Old Columbia Pike / Prosperity Drive Improvements: Project Prospectus

Montgomery County Department of Transportation

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Table 1: Table of Acronyms

Acronyms	Description
BRT	Bus Rapid Transit
DTE	Department of Transportation Engineering
EPA	Environmental Protection Agency
FCP	Forest Conservation Plan
FEMA	Federal Emergency Management Agency
FIDS	Forest Interior Dwelling Species
FSD	Forest Stand Delineation
FWS	U.S. Fish and Wildlife Services
GIS	Geographical Information System
HOA	Homeowner’s Association
IPaC	Information for Planning and Consultation
LOS	Level of Service
MCDOT	Montgomery County Department of Transportation
MD-DNR	Maryland Department of Natural Resources
MDE	Maryland Department of the Environment
MHT	Maryland Historical Trust
M-NCPPC	Maryland-National Capital Park and Planning Commission
MVA	Motor Vehicle Administration
NRCS	National Resource Conservation Service
NRI	Natural Resource Inventory
NWI	National Wetlands Inventory
OCP	Old Columbia Pike
SHA	State Highway Administration
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VEIP	Vehicle Emissions Inspection Program
WMATA	Washington Metropolitan Area Transit Authority

1 Executive Summary

1.1 INTRODUCTION

The Montgomery County Department of Transportation (MCDOT) Division of Transportation Engineering (DTE) has completed a Phase 1 Facility Planning Project along Old Columbia Pike (OCP)/Prosperity Drive from Stewart Lane to Cherry Hill Road to evaluate ways to improve existing traffic patterns, operations, and geometric deficiencies and resolve intersection safety and capacity issues. This Prospectus presents the results of Phase 1 and will be used to determine if the project should proceed to Phase 2 Facility Planning.

1.2 BACKGROUND AND DESCRIPTION

The project area extends from White Oak, Maryland in the south to Fairland, Maryland in the north. The project corridor begins at Stewart Lane and extends to Cherry Hill Road. The roadway is named Old Columbia Pike from Stewart Lane to Tech Road and Prosperity Drive from Tech Road to Cherry Hill Road. The project length is approximately 1.8 miles, which includes a bridge over Paint Branch which is currently closed to motorized traffic but open to pedestrians and bicyclists.

The project area is a mixture of residential and commercial development. Within the project area, Old Columbia Pike/Prosperity Drive is an undivided, two-way roadway with one lane in each direction and a posted speed limit of 30 to 35 mph. There are existing sidewalks in select locations along the east side of the roadway, but there is not continuous pedestrian connectivity. There are no existing marked bicycle facilities along Old Columbia Pike/Prosperity Drive; the shoulder widths vary from two to six feet and include a mixture of curb and gutter and open section. The County is seeking ways to upgrade this corridor and advance the goals of Montgomery County's *Complete Streets Design Guide*, *Vision Zero Plan*, and *Thrive Montgomery 2050*.

1.3 PROJECT PURPOSE

The purpose of the Old Columbia Pike / Prosperity Drive Improvements Project is to:

- Improve local connectivity and address safety needs along Old Columbia Pike/Prosperity Drive.
- Enhance safety for all roadway users and modes of transportation including pedestrians and bicyclists and promote equity and accessibility by providing continuous pedestrian facilities, in accordance with Montgomery County's *Vision Zero Plan.*
- Evaluate options for short-term and long-term improvements of the bridge over Paint Branch.
- Comply with existing master plans.

1.4 PROJECT NEED

The need for the Old Columbia Pike / Prosperity Drive Improvements project is to:

- Address sidewalk and bicycle facility gaps along the corridor.
- Improve traffic safety and operations to resolve critical safety and capacity issues along the corridor.
- Assess existing conditions of the bridge over Paint Branch and identify improvement measures to ensure continued safety of all users.

- Upgrade Old Columbia Pike/Prosperity Drive to accommodate anticipated increased vehicular and pedestrian traffic volume due to upcoming developments.

1.5 ALTERNATIVES EVALUATED

As part of the Phase 1 Facility Planning Project, the following four alternatives were evaluated and presented to the public for their feedback:

- Alternative 1: No build alternative
- Alternative 2: Improve intersections, add sidewalks and sidepath, safety improvements to existing pedestrian/cyclist bridge
- Alternative 3: Alternative 2 with bridge open to traffic
- Alternative 4: Four lanes with bridge open to traffic

2 Project Purpose and Need

2.1 BACKGROUND AND DESCRIPTION

The Montgomery County Department of Transportation (MCDOT) Division of Transportation Engineering (DTE) initiated a Phase 1 Facility Planning Project for Old Columbia Pike (OCP)/Prosperity Drive from Stewart Lane to Cherry Hill Road to evaluate ways to improve existing traffic patterns, operations, and geometric deficiencies and resolve intersection safety and capacity issues. Recent developments under development and construction, including the White Oak Town Center, may attract additional traffic and pedestrian activities along the project corridor. The project corridor is approximately 1.8 miles, which includes a bridge over Paint Branch that is currently closed to vehicular traffic but open to pedestrians and bicyclists. The County is seeking to upgrade this corridor to advance towards goals described in Montgomery County's *Complete Street Design Guide*, *Vision Zero Plan*, and *Thrive Montgomery 2050.* The project will evaluate the condition of the bridge and investigate improvement options for it; develop recommendations to address safety, improve bicycle and pedestrian connectivity; accommodate future development plans; and improve existing traffic patterns and operations along the corridor.

