of multi-use paths through varying urban environments: a public park (left), urban corridor (middle), and natural open space (right)

THE GRAND STAIRS

Three sets of Grand Stairs traverse several of the existing ravines within the Site. The most prominent set of stairs, paralleling the path of Funicular down to the James River waterfront, staggers its alignment down the slope, providing room for wide landings or resting areas offering great views of the river valley and opposite bluffline in Lynchburg.

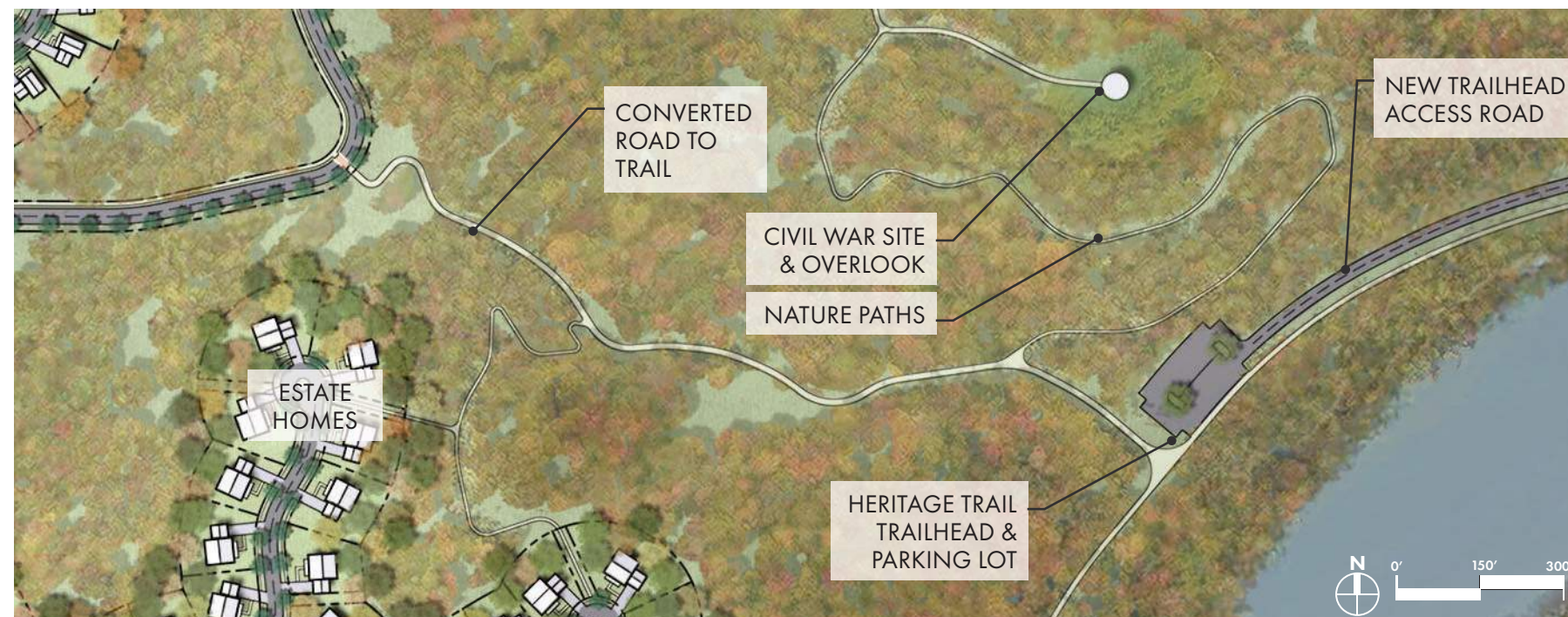
The other two sets of Grand Stairs are paired with switch-back accessibility ramps and provide access to the Smokestack Plaza. The eastern stair is aligned on axis between the Smokestack and the Cupola Monument. The western stair proves a key link between the Smokestack and the amphitheater and playground area.



Plan enlargements of the Grand Stair sites



Precedents of grand stairs set within native landscaping



Plan enlargement of Fertilizer Road and adjacent trail connections

FERTILIZER ROAD CONVERSION

Currently, Fertilizer Road provides the only vehicular, bike, and pedestrian access to the existing Heritage Trail parking lot and trailhead. The road segment is extremely narrow as it follows in close proximity a steep wooded stream bank. Most sections of pavement are deteriorated, creating a number of hazardous locations along the route.



With the proposed extension of Colony Road providing vehicular access to the parking lot and trailhead, Fertilizer Road can feasibly be converted to a bike- and pedestrian-only trail. The conversion should include re-paving the route along with the construction of strategically-located retaining walls and stormwater features to correct any remaining potential hazardous locations.



Precedents of widened multi-use paths through landscaping



THE “RAVINE” PEDESTRIAN BRIDGE

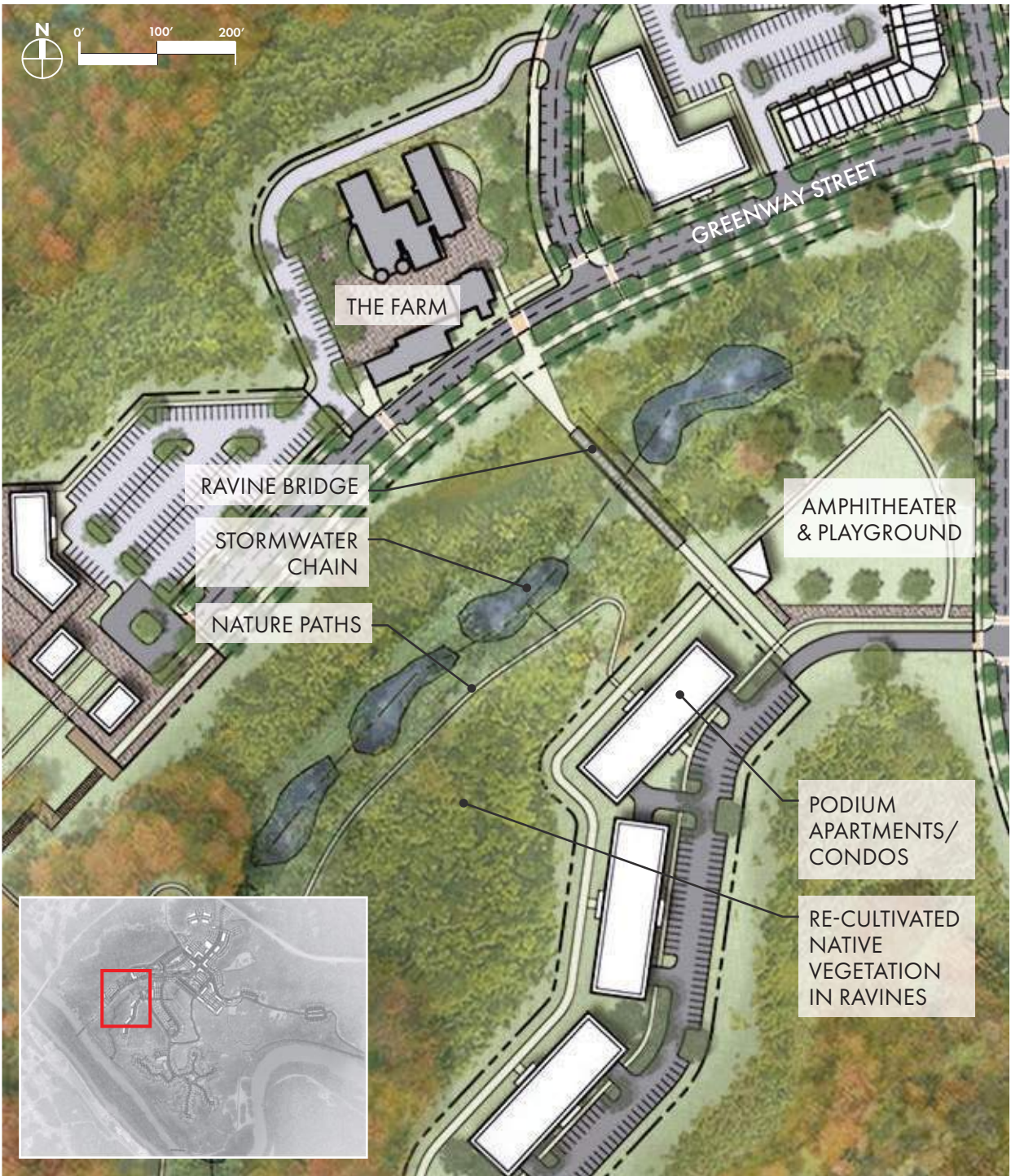
Spanning the most visible ravine within the neighborhood, the long-span pedestrian bridge over the proposed Stormwater Chain, has the potential to become an iconic design feature for the entire development. To compliment its engineering, a significant design effort should be undertaken toward the bridge’s aesthetics. The structure has great visibility and will be heavily trafficked, as it connects two big destination and event venues, The Farm and the amphitheater and playground amenity area. Users may be encourage to stop while on the bridge to take in the breathtaking panoramic views to the west toward Lynchburg and the James River valley.



Vignette of the Ravine Bridge over the proposed Stormwater Chain



Precedents of iconic, highly-detailed pedestrian bridges



Plan enlargement of the Ravine Bridge and surrounding site amenity areas



Bird's-eye perspective of the mobility facilities traversing the ridgelines with development over the James River Valley



9 | PARK & OPEN SPACE SYSTEM

OVERVIEW

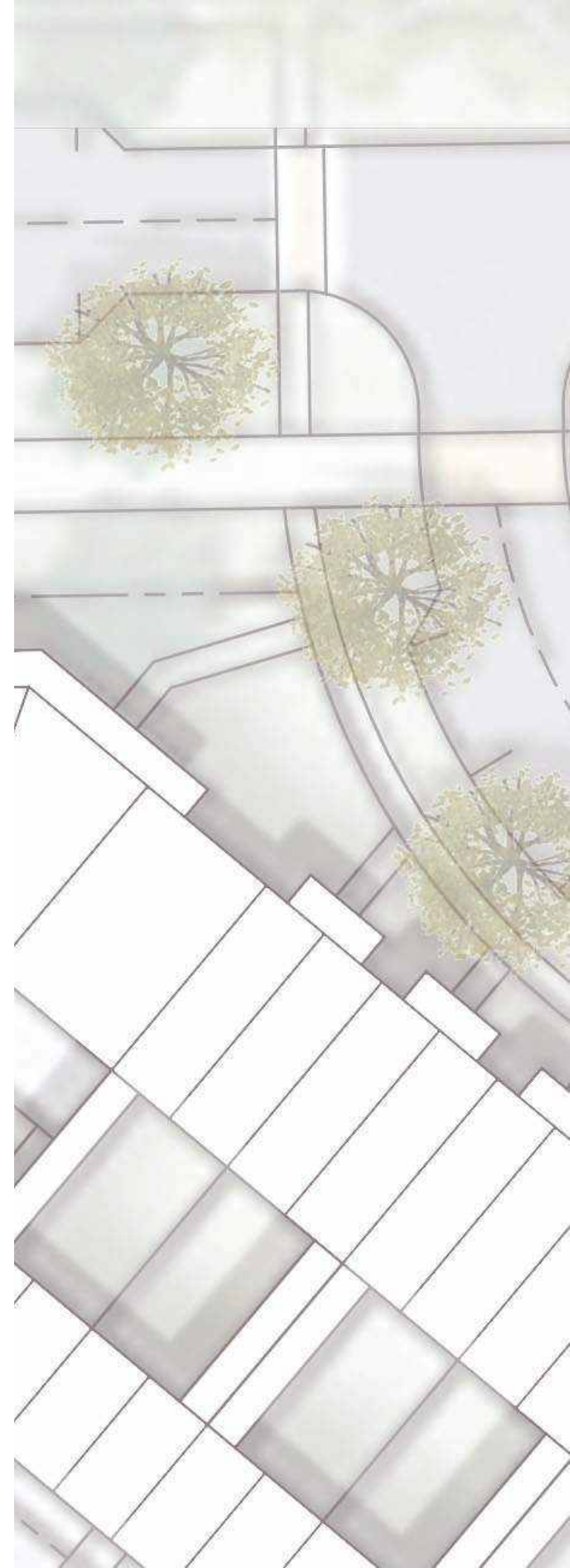
ATTACHED SQUARE

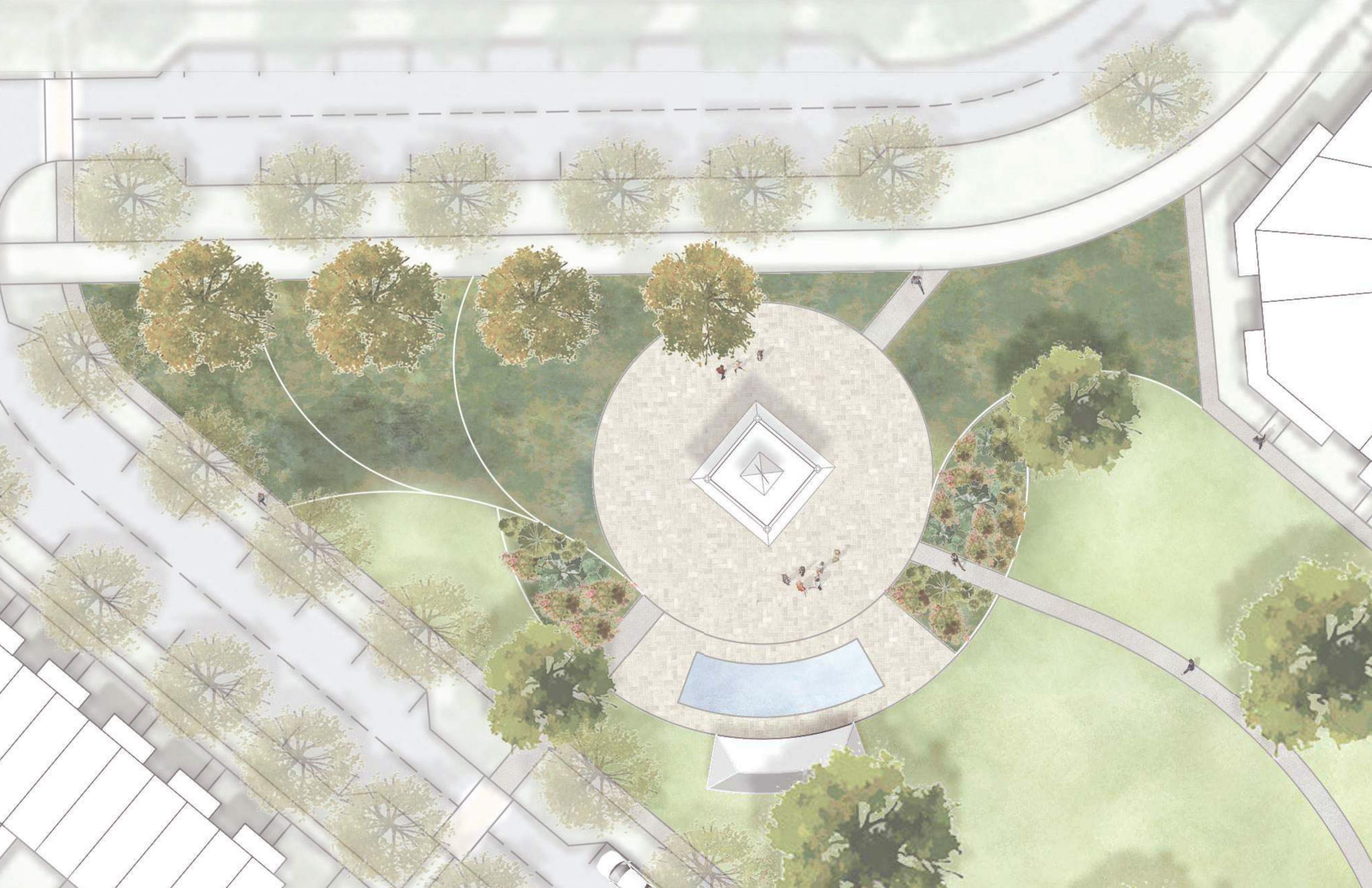
"QUADS" & FORMAL GREENS

NEIGHBORHOOD PARKS

AMPHITHEATER & PLAYGROUND

GREEN INFRASTRUCTURE



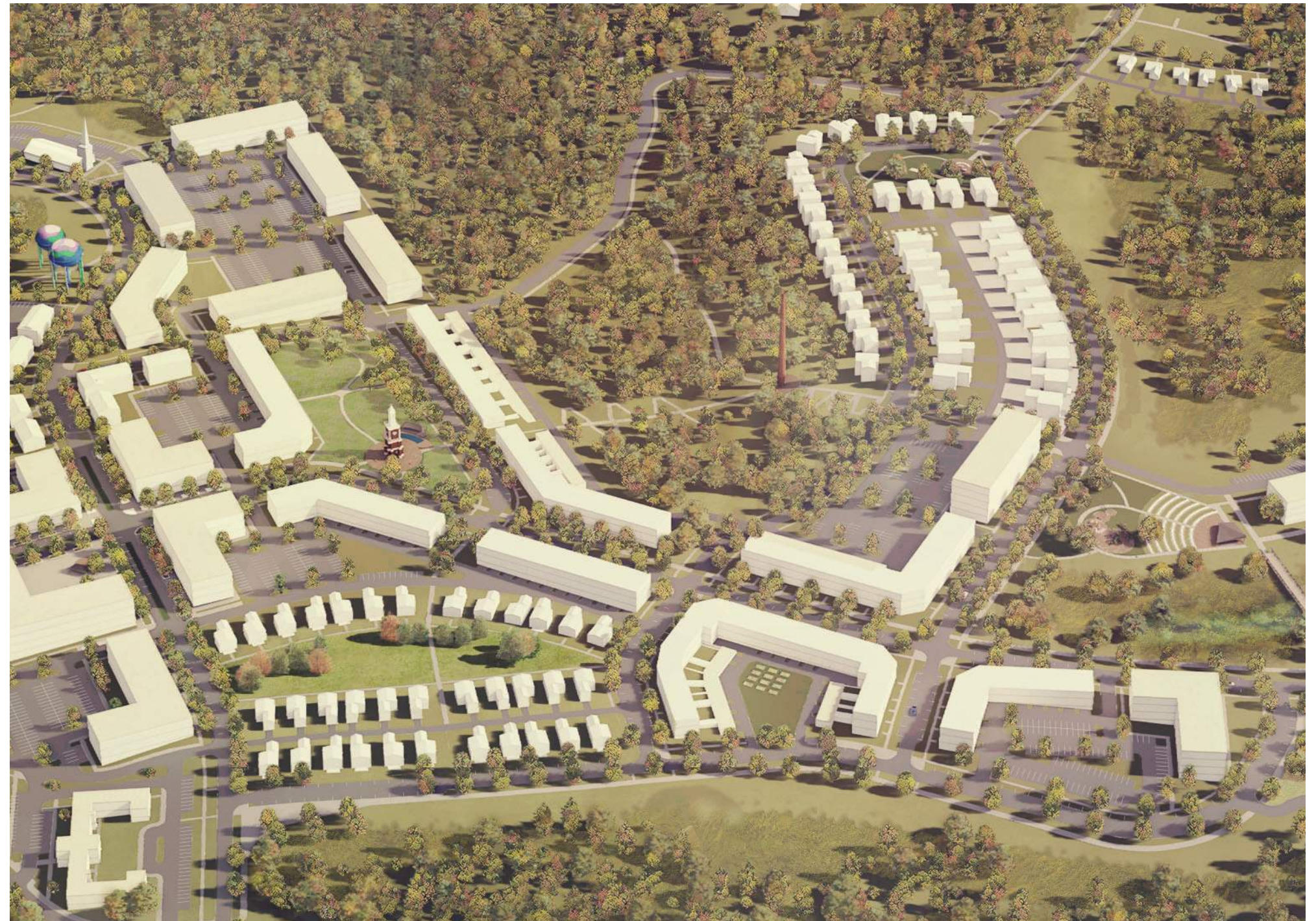


OVERVIEW

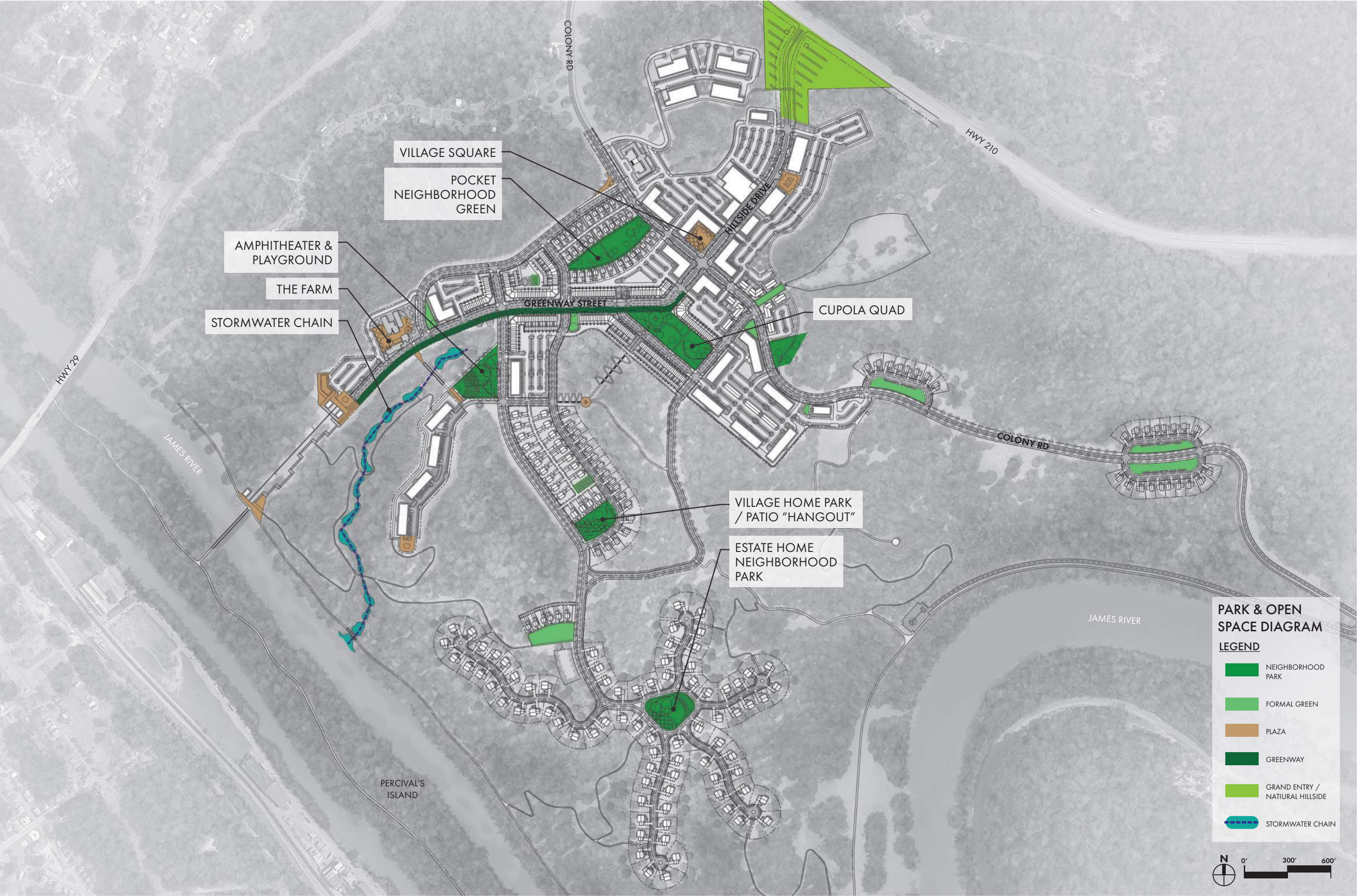
In concert with its multi-layered mobility system, the Redevelopment Plan includes a diverse set of parks and open spaces. Typically located at key street intersections, near trailheads, or aligned on axis down a view corridor or pedestrian promenade, these green spaces are strategically-located to offer the greatest benefit to the neighborhood. The public spaces are community gathering places. They vary in character, from formal, manicured greens to more naturalized gardens or re-vegetated ravines. The variety of design mirrors the diversity among the neighborhood's various districts.

As the overall plan diagram on the opposite page illustrates, the parks and open spaces are evenly distributed across the neighborhood. The clear-cut hillside entrance area off Highway 210 provides a stunning, naturalized gateway for the neighborhood. The greenway running through the heart of the development connects the traditional urban plaza space of the Village Square with the more active, event-oriented plazas of The Farm and the Funicular Station/destination restaurant site. The Community Green within the large pocket neighborhood is a passive space dominated by large, preserved trees. The Cupola Quad has a number of similar specimens, but is focused more on the active plaza space around the Cupola Monument. The amphitheater and destination playground complex offers a high-activity venue for the neighborhood's ridgeline developments.

The single-family residential areas provide smaller-scale parks as well. These green spaces become the true community areas for residents. The prominent, naturalized ravine is enhanced with a Stormwater Chain that not only offers an innovative functional feature, but also a beautiful, aesthetic element within the landscape.



Bird's-eye perspective showing the neighborhood's various parks and open spaces, around which development is framed



VILLAGE SQUARE



At the heart of the Redevelopment Plan’s mixed-use core is the Village Square. The primarily hardscaped space is “attached” to an L-shaped mixed-use building, with room provided for ground-level retail activity or dining to extend out into the public realm. The square opens out to both Hillside Drive and Colony Road, enhancing the space’s visibility within the greater neighborhood context. A tiered water feature anchors the Square’s streetside corner. A lawn area shaded by a bosque of trees counterbalance the paved plaza space oriented around a performance pavilion. The plaza area is covered by festival string lighting that would allow nighttime use.



Precedents of an attached square with focal pavilion and plaza space

ILLUSTRATIVE DETAIL PLAN





Precedents of attached squares with varying aesthetics and levels of hardscape & landscape



Vignettes of the Village Square, adjacent streetscapes, and mixed-use building

QUADS & FORMAL GREENS

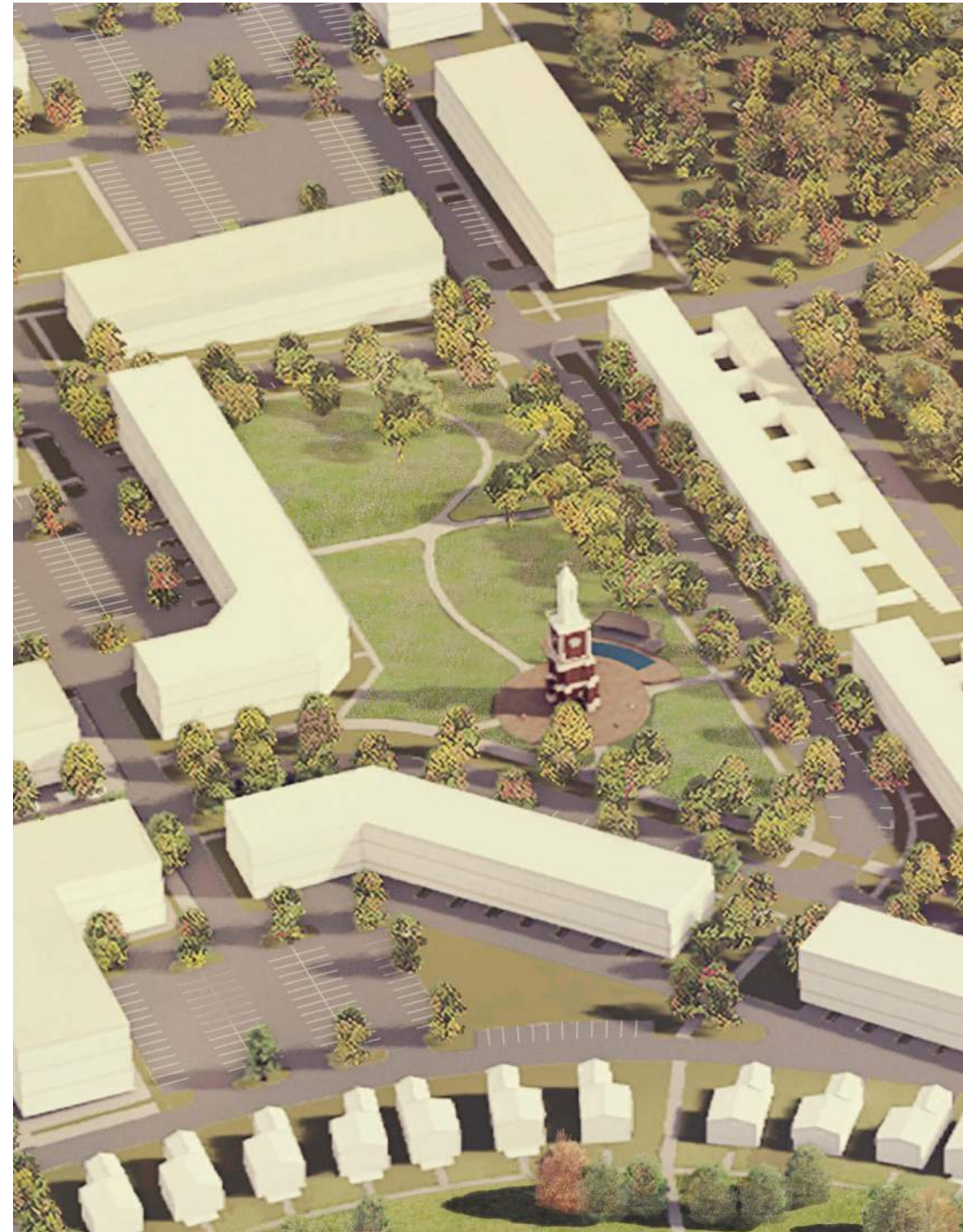
CUPOLA QUAD

The area of the existing Site transformed into the Cupola Quad was identified in multiple concepts early in the Design Charrette as providing an ideal space for a campus-like quad green space. The area is home to a number of large, healthy specimen trees that should be preserved. Thus, the formal lawn and active monument plaza areas developed around these elements.

In the Redevelopment Plan, the Cupola Quad lies along the Greenway Street, with direct access into the open space provided by the street corridor's side path. The view corridor and alignment of Hillside Drive/Greenway Street terminates on the large-scale Cupola Monument on the green's west side. A small plaza at the base of the monument allows people to view and walk around and under the iconic feature. Just off the plaza is a water splash fountain and small pavilion offering shaded seating for users. The fountain, a shallow veneer of water with spray jets, offer a safe, interactive play element to the space.

The landscape beds and rain gardens that encircle the monument plaza transition to a large expanse of lawn as one travels east through the quad. This area provides opportunities for passive use or active play. The lawn is dotted with the large specimen trees preserved from the existing CVTC campus. Sidewalks line and run through the lawn space, providing access to all areas of the space.

On the quad's north edge, a line of townhomes front directly onto the green space. Secondary urban streets define the quad's east and south sides, providing on-street parking stalls for visitors to use. Residential uses front onto the quad on all sides, providing a large user group for the space. These residents also serve as the eyes-and-ears of the quad, ensuring a safe and comfortable setting.



Aerial view of the Cupola Quad and surrounding development



Precedents of large event lawn area (top & middle) and water splash fountain feature (bottom)



ICONIC CUPOLA
MONUMENT

GREENWAY STREET

GREENWAY SIDE PATH

RAIN GARDEN WITH
COLORFUL NATIVE
PLANTINGS

LANDSCAPE BEDS WITH
ACCENT PLANTINGS

LARGE PLAZA WITH
DECORATIVE PAVERS

WATER SPLASH
FOUNTAIN

PAVILION WITH
COVERED SEATING

TOWNHOMES

MISSING
MIDDLE
BUILDINGS

PRESERVED LARGE
SPECIMEN TREES

TOWNHOMES

LARGE ACTIVITY LAWN

SIDEWALK

LANDSCAPE BEDS WITH
ACCENT PLANTINGS

APARTMENT

ILLUSTRATIVE DETAIL PLAN

N 0' 25' 50'



MISSING MIDDLE GREEN

The lawn space at the heart of the missing middle housing complex serves as a community space for residents to share and to gather in. The green basically serves as their front yards. The lawn is lined by widened promenades and columnar trees on both sides. The space opens to the street on its south side. The green is centered on the enhanced gate entrance of the Memorial Gardens cemetery, which terminates the space on the north end. On this end, the neighborhood's primary multi-use trail passes through the space, providing increased access to and visibility of the formal green.

Vignettes of Missing Middle Green looking south from the Memorial Garden gate



Precedents of small, shared green spaces enclosed by missing middle housing

COMMUNITY GREEN AT THE POCKET NEIGHBORHOOD

Similar to the Cupola Quad, the Community Green on the neighborhood’s north side was founded around a large grouping of preserved specimen trees. The surrounding street network defined the limits of the pocket neighborhood development encircle the green. The large expanse of lawn is flexible, allowing passive, more reflective use or promoting space for active recreation.

Residents of the cottage homes that front onto the space will use the Community Green as a shared front yard. Interactions with neighbors will occur daily, while the green space will be enjoyed for larger gatherings or events. The green is open to streets on both its west and east ends. This permeability will attract use and attention into the green. New understory landscaping and trees will be minimized, as the simple lawn area will allow the stately, specimen trees to truly be celebrated and define the space.



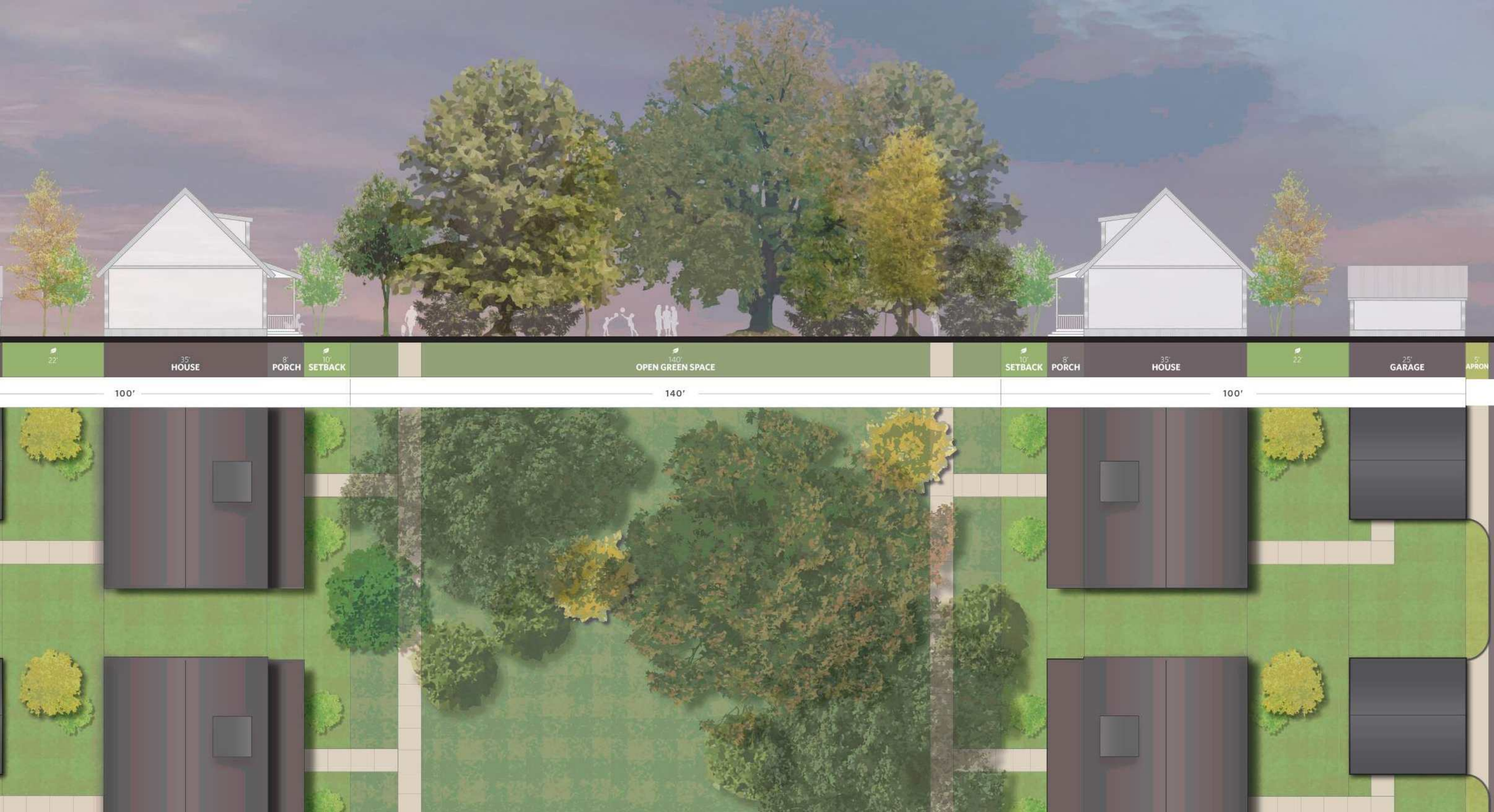
Precedents of community green spaces surrounded by smaller, cottage-style homes

POCKET NEIGHBORHOOD SITE SECTION

As the site section to the right illustrates, the Community Green lies at the heart of the pocket neighborhood. The cottages homes that front onto the green are alley-loaded, allowing the homes themselves to define the space. The north side home share an alley an additional row of cottage homes that front onto a residential street abutting an existing ravine. A multi-use trail runs along the edge of the ravine, as the steep slopes, re-vegetated with native meadow-type plantings, will provide great visual interest along the periphery of the neighborhood. Parking for visitors to the cottage homes are provided via on-street stalls on the surrounding neighborhood streets.



Site Section across the cottage home lots of the pocket neighborhood and central green space



VILLAGE HOME PARK / PATIO
“HANGOUT”

The community open space provided to the residents of the village homes located south of the amphitheater and designation playground, hugging the edges of two ravines, comes in the form of a shared patio-type space. The area is designed to function as a communal “hangout” space. A pavilion covers an outdoor kitchen and lies adjacent to a plaza that includes a large fire pit with movable chairs and furnishings. Residents are invited to use the space like they would their backyards for gatherings with friends or families. Festival lighting is proposed over the plaza to encourage nighttime use.

A small bosque of shade trees bisect the green, with a small lawn and bocce ball court inviting active use. Two large preserved trees are formalized within the space. The lawn is enclosed on its north by landscape beds and on its south by a large rain garden made up of colorful, native water-tolerant plantings.



ILLUSTRATIVE DETAIL PLAN





Precedents of smaller residential neighborhood open spaces with various shared amenities



Plan enlargement of the cottage home / cemetery green and its trail connections to other amenity areas

COTTAGE HOME / CEMETERY GREEN

To better memorialize the reclaimed second cemetery site, a small lawn is proposed. Enhancements to the cemetery include the construction of a new gate and border fenceline along with a general cleanup of overgrown vegetation over the plots. The formal green would accompany these enhancements, with the lawn meant solely as a ceremonial feature as opposed one promoting active use. The “feel” of the lawn space would instead encourage reflection.

Given the formal aesthetic, the opportunity to line the green’s north side with six cottage homes exist. These homes would be set back comfortably from the cemetery. A row of shade trees provide enclosure along the home frontages. On the green’s south side, a widened promenade allows access to the cemetery while also connecting to nature paths. On-street stalls are provided for visitors use as well.



Precedents of memorialized spaces with honorary details and focus of experience



EAST VILLAGE HOME GREENS

On the neighborhood’s east side, three clusters of village homes are proposed along Colony Road. The expectation is that as development occurs further east along the James River, Colony Road will see greater volumes of traffic. This increase will also partly be created by more users driving to the Heritage Trail trailhead, which will be accessed via Colony Road. Thus, it was important to set the village homes back from the roadway to offer a comfortable buffer for residents.