2.1.1 Vicinity Map

The project area extends from White Oak, Maryland in the south to Fairland, Maryland in the north. The project limits extend along Old Columbia Pike/Prosperity Drive from Stewart Lane to Cherry Hill Road (See *Figure 1*). The roadway is named Old Columbia Pike from Stewart Lane to Tech Road and Prosperity Drive from Tech Road to Cherry Hill Road.

Figure 1: Vicinity Map

2.1.2 Master Plan Recommendations

This project included a review of the *White Oak Science Gateway Master Plan* (July 2014) and the *Approved and Adopted Fairland Master Plan* (1997). Montgomery County Planning Board approved the *Fairland and Briggs Chaney Master Plan* on May 25, 2023, which succeeded the *Fairland Master Plan* (1997). However, this project's limits are outside of the Fairland and Briggs Chaney Master Plans' boundaries.

2014 White Oak Science Gateway Master Plan

The *White Oak Science Gateway Master Plan*, which is the most recent master plan for this area, recommends a trail from Old Columbia Pike to Martin Luther King Recreational Park to improve connectivity for walking and cycling. It also recommends a sidepath along Lockwood Drive, Stewart Lane, and Old Columbia Pike to connect the surrounding, residential communities. The Master Plan also recommended that the bridge along Old Columbia Pike over the Paint Branch be rebuilt and reopened to vehicular traffic and Old Columbia Pike be reconstructed as a four-lane arterial between Industrial Parkway and Stewart Lane. The Master Plan recommended a grade-separated interchange at US 29/Stewart Lane and US 29/Industrial Parkway/Tech Road. Additionally, the Master Plan recommends the development of a Bus Rapid Transit (BRT) system to improve transit service within the existing corridors and reduce congestion and reliance on automobiles and notes the development of the BRT system is essential to improving transportation capacity and meeting existing and future land use demands identified in the Plan.

1997 Approved and Adopted Fairland Master Plan

The *Approved and Adopted Fairland Master Plan* included Old Columbia Pike from Cherry Hill Road to Industrial Parkway and classified Old Columbia Pike as a "Primary Road" within those limits. In the Master Plan, pedestrian improvements are recommended for the entire length of Old Columbia Pike. This Master Plan also recommended Old Columbia Pike be reclassified as a four-lane arterial between East Randolph Road and Tech Road and recommends grade-separated interchanges at Randolph Road, Tech Road/Industrial Parkway and Stewart Lane. In this Master Plan, a continuous sidewalk/path on the east side of Old Columbia Pike, from Tech Road to MD 198 is recommended, including pedestrian crossings, while remaining consistent with the residential character of Old Columbia Pike.

2023 Fairland and Briggs Chaney Master Plan

The Montgomery County Planning Board approved the *Fairland and Briggs Chaney Master Plan* in June 2023 succeeding the *Fairland Master Plan* in 1997. The project limits fall outside the Master Plan's boundary. This Master Plan eliminated a previously recommended grade-separated interchange at US 29 and Tech Road and recommended that the existing signalized intersection remain and be improved to allow for greater safety, mobility, and comfort for all transportation users. The Master Plan recommended that the grade-separated interchange at US 29/Tech Road/Industrial Parkway recommended in the 2014 White Oak Science Gateway Plan should be amended and the interchange should be placed only at the US 29/Industrial Parkway intersection. This Master Plan recommends that an additional needs study and/or a facility study be conducted to explore the need for this interchange in light of current policies and priorities. If the interchange recommendation is no longer supported, the Master Plan recommends that the *White Oak Science Gateway Plan* and supporting *White Oak Local Area Transportation Improvement Program* should be amended.

2.1.3 Community Facilities and Destination Points

Nearby community facilities and destination points identified in the project area include (see Figure 2 below):

1. Stonehedge Local Park, a 4.4-acre park with two playgrounds, located about 600 feet south of the Old Columbia Pike and Industrial Parkway intersection.

2. Rainbow Family Christian Center located on Industrial Parkway east of the White Oak Town Center.
3. General Conference of Seventh-day Adventists located on Columbia Pike about 200 feet south of the Columbia Pike and Cherry Hill Road intersection.
4. Julia Brown School located on Milestone Drive just west of the Old Columbia Pike and Stewart Lane intersection.
5. Paint Branch Trail located about 0.34 miles north of the bridge over Paint Branch and extends for three miles between Martin Luther King Jr. Recreational Park and Fairland Road.