The offsets are shaped by small shared greens enclosed by the homes’ access drives. Visitor parking stalls are provided off the drives as well. The lawn spaces themselves will be tree-lined and kept open to preserve visibility and allow flexible usage from residents.



Plan enlargement of the communal green spaces, shared by the clusters of village homes, that provide a buffer from the roadway



Precedents of estate homes set around a shared green space and access drive with parking

ESTATE HOME NEIGHBORHOOD PARK



Precedents of the amenities and design character/context proposed for the neighborhood park

The proposed estate homes development on the current mobile home park property sees the residential lots follow the streets as they meander along existing ridgelines. These streets come together centrally within development at relatively flat piece of ground. Here, it is envisioned an active park space would be created.

The main street coming from the west, which provides access to the estate homes from the rest of the neighborhood, lies on axis with the park pavilion. The pavilion, as it terminates that primary entrance view, will be an aesthetic icon feature. Off the pavilion is a plaza space with a fire pit and movable seating. A bosque of trees defines the south side of a lawn space for active use. A bocce ball court is also provided here.

On the north side of the lawn lies a set of play structures. Given the immediate wooded setting, it is envisioned these structure could be designed in a nature-play aesthetic. The lawn's east edge is defined by a sidewalk and a series of community garden plots. These elements are shared amongst the estate home residents. A large rain garden is proposed on the park's east edge to capture and treat runoff from not only the rest of the park, but the adjacent residential drives as well.



AMPHITHEATER & PLAYGROUND

In line with the green spaces provided for the single-family residential areas of the neighborhood, the amphitheater and large destination playground complex serves as the community amenity area for the multi-family buildings lining the Site's western ridgelines. Sidewalks leading into the space align with the adjacent streetscapes, promoting ease of access.

Sight lines between the play structures and streets are open, providing the foundation for safe and comfortable use. A small pavilion is located off the playground to provide shaded seating for parents of children enjoying the playground. Two rows of trees create definition and a buffer between the playground and amphitheater, the latter of which utilizes existing terrain for its orientation. The series of lawn terraces are built into the existing slope, minimize site impacts from re-grading. The terraces are wide enough allow for lay-out space during events or performance in addition to seating.

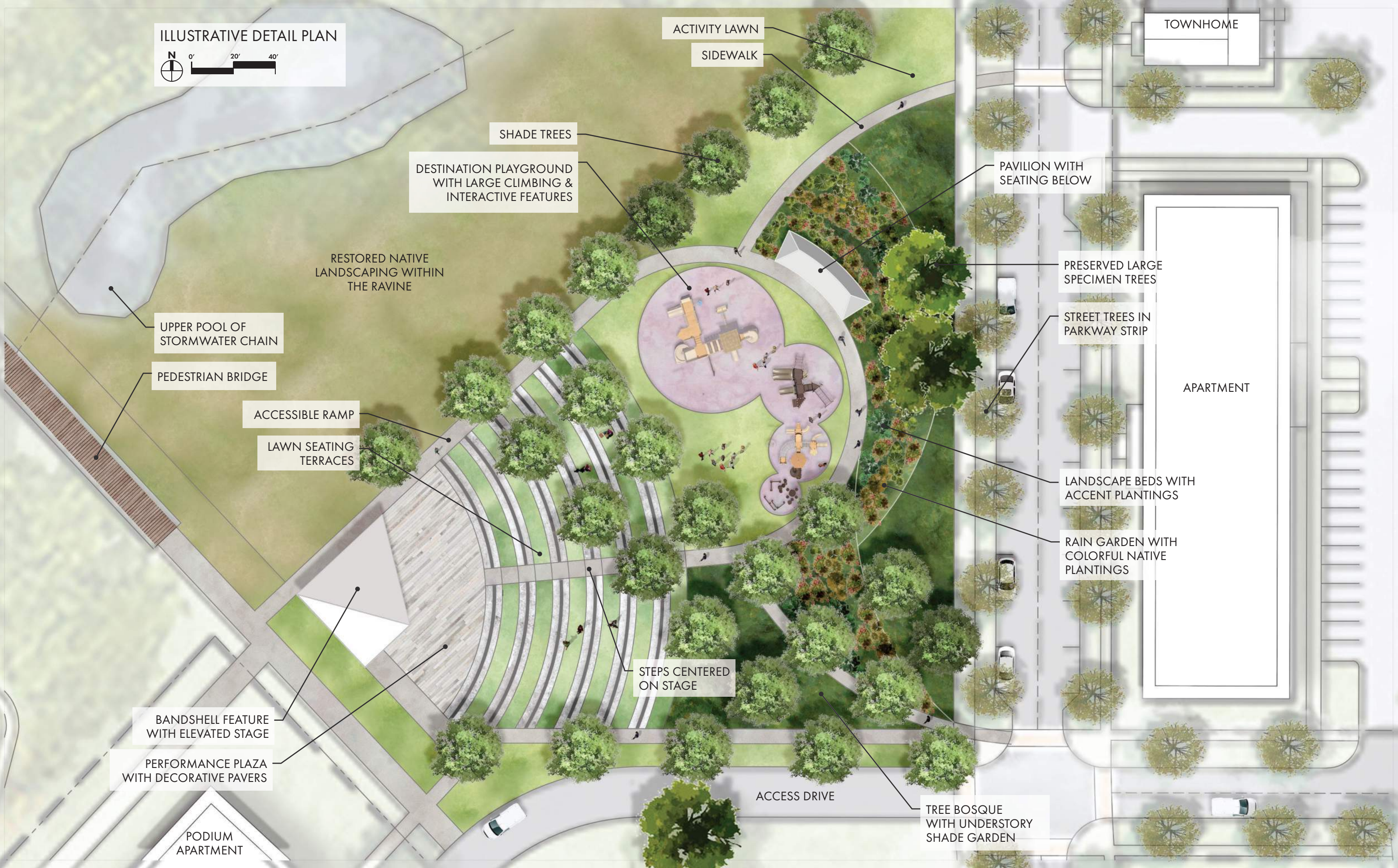
The amphitheater's stage is set just off the south end of the ravine pedestrian bridge. It is covered by a bandshell designed to be an iconic focal element in the landscape. While users will enjoy incredible panoramic views to the west over the James River valley, the ravine edge that defines the complex's north edge will attract much attention as well. The naturalized landscape expanse and Stormwater Chain will be a dynamic composition to view from above.



Precedents of the amenities and design character/context proposed for the amphitheater and destination playground area

ILLUSTRATIVE DETAIL PLAN

N 0' 20' 40'



ACTIVITY LAWN

SIDEWALK

SHADE TREES

DESTINATION PLAYGROUND
WITH LARGE CLIMBING &
INTERACTIVE FEATURES

RESTORED NATIVE
LANDSCAPING WITHIN
THE RAVINE

UPPER POOL OF
STORMWATER CHAIN

PEDESTRIAN BRIDGE

ACCESSIBLE RAMP

LAWN SEATING
TERRACES

PAVILION WITH
SEATING BELOW

PRESERVED LARGE
SPECIMEN TREES

STREET TREES IN
PARKWAY STRIP

APARTMENT

LANDSCAPE BEDS WITH
ACCENT PLANTINGS

RAIN GARDEN WITH
COLORFUL NATIVE
PLANTINGS

STEPS CENTERED
ON STAGE

BANDSHELL FEATURE
WITH ELEVATED STAGE

PERFORMANCE PLAZA
WITH DECORATIVE PAVERS

PODIUM
APARTMENT

ACCESS DRIVE

TREE BOSQUE
WITH UNDERSTORY
SHADE GARDEN

GREEN INFRASTRUCTURE

The provision of green infrastructure facilities throughout the neighborhood will promote an environmental and ecological ethic amongst residents and visitors to the Site alike. The naturalized, heavily-wooded context encourages the adaption of innovate stormwater best management practices (BMPs) into the public realm design. Site-specific BMPs will minimize the need to reinforce the existing storm sewer system. The demand on these sewer systems would be limited, as most of the runoff from the new neighborhood could be treated via more naturalized features, like rain gardens or bioswales. General illustrative diagrams of several of the BMPs envisioned for the Site are shown on the opposite page.

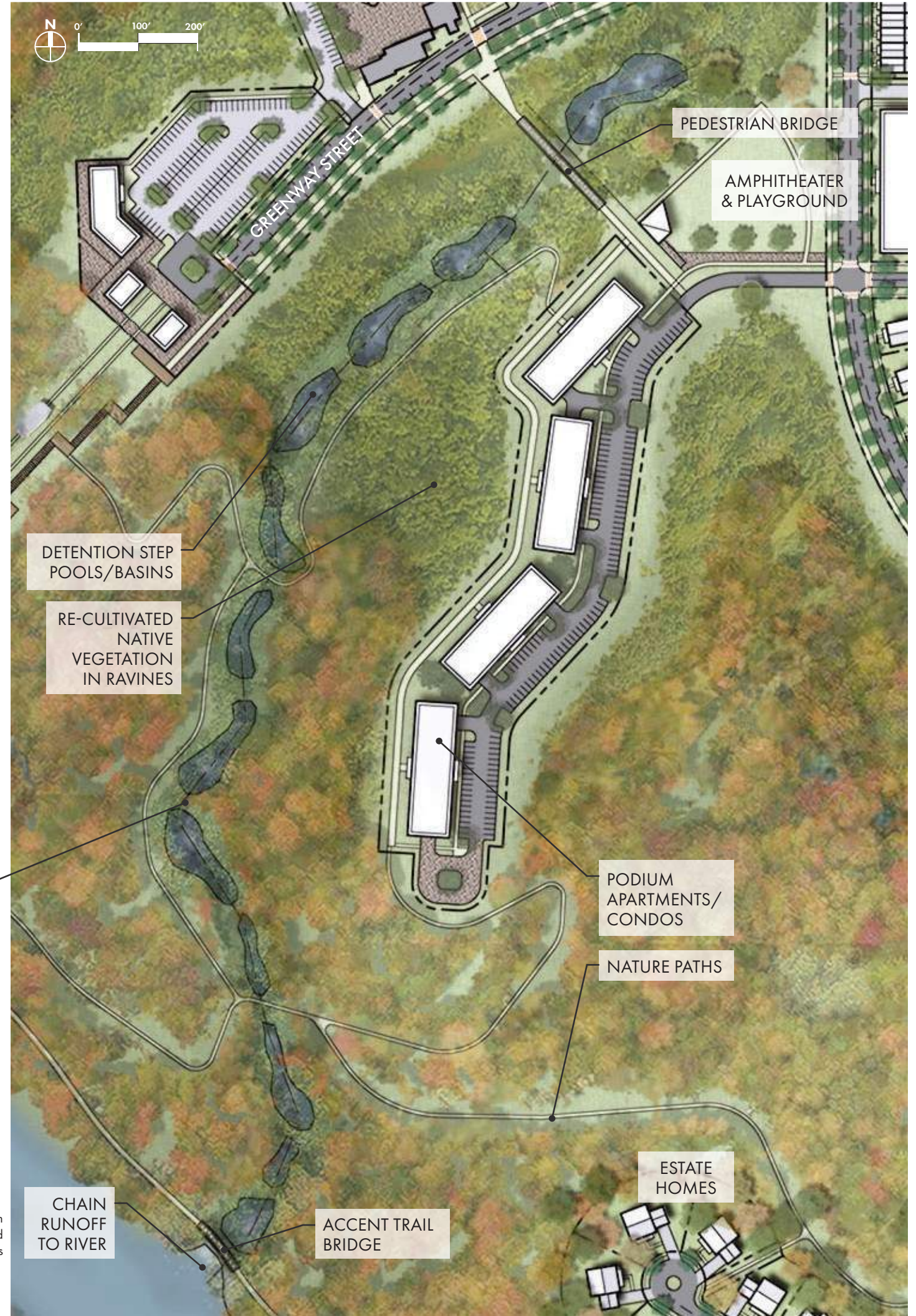
Within the Redevelopment Plan, the major green infrastructure feature proposed is the Stormwater Chain. The Chain is comprised of a series of detention pools or basins that step down the ravine grade. Each basin is sloped, with either an earthen forebay or weir wall on its downhill side. Within each basin, runoff is collected, and treated, with a percentage allowed to permeate into the ground. Water-tolerant native plants help with the treatment process.

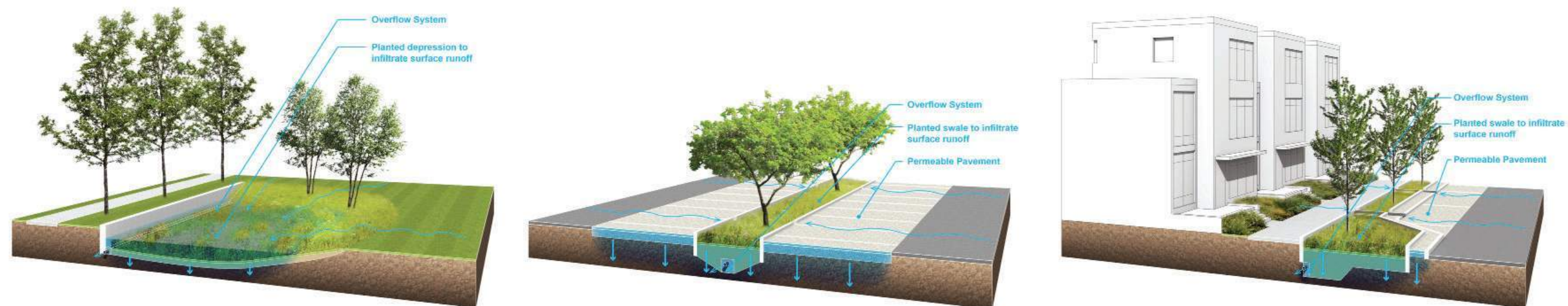
High water is allowed to pass down the Chain to the next, lower basin. This series of basins will meander along the bottom of the natural ravine. Eventually the Chain will reach the James River. A small trail bridge will span the confluence, providing a great opportunity for informative signage and educational features.



Vignette of Stormwater Chain pools/basins with weir walls under the Ravine Bridge

Plan enlargement of the Stormwater Chain feature with adjacent development sites and connections to other amenity areas





Green Infrastructure Treatments - Rain Garden (left); Parking Lot Bioswale (middle); Stormwater Street Planter (right)



Step pools of a stormwater chain during a high-water runoff event



Stormwater basin planted with attractive native landscaping during a dry period



10 | DEVELOPMENT OPPORTUNITIES

OVERVIEW

BUILDING TYPOLOGIES





OVERVIEW

As the Market Assessment established, demand for the redevelopment of the Training Center Site represented a number of different land use typologies. The Redevelopment Plan proposes a true mixed-use neighborhood, with typologies intertwined both horizontally along of a development block’s frontage as well as vertically through an individual building. The distribution of the various uses across the neighborhood was determined by a number of factors, including the framework elements, mobility networks, and park and open space system detailed in previous sections. The diversity in land uses and building typologies create unique development opportunities throughout the redeveloped Site.

In this section, the individual building typologies will be described, with precedent imagery provided for reference. The locations and specific design details of each will be discussed as well, along with their expected impacts to both the aesthetic and economic foundations of the Redevelopment Plan.



Precedents of building typologies proposed for the neighborhood



Bird's-eye perspective looking west across the full neighborhood toward downtown Lynchburg

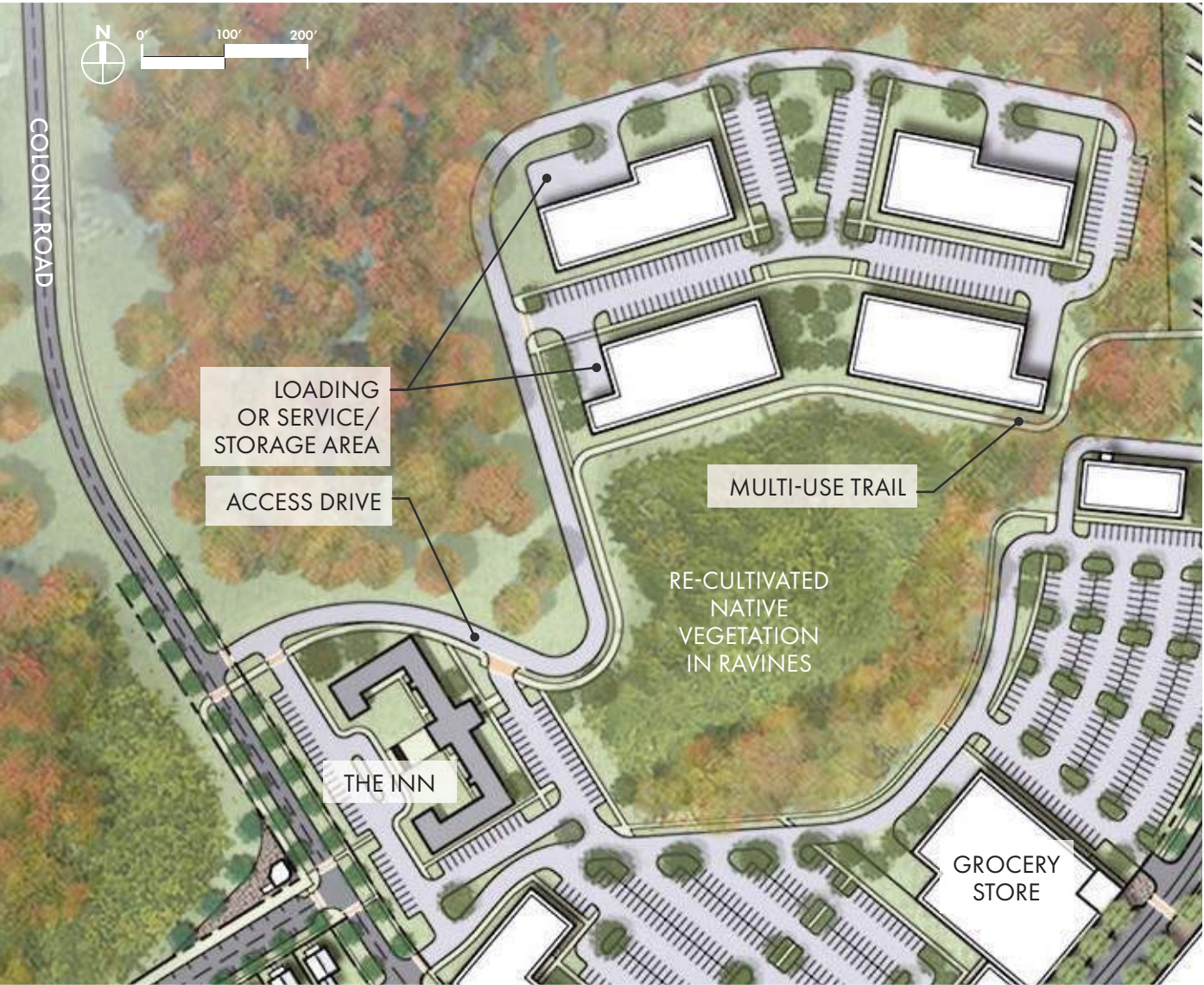
BUILDING TYPOLOGIES

TECH INDUSTRIAL / FLEX

In the neighborhood’s far north corner, a flat, elevated development site exists that is ideal for a set of light industrial / flex buildings. The site, removed from the mixed-use core yet still in close walking proximity to its retail uses, is accessed via a service drive off Colony Road near The Inn. The drive meanders up a slope to the building complex. Four building sites are proposed, with each structure provided with parking and loading/service areas. The one-story, high-bay structures provide a flexible footprint for many industrial uses. A shaded amenity space is provided between two of the buildings with great views south toward the neighborhood’s core. The multi-use trail that meanders throughout the neighborhood passes directly by this amenity area. Employees, then, have direct access to the trail network they can use for commuting or simple recreation during the workday. The trail also allows employees to walk to the retail outlets and grocery store along Hillside Drive and around the Village Square.



Precedents of common space (top) and building types envisioned for the tech/flex campus



Plan enlargement of the tech industrial / flex buildings proposed in the north section of the Redevelopment Plan



Street-level vignette along the entrance drive of the office buildings

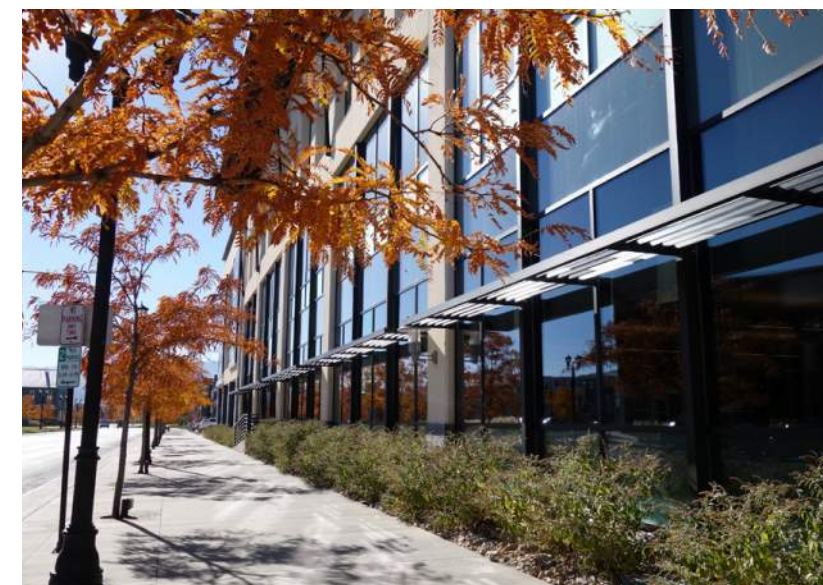
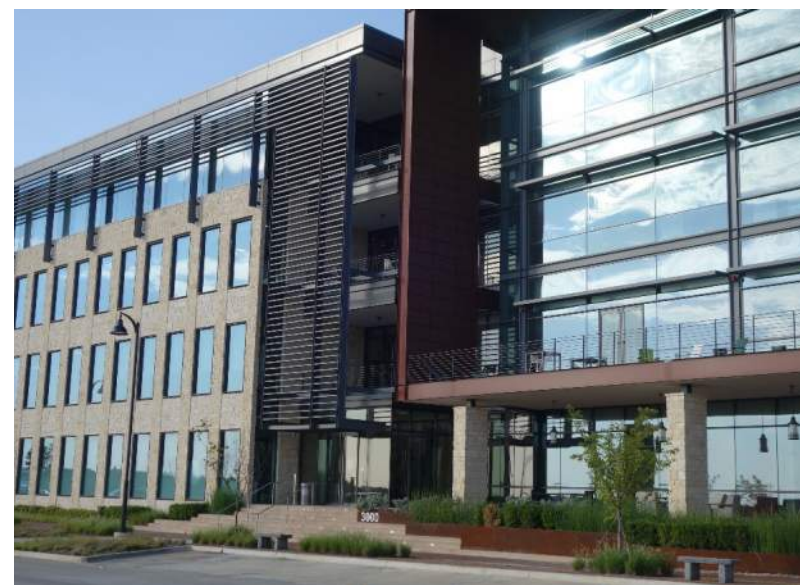
OFFICE

Two professional or medical office buildings are proposed on the south side of Hillside Drive, located on sites with great visibility from the Highway 210 gateway entrance. This visibility will prove vital in attracting tenants to the buildings. Aligning with the district's walkability, the buildings are pushed up to the streetscape, with their primary ceremonial entrances located off Hillside Drive. Their surface parking lots and/or decks are located behind the structures.

The front facades of the buildings will be designed with quality architectural detailing. The aesthetic will coordinate with the retail and mixed-use buildings further into the neighborhood. The two buildings will share an auto court, a plaza-type vehicular drop-off area that can be closed off at times for special events.



Precedents of urban office buildings pushed up to the adjacent streetscape





Street-level vignettes along the entrance drive of the office buildings

URBAN-FORMAT STAND-ALONE
COMMERCIAL (NEIGHBORHOOD
GROCERY STORE)

With the large influx of residents and daytime workers assumed by the Redevelopment Plan, the demand for a grocery store embedded near the center of the neighborhood is great. In the plan, a smaller-footprint, neighborhood-scale grocery store is proposed across Hillside Drive from the second office building. This location, with good visibility and in close proximity to Highway 210, will help attract customers outside of the neighborhood as well.

As an urban building, the grocery store is pushed up to the Hillside Drive right-of-way. The main entrance is located off the street, with the store’s parking lot oriented to the side of the building. The two-story entrance, which can accommodate interior offices on the upper level, will be a prominent marker that directs customer access. The store’s loading bays are located on its back side, hidden from the street, and accessed via a rear service drive pushed up against a ravine edge.

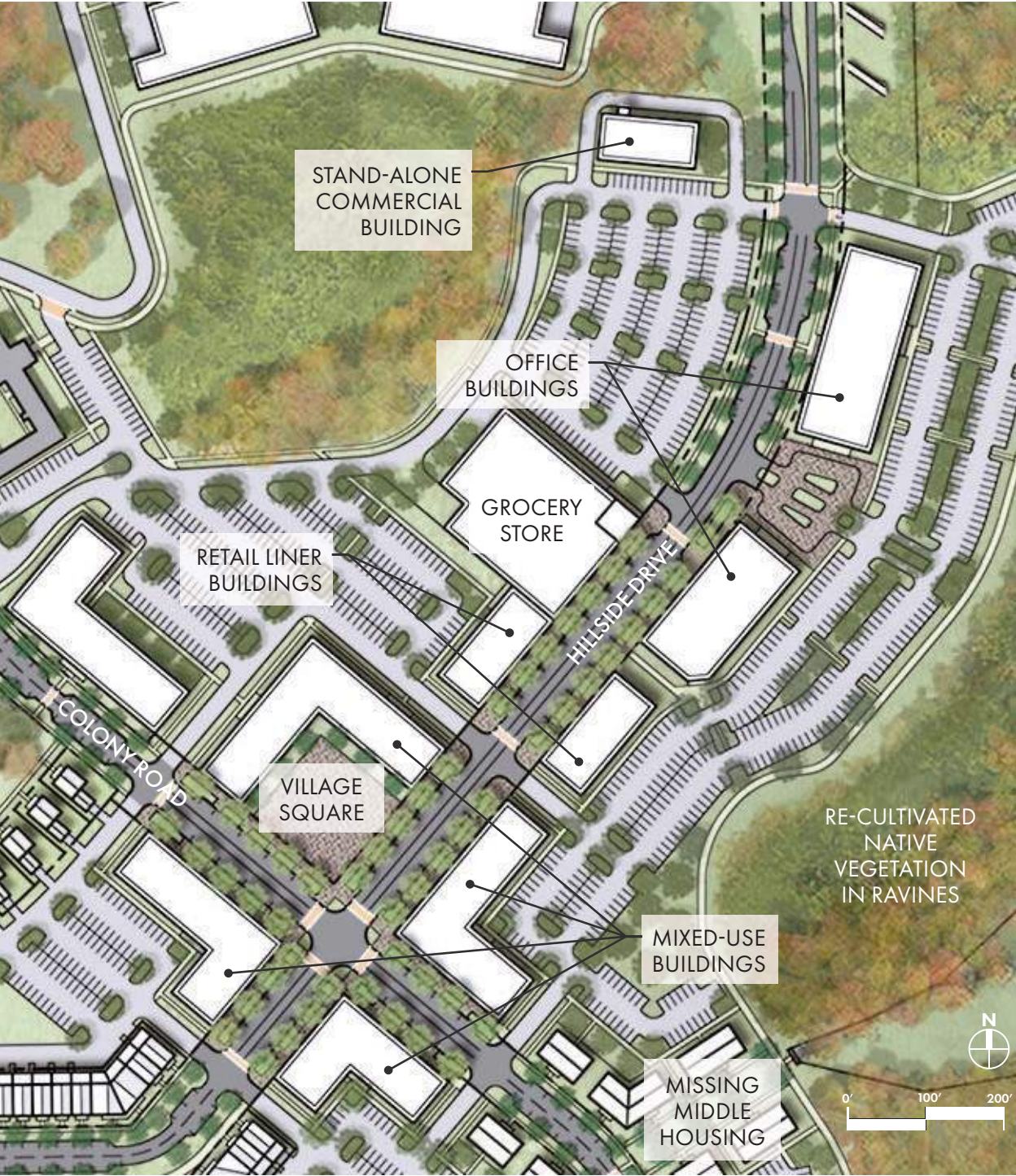


Precedents of stand-alone commercial/retail buildings



Precedents of urban, neighborhood-scale grocery store





Plan enlargement showing the locations of the mixed-use and retail liner buildings

RETAIL / LINER BUILDINGS

Located between the mixed-use buildings around the Village Square and the grocery store and office buildings further north down Hillside Drive, two smaller liner-type retail buildings continue the urban street frontage. As the name applies, these one-story buildings consist of multiple retail spaces that activity the adjacent streetscape. Functionally, the lower-density structures will maintain the street wall, hiding the parking areas at the rear of the property. On-street parking stalls are also provided for convenience to customers.



On the north side of the grocery store’s parking lot, a one-story retail building is proposed. The building could serve multiple retail and/or commercial-service tenants. The site proposal includes a drive-thru lane given the building is ideally located for a fast-food or coffee tenant servicing commuters.



Precedents of one-story liner retail buildings with urban frontages



Street-level vignettes of the retail liner buildings along the entrance drive



Vignettes of a mixed-use building near the Village Square

MIXED-USE BUILDINGS

Located off the intersection of Hillside Drive and Colony Road, a number of mixed-use buildings are proposed around the Village Square. Generally, these buildings will consist of ground-level retail or commercial uses, with upper-level residential units or professional office space. The retailers will activate both the adjacent streetscapes and the Square.

The residential units on the upper floors will include balconies and possibly a roof-top amenity deck. These features would allow residents to view the street-level activity or events in the Square while also providing architectural detail to the buildings' front facades.

Parking is provided via surface lots located behind the buildings and on-street parallel stalls along the streets.



Precedents of mixed-use buildings, with ground-level storefronts and residential units on upper floors



Aerial vignette from over the Village Square toward the mixed-use buildings



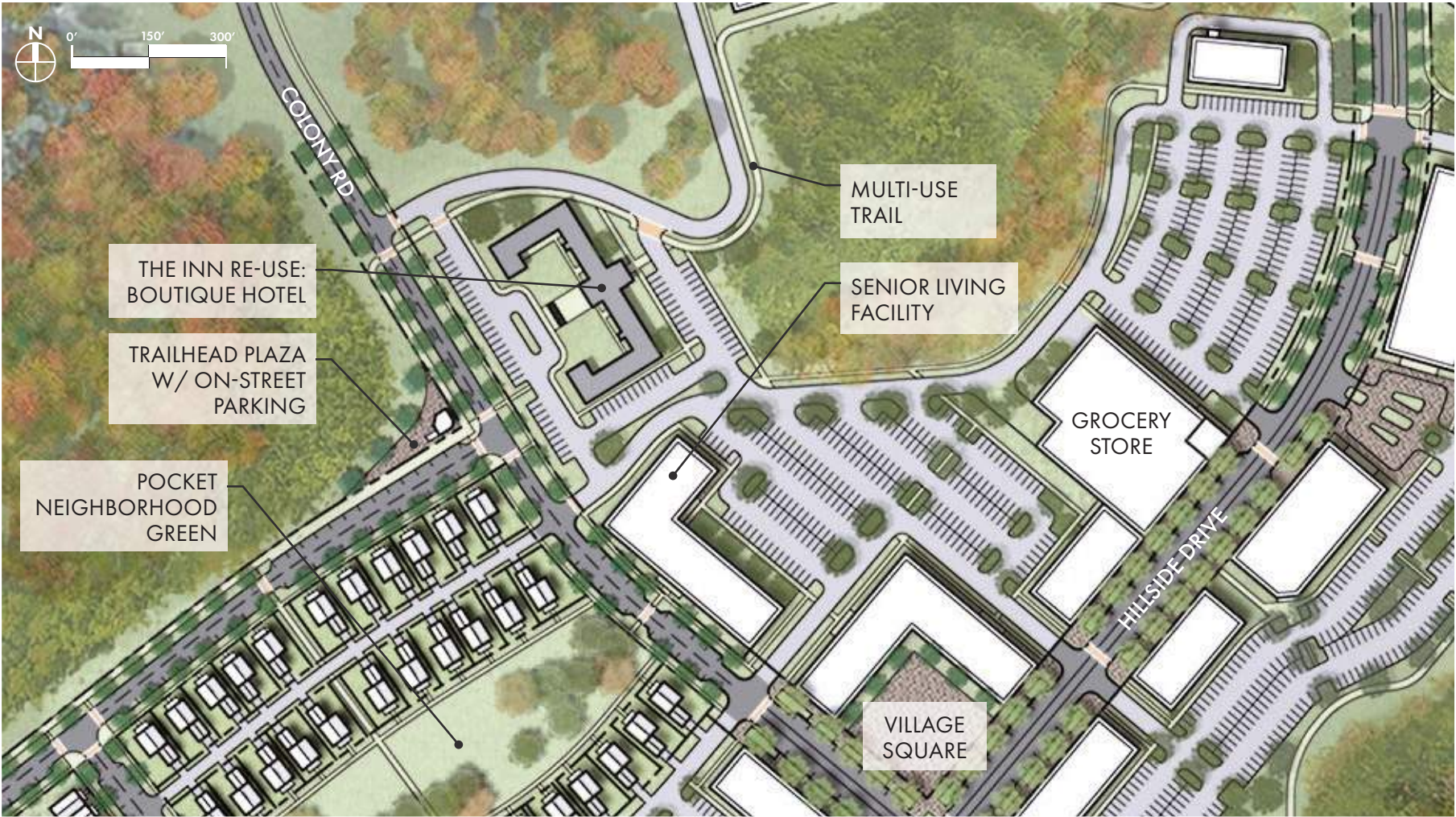
Street-level vignette of a mixed-use building with the Cupola Monument on axis with the entrance drive



Street-level vignette of a mixed-use building with the Cupola Monument on axis with the entrance drive

HOSPITALITY

The re-use of the Inn as a new boutique hotel fulfills an important need for the neighborhood. Visitors of neighborhood residents, out-of-town employees of the development’s office or commercial tenants, as well as individuals traveling to the region on vacation looking for a unique place to stay will be drawn to that hospitality site. The property sits in close proximity to the high-activity Village Square and has direct access across Colony Road to a trailhead on the multi-use trail network, both valuable factors complimenting the accommodations provided by the renovated historic building.



Plan enlargement showing the location of The Inn and Senior Living Facility along Colony Road just north of the Village Square



Precedents of historic hospitality buildings and the amenity areas typical of a destination, boutique hotel

SENIOR LIVING

Just north of the Village Square on Colony Road lies the proposed senior living facility. Like The Inn, the proximity to the Square and the neighborhood's active core is a major draw for potential residents. The building itself fronts onto Colony Road directly across from the open end of the Community Green. Residents then will have easy access to the trails and open space network of the neighborhood. With prime visibility from the Community Green and helping to enclose the open space, the building's front facade should be designed with quality architectural detail and balconies. Resident parking is provided to the rear of the building in a surface parking lot, while visitor stalls are located on-street on Colony Road.



Precedent multi-family buildings similar in scale and detail to the senior living facility proposed for the Site



Three-story apartment building precedents with detailed facades



MULTI-FAMILY RESIDENTIAL

APARTMENTS

The Redevelopment Plan locates a number of multi-family residential buildings throughout the neighborhood. Whether the buildings are designated for apartments, condominiums, or both, these structures provide the most dense residential typology within the Site. Density is driven by proximity to commercial uses and destinations, open space amenities (both formal and naturalized), are lot plots of developable land.

East of the Village Square, a large multi-family residential complex is proposed. Within this site, the buildings themselves are pushed to the street and open area frontages, with the large surface parking lot located in the center of the property. The buildings fronting onto the adjacent streets have residential units on their ground-level, providing visual interest and activity along the rights-of-way. The buildings fronting onto the wooded areas are podium-style multi-family buildings, with the ground-levels dedicated for internal private vehicle parking.

On the west side of the neighborhood, three separate development sites are identified for multi-family residential buildings. These buildings are oriented to take advantage of panoramic views across the river valley and more localized scenes around The Farm, the ravine pedestrian bridge, and the amphitheater and destination playground complex.

Like the mixed-use buildings, the multi-family residential buildings should provide balconies and patios for the living units. Resident amenity areas, whether they be located at the ground-level or on an upper level deck, should be provided where possible.

MISSING MIDDLE HOUSING

Missing Middle housing units introduce a smaller multi-family building into the neighborhood. Similar in scale to townhomes, yet providing high-density living, the buildings offer flexibility in design. The models for these buildings are the 4-to-12-plexes that were commonly constructed throughout the U.S. in the pre-WWII years. In the Redevelopment Plan, a district of these buildings are proposed on Colony Road between the Village Square and the preserved water towers.

The buildings are pushed close to the street corridor, with small setbacks provided for their raised entrances. Resident parking lots are located away from the streets toward the block interiors. These structure are usually built with 2-3 stories. On the north side of Colony Road, the housing units enclose a small communal green space that also serves as a means to access to the Memorial Gardens cemetery entrance.



Street-level vignette of the Missing Middle Housing



Precedents of missing middle housing units with highly-detailed architecture



Aerial vignette of the Missing Middle Housing complex



Precedents of townhomes with consistent urban frontages and detailed aesthetics

TOWNHOMES

The townhome typology, common in most areas in the eastern U.S., are ideal at the center of the Redevelopment Plan. The neighborhood's townhomes are concentrated along the middle section of Greenway Street and around the Cupola Quad. The framework of this typology allows for extended runs of units along a street or open space frontage. The narrower widths of units creates a condition for variety in the detailing of the front architectural facades. Entrances to the individual units are on raised porches sitting above the adjacent streetscapes.

The Redevelopment Plan incorporates both tuck-under and courtyard-style townhomes, giving prospective residents options in selecting their preferred units. Both styles function with private garage access off rear alleys. On-street parking stalls along the townhome frontages can be utilized for visitor use.

SINGLE-FAMILY RESIDENTIAL

COTTAGE HOMES / POCKET NEIGHBORHOOD

With the smallest-scale building footprint and lot size among the single-family residential typologies, cottage homes can add valuable density to more remote or confined development sites. In many cases, cottage homes are grouped around a shared green space to provide additional open space for residents to use. In such cases, the grouping of homes is referred to as a pocket neighborhood.

In the Redevelopment Plan, cottage homes are proposed within the pocket neighborhood surrounding the Community Green as well as off the ceremonial lawn near the reclaimed cemetery site. All of the cottage home lots are rear-loaded, with residents' garages accessed via alleys. Visitor parking is accommodated via on-street stalls.



Precedents of small-scale cottage homes designed in a traditional aesthetic



Bird's-eye perspective of the pocket neighborhood surrounding the Community Green



Precedents of rear/alley-loaded (top & middle rows) and front/street-loaded village homes

VILLAGE HOMES

Stepping up in building and lot size from cottage homes, in the Redevelopment Plan, village homes represent the mid-size option for single-family living. Village homes can be found on opposite ends of the neighborhood. To the east, along Colony Road, three sets of homes are laid out in arc around a common drive and lawn space. On the west side, a more traditional district of homes follow two parallel streets running along an existing ridgeline.

The neighborhood includes both front-loaded homes, with driveway access to garages, as well as alley-loaded units. With the front-loaded homes, it is important that the garages be set back, inset from the home's front door and porch to lessen its impact on the street environment. The 2-3-story homes are laid out with common setbacks along a given street frontage. Visitor parking can be accommodated either via the driveway or alley aprons of the individual lots or on provided on-street stalls.

ESTATE HOMES

The proposed estate homes are concentrated in the Redevelopment Plan on the far south area of the Site. The location is sensible, as these larger and more expensive homes will require the additional privacy provided by the heavily-wooded lots at the far southern corner of the neighborhood.