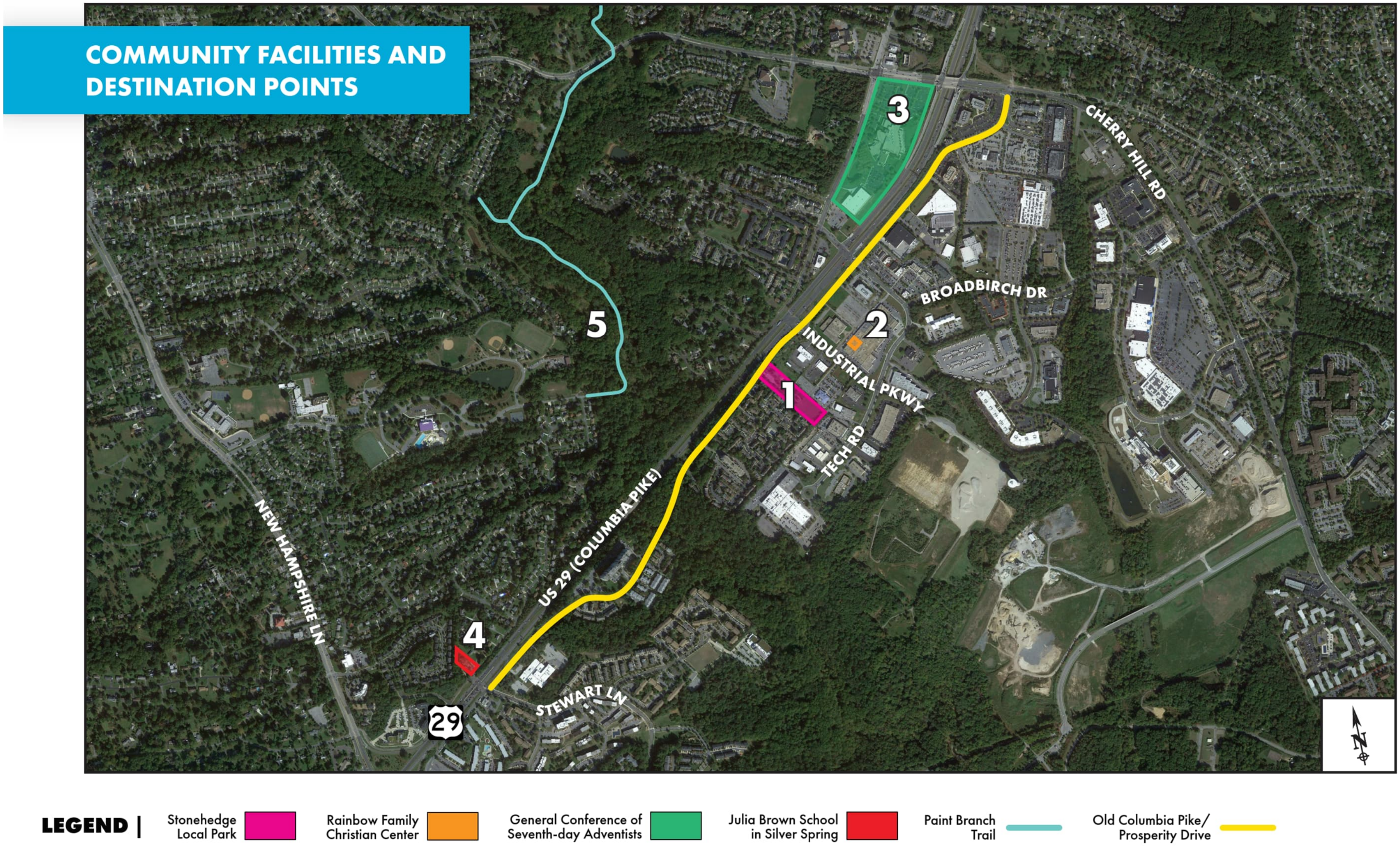


Figure 2: Community Facilities and Destination Points

2.1.4 Existing Bicycle and Pedestrian Facilities

Within the project limits, there are two travel lanes (one in each direction). There are marked crosswalks at Old Columbia Pike and Stewart Lane. There is a sidewalk on the east side of Old Columbia Pike, connecting Stewart Lane to Treetop View Terrace. There is no sidewalk available to connect people when the sidewalk terminates, about 120 feet north of Treetop View Terrace, to the bridge over Paint Branch. The bridge over Paint Branch has a clear roadway width of 27 feet and 3 inches and is currently closed to vehicular traffic but open to pedestrians and bicyclists, however, the railing on the bridge is not ADA-compliant. There is an existing sidewalk on the east side of Old Columbia Pike, from the first entrance north of the bridge to the entrance of Stonehedge Park. There is also a sidepath at the entrance of Stonehedge Park that transitions to a sidewalk at Industrial Parkway. There is no sidewalk along