The estate homes will be accessed via residential streets following the area’s existing ridgelines. Lots on either side of these drives will follow the terrain an fall quickly away from roadways. Thus, the homes will most likely include walk-out basements and elevated back deck with views out into the forested hillsides.

All of the estate homes on the Site are front-loaded with garage access from the drives. Like the village homes, front garages should be set back behind the front porches. The driveways will accommodate the majority of visitor parking demand for the homes.

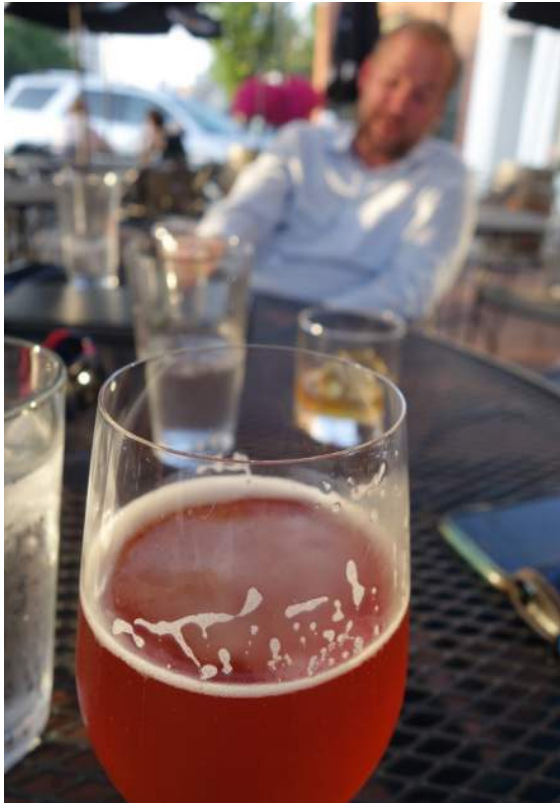


Precedents of large-scale estate homes pushed up toward the adjacent street

SPECIAL DESTINATIONS

The Redevelopment Plan accounts for several special destination uses within the neighborhood. At the far west end of the Site, at the ridgeline terminus of Greenway Street, resides the Funicular Station and the destination restaurant. The structures, unique in function, are to be designed in a unified aesthetic, with common forms and building materials utilized to promote a true sense of place for highly-visible development site.

In terms of orientation, both buildings’ entrances are located on their east sides off a shared drop-off plaza and surface parking lot. The restaurant and station also share a large overlook terrace on their west side. This feature allows patrons of both facilities incredible panoramic views north and west across the James River valley to downtown Lynchburg and the Blue Ridge Mountains further in the distance.



Precedents of special destination uses that utilize buildings with open floor plans and large outdoor plazas for markets and live performances



Photos of the existing farm complex (bottom) and the individual structures proposed for re-use (top)

THE FARM

Lying at key location along the proposed Greenway Street, across the pedestrian bridge from the amphitheater and destination playground, and on a blufftop overlooking the river valley, The Farm complex offers an incredible opportunity to create a unique entertainment experience within the neighborhood's framework. The Farm has the potential to be not only a local, but regional draw for visitors and prospective residents or investors looking to enter the market.

Uses for the renovated structures are split between an event space and local brewery/winery/distillery outfit. Both uses align with adaptive re-use of the complex. The unique forms and materials of the buildings are best celebrated within these types of venues. The open floor plans of the structures allow for maximum flexibility during entertainment activities and events.

The exterior space between and around the buildings can be transformed into a plaza space, with a covered seating area and bandshell/stage feature providing accommodation for both day-to-day big event use. Festival string lighting and rustic pole lights promote nighttime use of the space. The aesthetic of the plaza design mirrors that of the buildings themselves. The opportunity exists to re-use bricks from the facades of the demolished CVTC buildings.

Shade trees and rain garden plantings will soften the exterior space, providing seasonal interest around the complex. A tiered water feature is located on the east side of the plaza, serving as a wayfinding feature off Greenway Street and in-line with landing plaza of the pedestrian bridge.

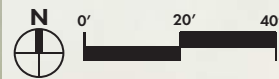


Precedents of outdoor event or food hall plazas



Vignette of the plaza and renovated building for the event venue at The Farm

ILLUSTRATIVE DETAIL PLAN



ACCESS DRIVE

RAIN GARDEN WITH
COLORFUL NATIVE
PLANTINGS

RENOVATED
EVENT SPACE

SHADE TREES

SMALL PATRON
PARKING LOT

FESTIVAL STRING
LIGHTING OVER
EVENT PLAZA

RENOVATED
BREWERY / WINERY /
DISTILLERY

BANDSHELL
FEATURE WITH
ELEVATED STAGE

PEDESTRIAN BRIDGE
LANDING PLAZA

RESTORED NATIVE
LANDSCAPING WITHIN
THE RAVINE

SHADE TREES

TIERED WATER
FEATURE

LARGE PLAZA
WITH DECORATIVE
PAVERS

CANOPY STRUCTURE WITH
SEATING / OUTDOOR
DINING BELOW



Precedents of restored farm structures used for entertainment or special retail uses



Vignette of the plaza and renovated brewery/winery/distillery building at The farm



11 | IMPLEMENTATION

DEVELOPMENT YIELD
POTENTIAL PHASING PLAN
IMPLEMENTATION STRATEGY



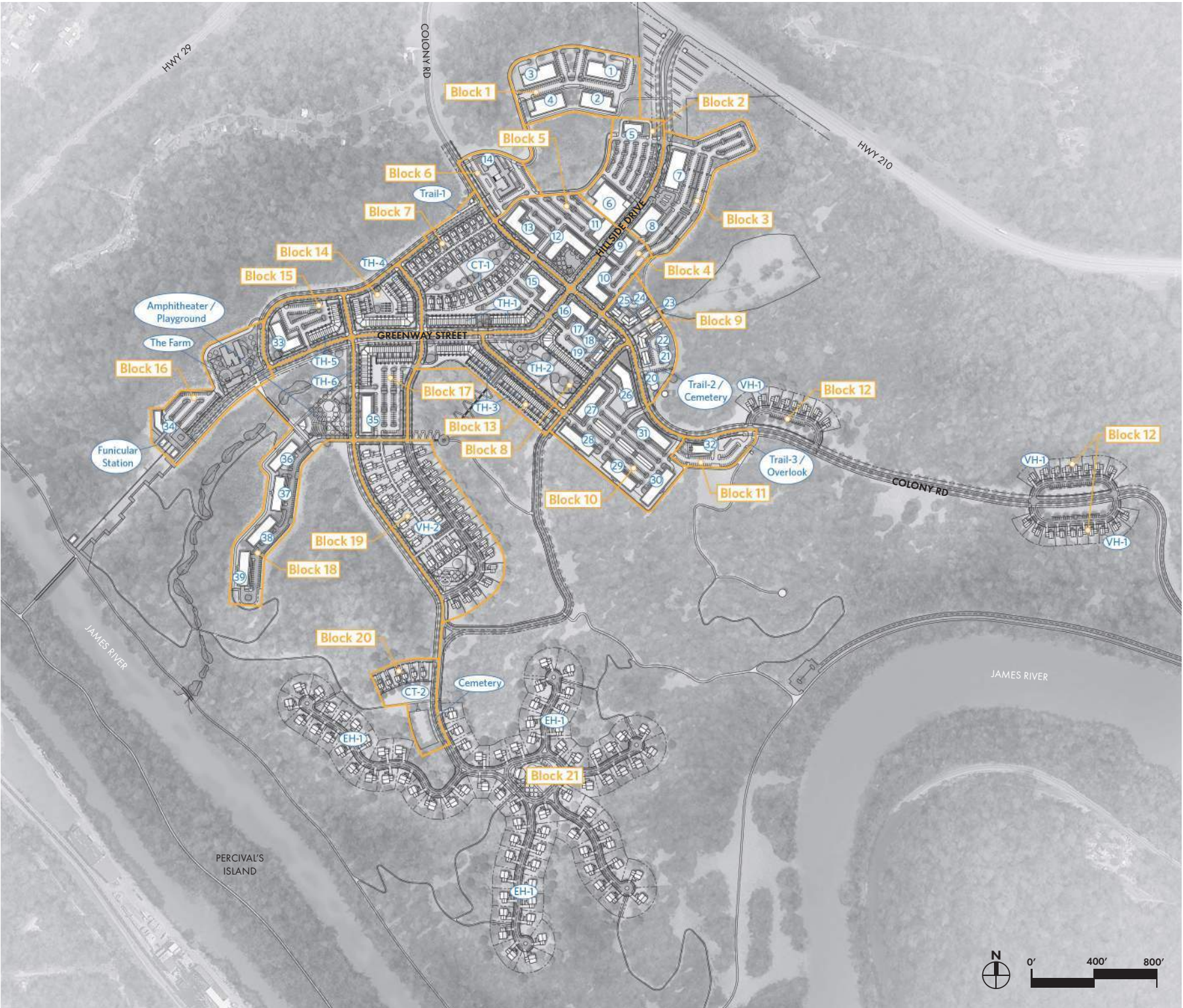


DEVELOPMENT YIELD

Prior to outlining a detailed strategy for implementation of the many design initiatives and built projects included in the Redevelopment Plan, its true capacity for development must first be identified. This capacity is represented here in the form of the overall Development Yield.

To do this, the various blocks of the proposed neighborhood are calculated per land use and achievable density. Density is factored using the footprints of individual buildings as well as their typologies, designated parking stall counts, and applicable parking ratios. Each of these items are used to determine the feasible number of levels/stories for each building, which represents the block's density.

The diagram to right shows the division of the Redevelopment Plan by block and building IDs. These figures can then be referenced on the Block Table on the opposite page. Also on that page is the Yield Summary Table and a listing of assumptions used in the calculations.



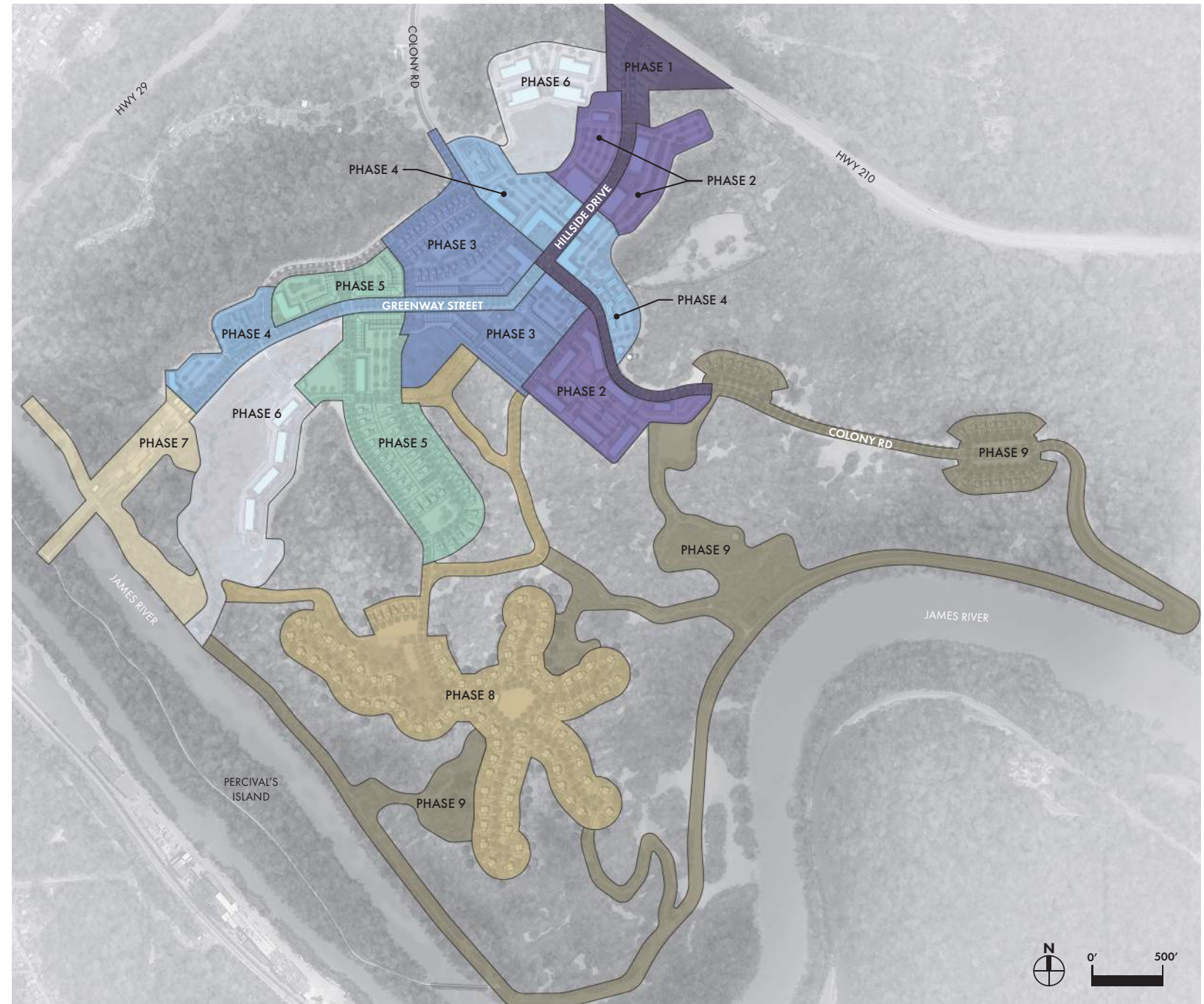
Development Yield Reference Diagram

TRAINING CENTER REDEVELOPMENT PLAN																			
Building ID	Building Type	Building Footprint	Stories	Square Footage	Comm. SF	Mixed SF	Office SF	Hotel SF	Misc SF	Resid SF	Hotel Rooms	Residential Units	Parking Demand	Parking Provided	Private	Pkg Lot	Pkg Gar	On Street	Notes
Block 1																			
1	Industrial / Tech	20,100	1	20,100	0	0	0	0	20,100	0	0	0	41	42	-	42	-	-	
2	Industrial / Tech	21,600	1	21,600	0	0	0	0	21,600	0	0	0	44	44	-	44	-	-	
3	Industrial / Tech	20,100	1	20,100	0	0	0	0	20,100	0	0	0	41	42	-	42	-	-	
4	Industrial / Tech	21,600	1	21,600	0	0	0	0	21,600	0	0	0	44	48	-	48	-	-	
Block 2																			
5	Retail	7,500	1	7,500	7,500	0	0	0	0	0	0	0	30	238	-	223	-	15	
6	Grocery Store	36,650	1	36,650	36,650	0	0	0	0	0	0	0	147	0	-	-	-	-	Shares parking with #5
Block 3																			
7	Office	25,000	2	50,000	0	0	50,000	0	0	0	0	0	200	400	-	385	-	15	
8	Office	19,800	3	59,400	0	0	59,400	0	0	0	0	0	238	0	-	-	-	-	Shares parking with #7
Block 4																			
9	Retail	10,500	1	10,500	10,500	0	0	0	0	0	0	0	42	145	-	125	-	20	
10	Mixed Use	23,100	3	69,300	0	23,100	0	0	0	46,200	0	50	151	0	-	-	-	-	Shares parking with #9
Block 5																			
11	Retail	10,500	1	10,500	10,500	0	0	0	0	0	0	0	42	247	-	217	-	30	
12	Mixed Use	26,660	3	79,980	0	26,660	0	0	0	53,320	0	57	174	0	-	-	-	-	Shares parking with #11
13	Senior Housing	23,240	3	69,720	0	0	0	0	0	69,720	0	75	113	0	-	-	-	-	Shares parking with #11
Block 6																			
14	Hotel	13,900	3	34,750	0	0	0	34,750	0	0	77	0	78	72	-	72	-	-	
Block 7																			
15	Mixed Use	20,650	3	61,950	0	20,650	0	0	0	41,300	0	44	134	168	-	92	-	76	
CT-1	Cottage Home Lots	-	2	-	0	0	0	0	0	0	0	35	35	35	35	-	-	-	
TH-1	Townhomes	-	3	-	0	0	0	0	0	0	0	24	48	48	48	-	-	-	
Trail-1	-	-	-	-	0	0	0	0	0	0	0	0	12	13	-	-	-	13	
Block 8																			
16	Mixed Use	17,150	3	51,450	0	17,150	0	0	0	34,300	0	37	112	158	-	90	-	68	
17	Missing Middle	2,400	3	7,200	0	0	0	0	0	7,200	0	9	12	0	-	-	-	-	Shares parking with #16
18	Missing Middle	4,360	3	13,080	0	0	0	0	0	13,080	0	15	20	0	-	-	-	-	Shares parking with #16
19	Missing Middle	3,200	3	9,600	0	0	0	0	0	9,600	0	12	16	0	-	-	-	-	Shares parking with #16
TH-2	Townhomes	-	3	-	0	0	0	0	0	0	0	16	32	32	32	-	-	-	
Block 9																			
20	Missing Middle	3,200	3	9,600	0	0	0	0	0	9,600	0	12	16	61	-	51	-	10	
21	Missing Middle	4,500	3	13,500	0	0	0	0	0	13,500	0	15	20	0	-	-	-	-	Shares parking with #34
22	Missing Middle	3,200	3	9,600	0	0	0	0	0	9,600	0	12	16	0	-	-	-	-	Shares parking with #34
23	Missing Middle	3,200	3	9,600	0	0	0	0	0	9,600	0	12	16	38	-	32	-	6	
24	Missing Middle	4,200	3	12,600	0	0	0	0	0	12,600	0	14	19	0	-	-	-	-	Shares parking with #37
25	Missing Middle	2,400	3	7,200	0	0	0	0	0	7,200	0	9	12	0	-	-	-	-	Shares parking with #37
Trail-2 / Cemetery	-	-	-	-	0	0	0	0	0	0	0	0	30	30	-	30	-	-	Shares parking with #26
Block 10																			
26	Apartments	21,500	4	86,000	0	0	0	0	0	86,000	0	92	123	542	126	290	86	40	
27	Apartments	17,500	4	70,000	0	0	0	0	0	70,000	0	75	100	0	-	-	-	-	Shares parking with #20
28	Apartments	17,500	3	52,500	0	0	0	0	0	52,500	0	56	75	0	-	-	-	-	Shares parking with #20
29	Apartments	17,500	3	52,500	0	0	0	0	0	52,500	0	56	75	0	-	-	-	-	Shares parking with #20
30	Apartments	18,900	3	56,700	0	0	0	0	0	56,700	0	61	82	0	-	-	-	-	Shares parking with #20
31	Apartments	17,500	4	70,000	0	0	0	0	0	70,000	0	75	100	0	-	-	-	-	Shares parking with #20
Block 11																			
32	Church	8,000	1	8,000	0	0	0	0	8,000	0	0	0	80	90	-	79	-	11	
Trail-3	-	-	-	-	0	0	0	0	0	0	0	0	25	27	-	27	-	-	Shares parking with #26
Block 12																			
VH-1	Village Home Lots	-	3	-	0	0	0	0	0	0	0	26	52	132	52	80	-	-	
Block 13																			
TH-3	Townhomes	-	3	-	0	0	0	0	0	0	0	32	64	97	64	-	-	33	
Block 14																			
TH-4	Townhomes	-	3	-	0	0	0	0	0	0	0	25	50	91	50	-	-	41	
Block 15																			
33	Apartments	18,900	4	75,600	0	0	0	0	0	75,600	0	81	108	138	-	104	-	34	
TH-5	Townhomes	-	3	-	0	0	0	0	0	0	0	12	24	24	24	-	-	-	
Block 16																			
The Farm	Retail / Event	15,000	1	15,000	15,000	0	0	0	0	0	0	0	60	41	-	16	-	25	
34	Destination Restaurant	7,750	2	15,500	15,500	0	0	0	0	0	0	0	62	164	-	142	-	22	
Funicular Station	Transit	4,800	1	4,800	4,800	0	0	0	4,800	0	0	0	36	0	-	-	-	-	Shares parking with #28
Block 17																			
35	Apartments	16,800	5	84,000	0	0	0	0	0	84,000	0	90	120	200	-	165	-	35	
TH-6	Townhomes	-	3	-	0	0	0	0	0	0	0	19	38	38	38	-	-	-	
Amphitheater / Playground	-	-	-	-	0	0	0	0	0	0	0	0	30	35	-	-	-	35	
Block 18																			
36	Podium Apartments	15,750	4	47,250	0	0	0	0	0	47,250	0	51	68	60	34	26	-	-	
37	Podium Apartments	15,750	4	47,250	0	0	0	0	0	47,250	0	51	68	84	38	46	-	-	
38	Podium Apartments	15,750	4	47,250	0	0	0	0	0	47,250	0	51	68	72	34	38	-	-	
39	Podium Apartments	15,750	4	47,250	0	0	0	0	0	47,250	0	51	68	77	38	39	-	-	
Block 19																			
VH-2	Village Home Lots	-	3	-	0	0	0	0	0	0	0	39	78	114	78	-	-	36	
Block 20																			
CT-2	Cottage Home Lots	-	2	-	0	0	0	0	0	0	0	6	6	14	6	-	-	8	
Cemetery	-	-	-	-	0	0	0	0	0	0	0	0	10	11	-	-	-	11	
Block 21																			
EH-1	Estate Home Lots	-	3	-	0	0	0	0	0	0	0	79	158	158	158	-	-	-	
YIELD TOTALS					100,450	87,560	109,400	34,750	96,200	1,073,120	77	1,476	3,763	4,070	855	2,545	86	584	
					Comm. SF	Mixed SF	Office SF	Hotel SF	Misc SF	Resid SF	Hotel Rooms	Residential Units	Parking Demand	Parking Provided	Private	Pkg Lot	Pkg Gar	On Street	

RECOMMENDED PHASING PLAN

Knowing that the governing body or master developer who will manage the redevelopment of the Site will establish a unique phasing plan based on the market conditions and other factors at that moment in time, the graphic to the right and following summary points show a proposed phasing approach as envisioned through this planning effort.

- Phase 1 - Construct the new gateway entrance and intersection at Highway 210. Construct the segment of Hillside Drive from the gateway to the intersection of Colony Road as well as the extension of Colony east to the future church/civic site and trailhead.
- Phase 2 - Develop the office building sites and neighborhood grocery store block nearest the gateway to attract anchor tenants to the neighborhood while providing regionally-focused services. In addition, the large apartment block on the south side of Colony will be developed to bring a large influx of initial residents to the neighborhood.
- Phase 3 - Reconstruct the west segment of Colony Road and develop the adjacent mixed-use and mixed-typology residential blocks to further boost the local population.
- Phase 4 - Develop the remaining building sites around the Village Square as well as constructing Greenway Street from Colony Road to the Farm and destination restaurant sites, both built during this phase to increase the use and visibility of the neighborhood.
- Phase 5 - Develop the mixed-typology residential blocks, including the village homes, near the center of the Site, diversifying the housing options for prospective residents.
- Phase 6 - Develop the tech industrial / flex campus on the north side of the neighborhood along with the line of mid-rise apartment buildings on top of the west ridgeline. The Stormwater Chain will also be constructed to manage runoff from the development sites.
- Phase 7 - Construct the Funicular and accompanying amenities (base plaza and grand stair). In addition, the trail bridge across the James River to Percival's Island will be built, connecting the neighborhood to the Heritage Trail and the regional mobility network.
- Phase 8 - Develop the estate home neighborhood, which primarily lies on the mobile home park. Thus, that property will be able remain in-place into the foreseeable future.
- Phase 9 - Extend Colony Road to the east and then turning back to make the new connection to the existing Heritage Trail trailhead. Develop the village home clusters along the Colony Road extension. Lastly, construct the remaining trails segments through the forested areas of the Site and along the riverfront.



Potential Phasing Diagram

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IMPLEMENTATION

The redevelopment of the Training Center Site presents a once-in-a-lifetime opportunity. In addition to evaluating the long-term market potential for residential, retail, office, and industrial development, an implementation strategy is critical in order to turn the Master Plan into a reality. This implementation strategy builds on the Development Yield and the Site’s capacity work, as well as physical, legal, financial, and market considerations influencing implementation.




It is assumed that the current owners will either transfer the Training Center Site to a local entity who will subsequently sell the Site to one or more developers (referred to hereafter as a singular developer) or sell directly to a private developer. This implementation strategy outlines key steps and considerations related to the redevelopment of the Site, including:

- Community Engagement
- Site Build-out
- Site Control



[1] Timing of Site transfers and developer selection is flexible and not necessarily dependent upon site preparation work. A Development agreement needs to be in place for vertical construction to begin.

COMMUNITY ENGAGEMENT

WHO?	WHAT?	WHEN?	WHERE?
<p>Engage:</p> <ul style="list-style-type: none">ResidentsEmployeesEmployersElected officialsOther stakeholders <p>Lead:</p> <ul style="list-style-type: none">Lynchburg Regional Business AllianceAmherst CountyDeveloperConsultants	<ul style="list-style-type: none">Provide project updatesSolicit public feedbackConduct public noticing and meetings as required by law	<ul style="list-style-type: none">Frequency may vary depending on project timeframe and desired level of engagementTiming of engagement may include:<ul style="list-style-type: none">Quarterly updatesCritical decision pointsAs required by law	<div><p>Website</p></div> <div><p>Mailing List</p></div> <div><p>Public Meetings</p></div>

KEY CONSIDERATIONS:

- What is the desired level of engagement?

For a long-term redevelopment project, ongoing community engagement with residents, employees, employers, elected officials and other stakeholders is required to provide project updates and solicit local feedback. The frequency of engagement may vary depending on project timeline, desired level of engagement, and legal requirements. The LRBA and other project leaders can develop a stakeholder engagement plan that will be regularly reviewed and updated throughout the implementation process to ensure continued community support.

NEXT STEPS

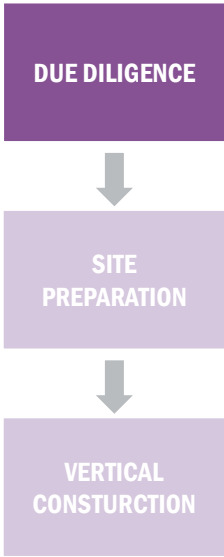
- Develop a stakeholder engagement plan that will be regularly reviewed and updated throughout the implementation process

SITE BUILD-OUT

The physical redevelopment of the Site is complicated by the presence of obsolete buildings, infrastructure, and utilities associated with the Training Center, varying topography and land conditions and extraordinary site preparation needs. Additional due diligence will be required to assess existing Site conditions and regulatory encumbrances. Since many developers prefer shovel ready sites, site preparation including demolition, remediation and the extension of public infrastructure and utilities will likely be necessary. Following a Development Agreement and an ownership transfer of some or all of the Site, a private developer will lead vertical construction of buildings.

Federal, Commonwealth and local funding sources may be available to support extraordinary costs associated with due diligence, site preparation, and vertical construction.

DUE DILIGENCE



The Site currently has existing buildings with obsolete roads, infrastructure and utilities that present challenges to redevelopment, however the full extent of these encumbrances and the costs to rectify them are unclear. Due diligence is critical to assess physical and legal encumbrances, perform cost benefit analysis of solutions to Site challenges, and inform detailed site planning, phasing, and negotiations with developers. Additional studies may be needed to uncover what improvements are required, the cost of clearing and cleaning the Site and the potential for phasing public investment over time.

NEXT STEPS

- Prepare due diligence checklist
- Review available reports and conduct additional due diligence, as needed
- Utilize findings from the additional due diligence research to inform negotiations with the current property owners. Depending on the timing of land transfers, the extent of liabilities at the time of the land transfers, it may be necessary to negotiate aggressively regarding land price



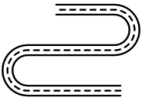
Land Use

- Existing buildings at the Training Center; several buildings are still operational and timing for full closure is unclear
- Mobile home residents on a portion of the Site
- Site topography and substantial, mature tree cover both reduce developable area



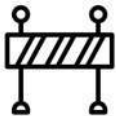
Utilities

- Unclear the extent to which the Site is adequately served by utilities (e.g., water, sewer, electric, natural gas, internet/fiber)



Roads

- Only one entrance from Highway 210 to the Site at Colony Road; additional access points would be required to support larger-scale development



Regulatory & Legal

- Confirm boundary through ALTA survey
- Determine recorded easements, such as access to mobile homes, river trail, etc.

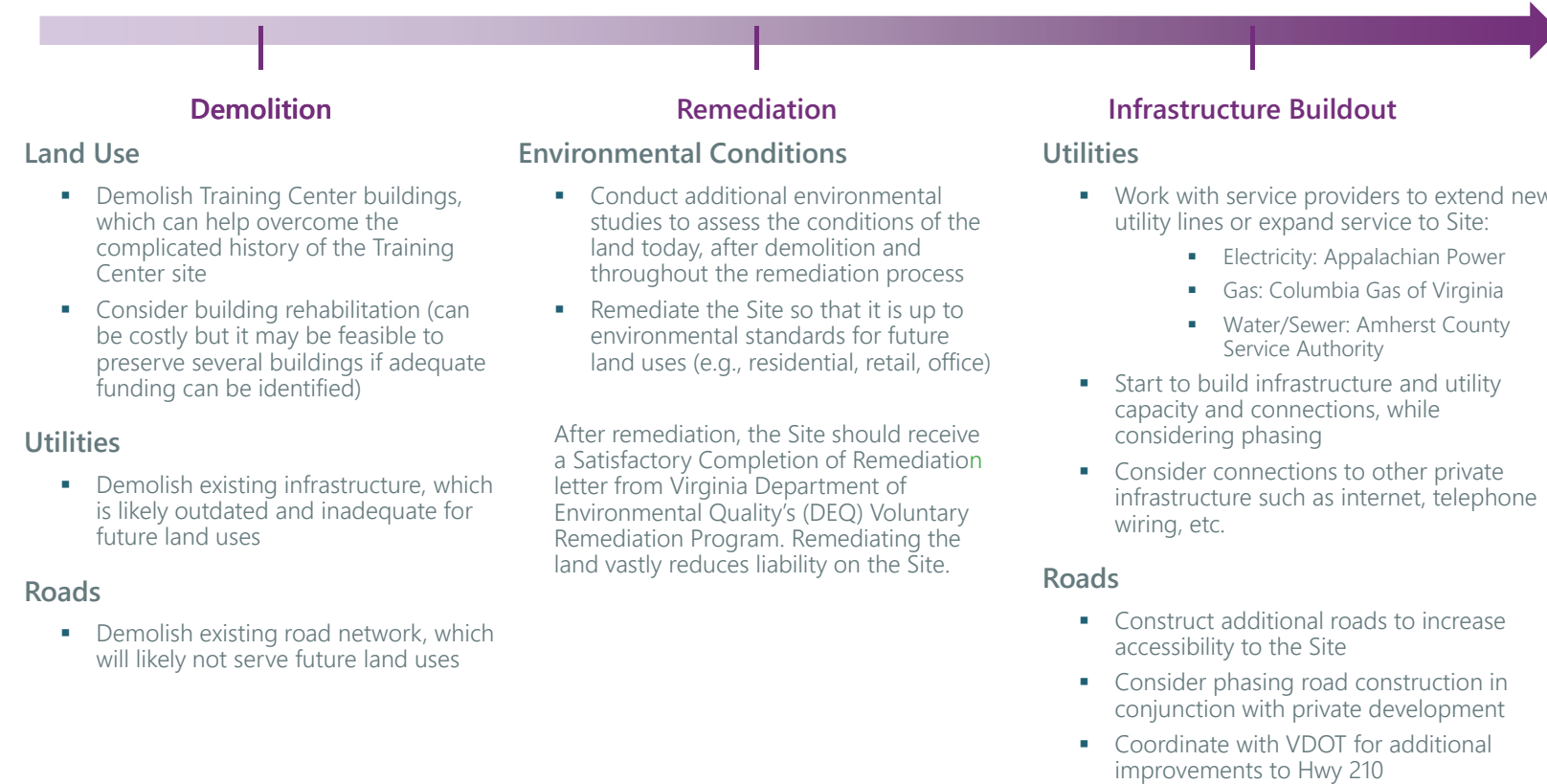


Environmental Conditions

- Phase 1 & at least one Phase 2 study completed
- State has completed required land remediation
- Some contamination may remain on Training Center buildings but the full extent and cost to remediate appears to be unknown

SITE TODAY

SHOVEL-READY



SITE PREPARATION

Many developers prefer shovel-ready sites that are served by utilities and have capacity to meet future demand. Shovel-ready sites are those that are clear of obstacles, mass graded and close to ready for vertical construction. Shovel-ready sites reduce risk in the site selection process and the time required for building delivery. While it may not always be economically feasible to extend utilities prior to selecting a private developer, detailed plans for site preparation could help accelerate redevelopment.

To get some or all of the Site shovel-ready for a private developer, the public sector may need to:

- Demolish most, if not all, vertical and horizontal site improvements;
- Strategically remediate environmental issues; and
- Extend public infrastructure and utilities to key portions of the Site.

Given the costs associated with site preparation, it may be necessary to phase improvements over time in conjunction with private development. Depending on the condition of the land when the transfer(s) take place, the financing and phasing plan to prepare the site and install new infrastructure, and the private sector's appetite to serve as the land developer, it may be necessary to hire a specialist or consultant team to support the land development and site preparation process.

NEXT STEPS

- Prepare preliminary work plan for site preparation
- Seek site preparation cost estimates





VERTICAL CONSTRUCTION

Following a Development Agreement and an ownership transfer of some or all of the Site, a private developer will presumably lead the construction of buildings. At that time, the Site would likely be clear and ready for further infrastructure buildout which should, as much as possible, be phased with the vertical development.

The first phase of development would likely include garden-style apartments and later phases could include townhomes and single-family development at varying densities. Retail and office will likely follow residential development. The intermediary (if one is utilized) and Developer should be open to “wild card” development opportunities but must ensure that the overall Site development potential is not unduly compromised in service of a single transaction.



Examples of mixed-use developments in Lynchburg

Federal, State and local funding sources are available to support extraordinary costs associated with due diligence, site preparation and vertical construction. These grants and incentives have various eligibility requirements.

FEDERAL GOVERNMENT

- Environmental Protection Agency (EPA) Brownfield Site Specific Assessment grants
- EPA Brownfield Revolving Loan Fund grants
- EPA Brownfield Cleanup and Multipurpose grants
- US Department of Transportation BUILD grant
- Surface Transportation Block Grant Program
- EDA Public Works and Economic Adjustment Assistance Program
- Opportunity Zone funding

STATE GOVERNMENT

- Virginia Brownfields Restoration and Economic Redevelopment Assistance Fund (VBAF) Site Remediation and Site Assessment & Planning grants
- Virginia Resources Authority Pooled Financing Program

LOCAL GOVERNMENT

- Community Development Block Grants (CDBG)
- Tax Increment Financing (TIF) / Value Capture
- Tax Abatement
- Joint development

NEXT STEPS

- Conduct further research on public funding options
- Establish a public funding strategy
- Continue conversations with Commonwealth and local partners about public funding sources

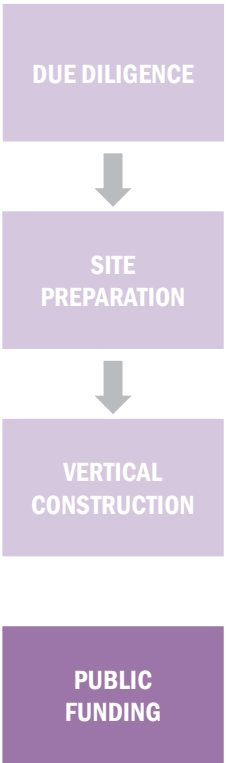
PUBLIC FUNDING

The developer is typically responsible for paying normal site preparation and vertical development costs including basic public infrastructure (on-site streets, water and sewer lines, stormwater management), private site improvement costs (final site grading, landscaping, detention ponds, parking lots), and vertical construction costs. However, the Site has various extraordinary development costs (that are above and beyond typical suburban development costs) that are anticipated to be paid for, at least in part, by the public sector, including:

- Building demolition, site preparation, and removal of old utilities associated with the Training Center
- Asbestos abatement and other environmental remediation
- Providing adequate sewer, water, gas, and electric capacity and extensions to the Site
- Other public amenities such as bike paths, green infrastructure, alleys, and the Funicular

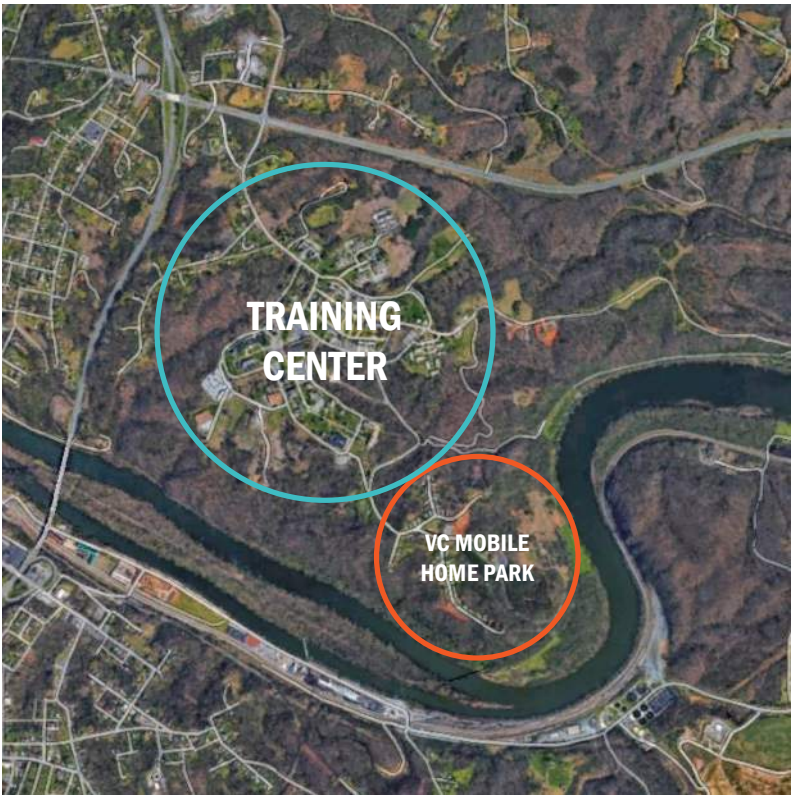
In instances where a vertical development project is infeasible without assistance due to competitive challenges, the local entity may provide additional public financial assistance. This is appropriate in cases where the market is not fully established and it is difficult to get financing, the project has desirable features that the market will not fully “pay for” and/or when one or more of the publicly-desired land use(s) are not the highest and best use(s).

While Federal, Commonwealth and local funding sources are available to support extraordinary costs associated with site buildout, who pays for what will be key points of negotiation throughout the redevelopment process.



SITE CONTROL

While portions of the Site are currently owned by the Commonwealth of Virginia and a private owner, it is a best practice to transfer the land to an intermediary that would assemble the full site and then manage the disposition process to a private developer. This process would enhance local control to help achieve the highest and best use of the Site that aligns with the vision outlined in the Redevelopment Plan. However, if it is not possible to transfer the entire Site to an intermediary, the Commonwealth of Virginia could sell their portion of the Site directly to a private developer. Negotiations related to the price, timing, responsibilities, entitlements, and public assistance are likely key discussion points between current owners and future owners at various stages in the process.



Context Diagram with Property Ownership

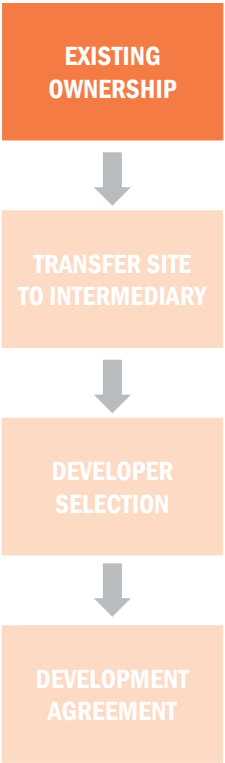
EXISTING OWNERSHIP

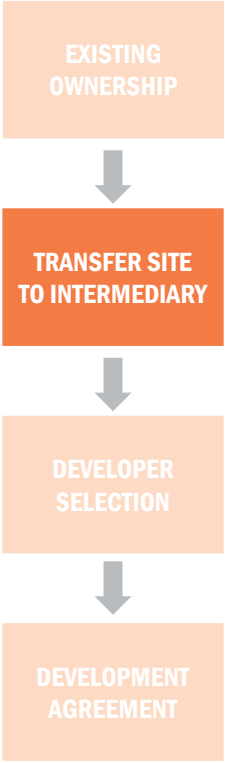
The Site currently has divided ownership. The Commonwealth of Virginia owns the land and buildings associated with the Training Center, while a private owner owns the land associated with the adjacent VC Mobile Home Park. In addition to the Training Center portion, future owners should consider acquisition of the mobile home park as well to create a cohesive site to support the overall redevelopment vision. Considerations related to acquisition of the mobile home park include:

- Inclusion of the mobile home park reduces uncertainty about adjacent land uses, aids utility and infrastructure buildout and ensures cohesive development.
- Acquiring the mobile home site early on will require capital that may be needed for other costs.
- Inclusion requires relocation of current residents and likely removes naturally-occurring affordable housing units from the area.
- Delayed inclusion increases the risk that the mobile home park owner may hold out for an above-market land price once development starts, requiring greater public expenditure.

NEXT STEPS

- Review bond documentation to determine financial encumbrance and legal options on the Training Center Site
- Initiate negotiations with mobile home park owner
- At the appropriate time, start discussions with mobile home park residents





TRANSFER SITE TO INTERMEDIARY

The best practice for land disposition would be for the Commonwealth to transfer the Training Center to a local intermediary after both parties agree on responsibility for extraordinary costs. The Department of General Services stated it will follow §2.2-1156 of the Virginia Code to dispose of the Training Center Site on behalf of the Department of Behavioral Health and Developmental Services. This allows the Commonwealth of Virginia to transfer the Site to a local intermediary that would manage disposition to a developer or the Commonwealth could sell directly to a local developer.

The local intermediary may be one or more local units of government, or a designated non-profit set up by local governments. Examples could include but not limited to organizations such as Lynchburg Regional Business Alliance, Amherst County, and partnership localities. The intermediary would need to have land acquisition and disposition powers. Regardless, the County will regulate land use and zoning. Additionally, the intermediary would need to have access to funding, staffing capacity and the legal authority to manage the Site. Depending on the type of intermediary, there may be a tradeoff between local and regional decision-making. For example, a non-profit could be created with a board comprised of regional stakeholders.

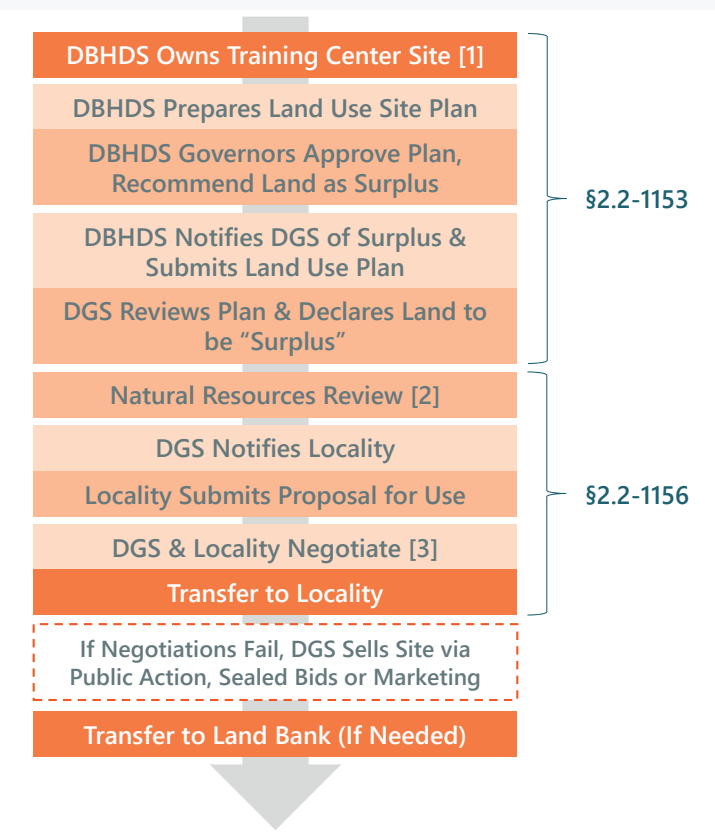
If a local intermediary is identified and/or established, prior to land transfer, the Commonwealth and intermediary will need to negotiate key terms and conditions based on the known encumbrances, including debt associated with the Training Center Site, the value of the Training Center Site, responsibility for site preparation (e.g., demolition and remediation), and timing. Should the intermediary

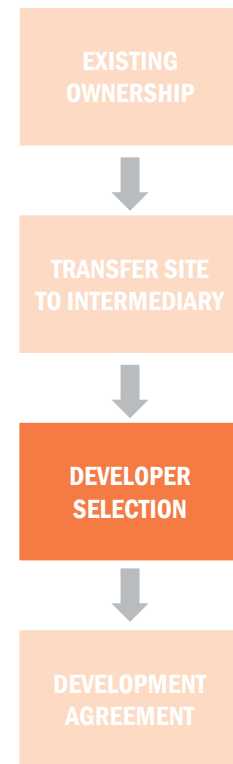
decide to acquire the mobile home park, both the Training Center Site and the mobile home park i could be considered as one site throughout the site preparation and land disposition processes.

While transferring the Site to a local intermediary to handle the disposition process to a private developer is the best practice, this may not be feasible due to various financial and/or capacity limitations. The Commonwealth of Virginia could sell directly to a private developer through public auction, sealed bids or other mechanisms. To ensure that development outcomes on the Site align with the vision of this Plan, Amherst County indicated that the County’s future land use plan will be amended to reflect the land uses presented in the plan. However, the County is open to future zoning amendments and re-zoning applications from future developers, if needed to deliver on the vision articulated in the plan.

NEXT STEPS

- Determine intermediary with local governments and continue to discuss transfer of the Training Center Site with Commonwealth of Virginia
- Amend the County’s comprehensive plan so that the future land use on the Site to conforms to the Master Plan





DEVELOPER SELECTION

The best practice to achieve the highest and best use of a site of this scale is for either the Commonwealth of Virginia or the local intermediary to select a master developer (or development team) with the qualifications and capacity to develop the entire Site. Transferring the Site to a local intermediary allows for significant local control on entitlements, design, communications and exit strategy, which helps ensure that future development aligns with the vision outlined in the Redevelopment Plan.

The first step in this process is to issue a Request for Information (RFI) to gauge developer interest in the Site. An RFI is a common, optional process to collect high-level information on developer qualifications, interest in the site, and potential development plans. An RFI can be used in conjunction with different developer selection processes. For example, an RFI could inform a subsequent two-step Request for Qualifications and Proposals (RFQ/P) process through which a master developer for the Site could be selected. Depending on ownership (either Commonwealth of Virginia or local intermediary), various local partners may be involved to issue an RFI or solicit developer interest which would require collaboration and partnership between the various entities. If there is limited interest from master developers and a local intermediary owns the Site, the intermediary could serve as the master developer and sell individual parcels with covenants. Otherwise portions of the Site could be sold off as is, depending on the Commonwealth’s desire and capacity of existing ownership to remain involved in the project.

NEXT STEPS

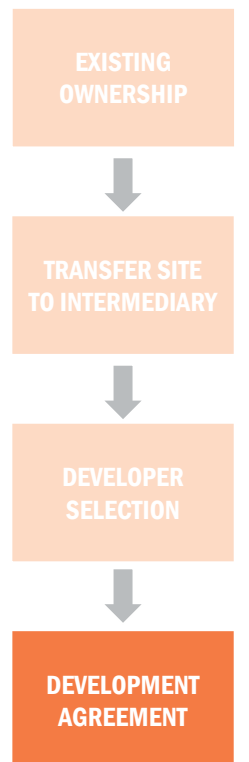
- Research potential master developers with capacity/ willingness to take on project
- Determine if RFI is needed to gauge developer interest
- Prepare marketing materials corresponding to preferred developer selection process



	Pros	Cons
Master Developer <i>*Preferred Pathway</i>	<ul style="list-style-type: none"> Significant local control on entitlements, design, communications and exit strategy Transfers entire Site as one, preventing the Site from splintering into good/bad parcels Single developer creates cohesive overall project 	<ul style="list-style-type: none"> May be difficult to find a qualified and willing master developer to take on the Site Entitling the entire Site at once may be a lengthy process
Sell Sites Individually with Covenants	<ul style="list-style-type: none"> Local control on design, communications and exit strategy Local intermediary oversees overall project cohesiveness 	<ul style="list-style-type: none"> Public sector takes on more of the land developer role, including ongoing workload and associated risks Public sector responsible for creating a master plan and covenants for sale Public sector must stay involved in the project until all properties are sold/leased
Conventional Real Estate Marketing	<ul style="list-style-type: none"> Developers may have more interest in some sites today, leading to quicker development Initial spot development may create demand for and incentivize further buildout 	<ul style="list-style-type: none"> Spot development – best site(s) cherry-picked, then harder to sell others Lack of control over development without appropriate zoning. Ultimate development may not align as well with master plan Less control on design, communications & exit strategy May not result in the highest and best return overall

DEVELOPMENT AGREEMENT

Once a qualified developer has been selected, the intermediary or Commonwealth will negotiate and enter into a Development Agreement to transfer the land. Negotiations will cover issues like the price of land, timing/phasing, responsibility for infrastructure buildout, entitlements and public financial assistance. Local partners can agree to streamline the regulatory process (e.g., entitlements) as part of these negotiations. Additionally, due to the extraordinary costs associated with site preparation and the relatively unproven market, it is likely a private developer could request public assistance. A gap analysis could be conducted to define the appropriate amount and structure of public financial assistance required to make the project financially feasible.



NEXT STEPS

- Further research on local public financing options
- Continue discussions with local partners about ability and willingness to incentivize development on the Site

SUMMARY & REVIEW OF NEXT STEPS

The redevelopment of the Site is a complex process that requires close collaboration between the Commonwealth, potential local intermediary (if applicable), private developers and other local and regional partners. The graphic below presents a summary of immediate next steps for the LRBA and other project leaders related to community engagement, site buildout, and ownership.





Aerial view looking east across the existing CVTC campus



12 | DESIGN GUIDELINES

OVERVIEW

BLOCK STRUCTURE

LAND USE

BUILDING HEIGHTS

BUILDING SETBACKS

PARKING & ACCESS

SPECIAL REQUIREMENTS



OVERVIEW

In this final section, the framework elements, design initiatives, and development opportunities formed by the Redevelopment Plan are synthesized into neighborhood-wide graphic diagrams. The diagrams illustrate how the master planning principles were applied to transform the Training Center Site into a walkable, mixed-use neighborhood.

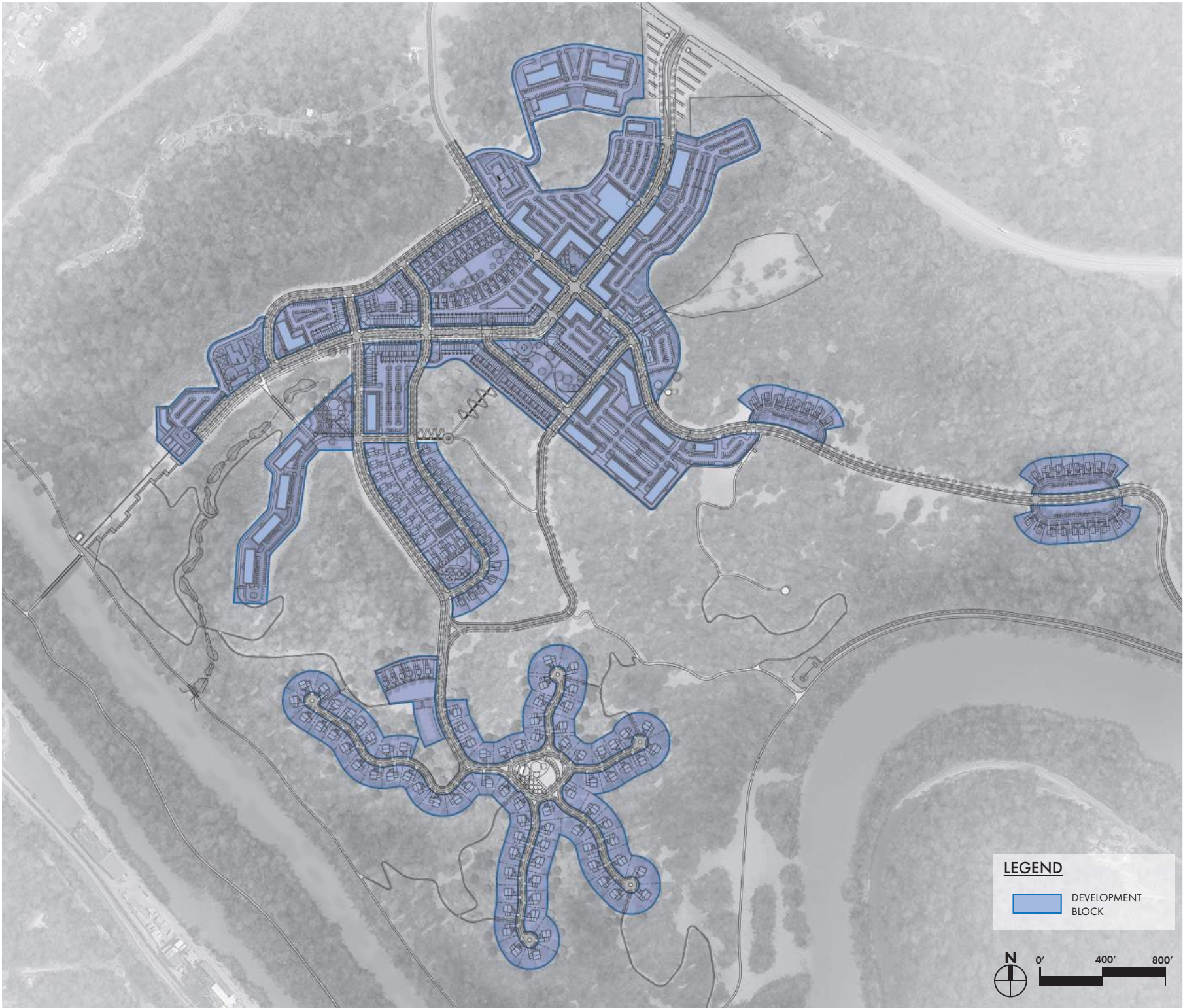
The complete set include the (a) Built Form, (b) Walkshed, (c) Preservation, (d) Street Hierarchy, (e) Active Mobility Network, and (f) Park & Open Space diagrams found in earlier sections in addition to those presented on the following pages. When compiled, the set is not meant to be comprehensive in scope, but simply representative of the major guidelines that were employed in laying out the overall neighborhood and designing specific sites, buildings, or public open areas. The overarching design intent and guiding vision for the Redevelopment Plan informed the composition of each of the diagrams.

Further, more in-depth planning and design efforts will need to be undertaken before implementation of the Redevelopment Plan can begin.



Bird's-eye perspective looking west, focused on the Cupola Quad and Greenway Street

BLOCK STRUCTURE



Given the Redevelopment Plan’s street network is most informed by the undulating terrain and series of ridgelines and ravines, the Block Structure of the neighborhood is quite variable. The development pattern was developed from the perimeter inward. The Hillside Drive/Greenway Street and Colony Road corridors bisect the Site. In the north and east halves of the neighborhood, large blocks are found over the relatively flat terrain. Small influences of grid block pattern are evident, as the blocks with the Community Green / pocket neighborhood, Cupola Quad, and large-scale multi-family residential complex near the church are enclosed by public rights-of-way.

As the Greenway Street corridors continue west, the flat areas ripe for a gridded structure narrow, creating pinch points for the adjoining development blocks. Smaller, more dense mixed-use or special destination blocks continue along Greenway. Moving south away from the central corridor, several secondary streets line elongated residential blocks. The podium-only multi-family, estate home, and eastern village home blocks are strictly informed by the surrounding terrain.

LAND USE

From its connection to Highway 210, Hillside Drive is lined with a variety of land uses, each requiring the visibility and ease of access the new roadway provides. Office, commercial/retail, and mixed-use buildings front onto the corridor. Mixed-use building encircle its intersection with Colony Road and adjacent Village Square. As Hillside continues west, it transitions to Greenway Street, with its townhome frontage expanded around the adjacent Cupola Quad.

Along Colony Road, moving away from the Village Square, typologies change to fit the less intensive, more removed context. To the north, as senior living building and hospitality use at The Inn line the roadway's east side. Small cottage homes surrounding the Community Green lie just to the west. In the far north corner of the Site, perched on detached bluff, the tech industrial/flex buildings are located. Moving south from the Village Square on Colony, missing middle lowers the development density near the Memorial Gardens cemetery and water towers. At the next block, though, residential density rises with a large multi-family complex. A church or civic use anchors the core segment of Colony before the roadway continues further east to service three clusters of village homes as well as provide access to the regional trail network.

Multi-family residential buildings are found on the ridgelines of the neighborhood's western section. Destination event space, restaurant, and transit uses lie along the far western segment of Greenway Street. Development on the ridgelines to the south include both village and estate homes, with the individual building and lot sizes increasing with the typology change as one moves further away from the central spine of development.



Mixed-use building



Cottage homes within a pocket neighborhood



Apartment building



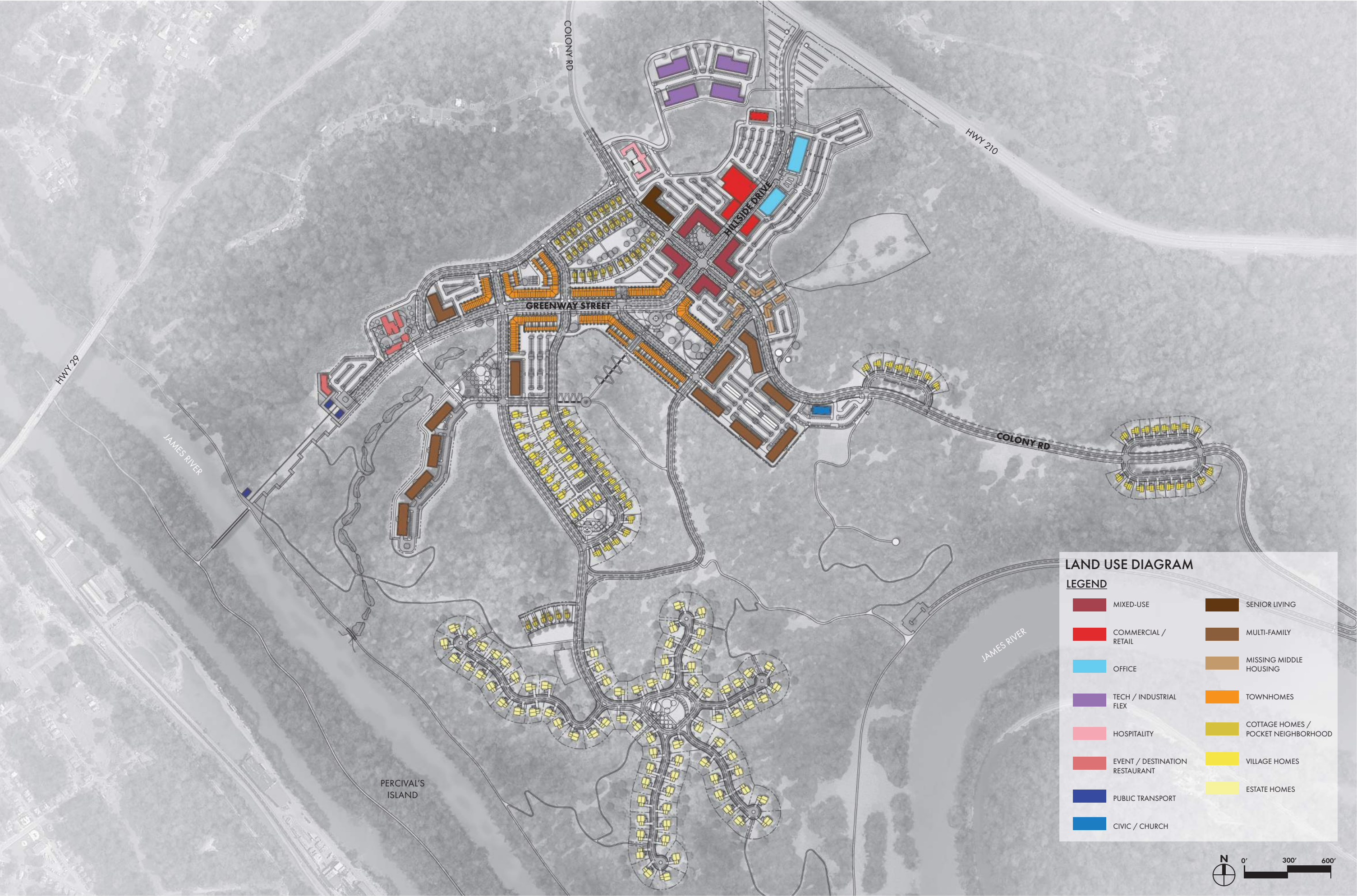
Village homes



Office building



Estate homes



BUILDING HEIGHTS

Within the Redevelopment Plan, the heights, or number of levels associated with individual structure, correlates quite directly with land use and typology. The tallest structures are the multi-family residential buildings, at 5 levels, lining a ridgeline jutting out toward the James River valley immediately surrounding the amphitheater and destination playground site. It’s the scenic views and proximity amenity areas that drove denser capacities at this location.

Other multi-family residential buildings elsewhere within the neighborhood are 4 levels. These structures are located on larger development sites where bigger parking lots can be accommodated. The townhomes are 3 levels as are the mixed-use buildings around the Village Square. These structures would consist of two levels of residential units above ground-level retail uses. The office buildings located closer to Highway 210 are also 3 levels in height.

The single-family residential homes are provided with a range of 2-3 levels depending on specific designs and grading impacts. The walkout composition of The Inn also splits the structure between 2-3 levels in height.

The buildings with only 1 story include the retail liner buildings, the grocery store (though a portion could be two stories tall), the tech industrial/flex buildings (though their floor-to-ceiling heights would be greater than the other structures), and The Farm complex.



One-level retail liner buildings



One-to-two-level cottage homes



Three-level mixed-use building



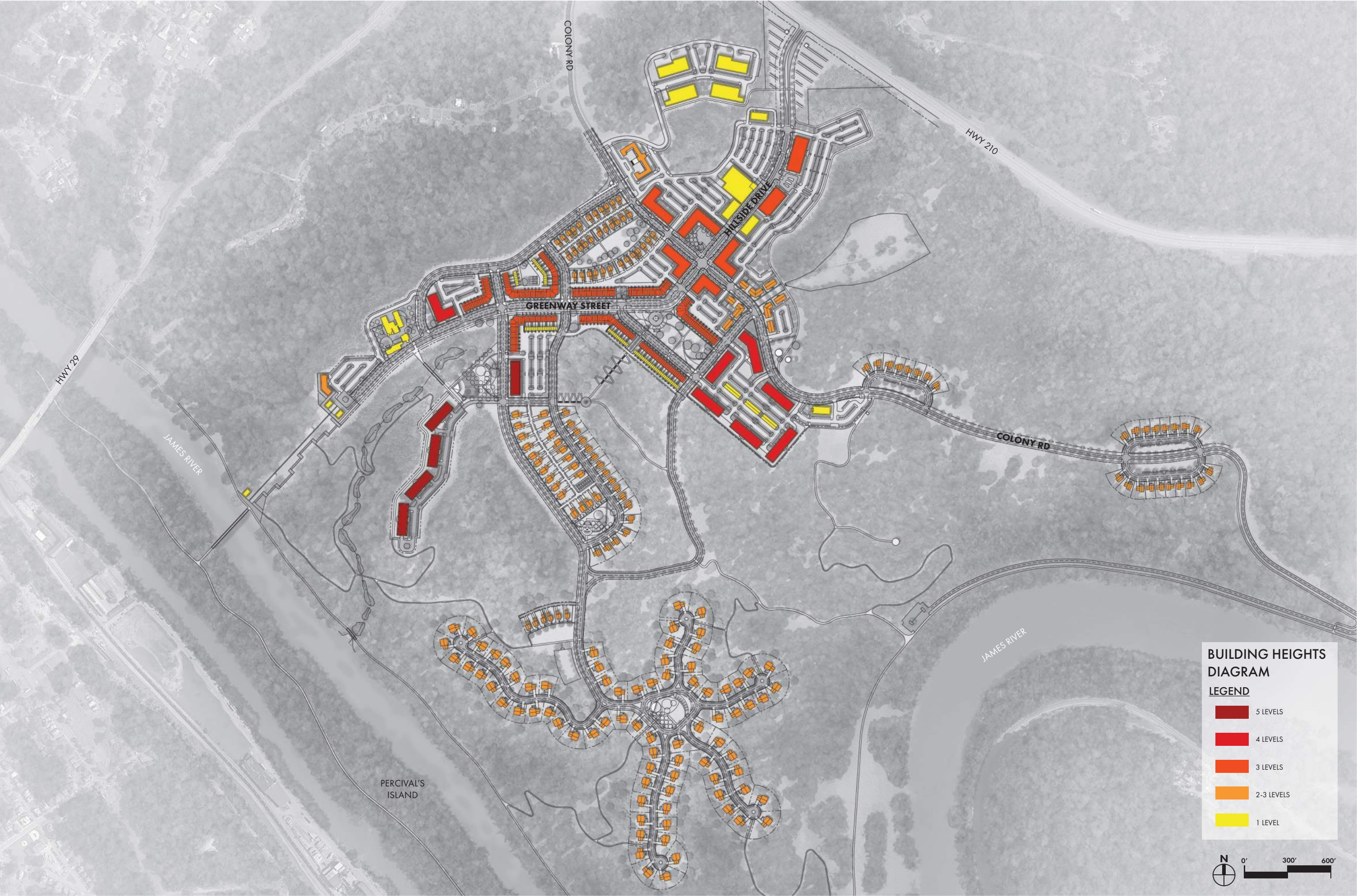
Two-level missing middle housing buildings



Four-level mixed-use building



Three-level townhomes



**BUILDING HEIGHTS
DIAGRAM**

LEGEND

	5 LEVELS
	4 LEVELS
	3 LEVELS
	2-3 LEVELS
	1 LEVEL



BUILDING SETBACKS

The more urban frontages along Hillside Drive and Colony Road approaching the Village Square accommodate the smallest setbacks. In these areas, the buildings are pushed close to the right-of-way line to encourage interaction between the street and ground-level uses. Setbacks range from 0-10’ at the neighborhood’s mixed-use core.

Setbacks then increase as the retail and mixed-use frontages of the core transition to residential. The multi-family residential, missing middle, and townhome typologies generally provide 15-20’ setbacks from the adjacent streets. This depth allows for appropriate landscaping buffers for the residences from the public realm. Single-family residences, though, providing yet an even greater setback. A minimum 25-foot setback allows the homes to have a decent front yard space without compromise the urban frontages ideal for the neighborhood.

Throughout the Redevelopment Plan, select buildings are provided with what are termed “special” setback depths. Typically these setbacks are quite large due a number of site factors, including attachment to a public green space (meaning the closest street lies on the opposite side of the open space) or proximity to a natural feature (like a ravine). The larger setbacks minimize impacts the structures may have on the accompanying space or feature while providing a comfortable offset from which users of the buildings can view the amenity areas.



Mixed-use, urban street frontage (typically 0-ft setback) with widened pedestrian amenity zone



Village homes with 15-20-ft setback



Apartment building with a greater than 10-ft landscaped setback



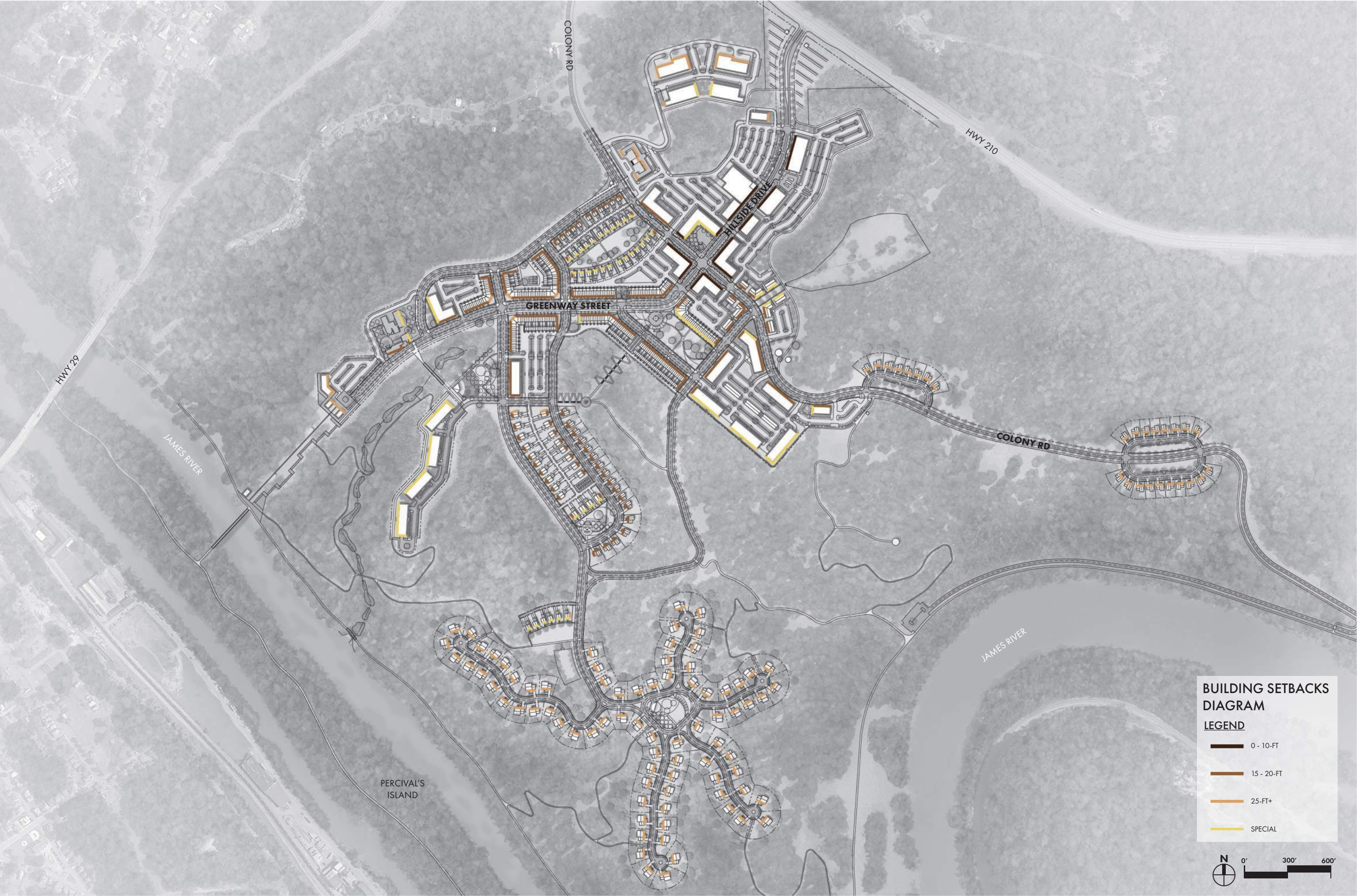
Front-loaded village home with 25-ft(+) setback



Residential street with a consistent 15-20-ft setback



Special setback condition with estate homes fronting onto a shared green space



**BUILDING SETBACKS
DIAGRAM**

LEGEND

- 0 - 10-FT
- 15 - 20-FT
- 25-FT+
- SPECIAL



PARKING & ACCESS

As a mixed-use neighborhood, the Redevelopment Plan employs a layered approach to parking accommodations. Most of the neighborhood’s active, walkable streets include on-street parallel parking stalls on both sides. The large surface parking lots are located to the rear of lots, hidden from the streets by the buildings. The largest surface lots are found behind the commercial and office buildings, whose use designation requires a more intensive parking ratio.

Within the multi-family or mixed-typology residential blocks, the surface parking lots located on the interior of the blocks, with the buildings pushed to the street frontages. Podium multi-family buildings include private garage stalls on their ground-levels. The townhomes and single-family residential units all provide private garages to their residents.

Most of the surface parking lots within the urban neighborhood are accessed via alleys or service drives at the rear of the various lots. The larger residential blocks with internal surface lots provide short, mid-block driveways off the adjacent streets for access. The garages of all townhomes and most single-family residences are accessed from back alleys. The exception are the front-loaded village homes and estate homes, whose driveways begin at the adjacent street.



Surface parking lot with landscaped islands



Tuck-under townhomes with attached garages accessed via rear alleys or parking lots



Townhomes with detached garages accessed via an alley



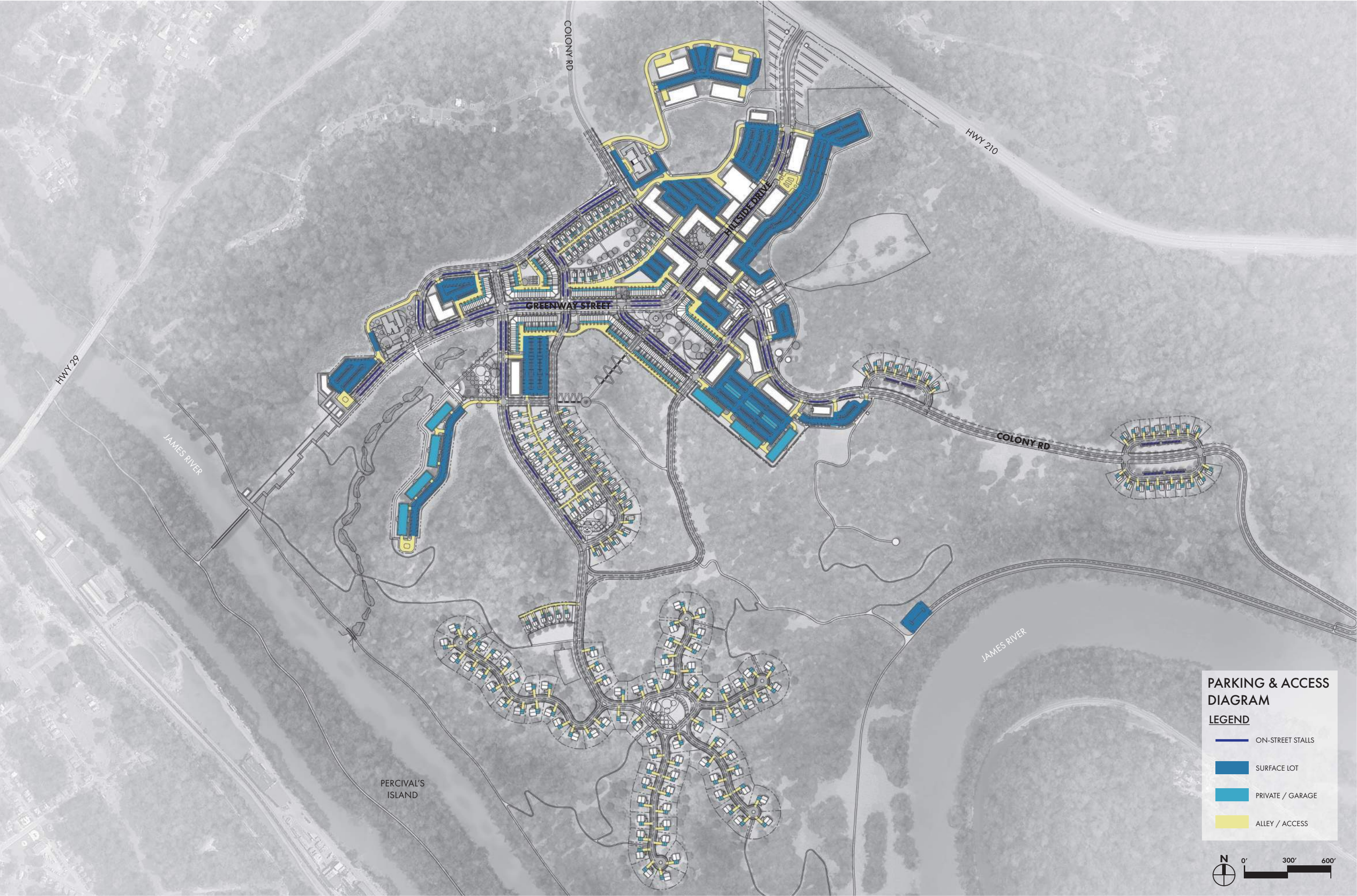
Surface parking lot located to the interior of a block, behind liner buildings fronting the street



On-street parallel parking stalls adjacent to a row of townhomes



Village homes with rear alley access to their garages



**PARKING & ACCESS
DIAGRAM**

LEGEND

- ON-STREET STALLS
- SURFACE LOT
- PRIVATE / GARAGE
- ALLEY / ACCESS



SPECIAL REQUIREMENTS

Upon implementation of the Redevelopment Plan, several overarching master planning initiatives will need to be incorporated to realize its vision and development potential. Most can be thought of as “big moves” around which more specific design principles can be employed.

Building frontages along key corridors, most notably Hillside Drive and Greenway Street, should be enhanced with quality architectural detailing and design. This principle should also be applied to the building enclosing a major open space, like the townhomes around the Cupola Quad or the cottage homes lining the Community Green. In addition, facades of buildings oriented toward views of re-vegetated ravines or with promontory views should be well-detailed.

Around the Village Square and larger mixed-use core of the neighborhood, ground-level storefronts or retail space will be required. The same is true for The Farm complex and at the destination restaurant. The side path along the south side of Greenway Street is to be delineated with a double row of canopy trees, emphasizing the route’s importance within the active mobility network.

Many of the street alignments and open space orientations were framed along axial views with iconic features terminating the vistas. Hillside Drive is aligned to Cupola Monument in the quad space. The monument itself lies on axis with the preserved smokestack, which in turn terminates another key corridor stretching from the amphitheater area. Pavilions in the residential park spaces, the church building, and Memorial Gardens cemetery gate also terminate axial views.

Selective clearing of wooded areas will need to be performed to allow for several axial view and mobility corridors to exist. Most importantly, though, clearing will need to run up to the view lines associated with the new Highway 210 gateway entrance to ensure the viability of the neighborhood’s true development potential.



Terminated vista with a public art installation



Required retail storefronts along important street frontages



Axial views down street corridors, terminating on a plaza & water fountain (left) and building feature (right)










Enhanced facades utilizing specialty materials and detailed massing along their frontages





SPECIAL REQUIREMENTS DIAGRAM

LEGEND

	ENHANCED FACADE		TERMINATED VISTA OR ICONIC ELEMENT
	REQUIRED STOREFRONT / RETAIL		PROMONTORY VISTA VIEWPOINT
	TREE ALLEE		SELECTIVELY-CLEARED WOODED AREA FOR VIEW / ACCESS CORRIDOR
	AXIAL VIEW		













13 | APPENDICES

ASSOCIATED DOCUMENTS (PROVIDED SEPARATELY)

CVTC ENVIRONMENTAL ASSESSMENTS & REPORTS

REDEVELOPMENT PLAN - MARKET ASSESSMENT

REDEVELOPMENT PLAN - IMPLEMENTATION STRATEGY





Training Center
Redevelopment Plan

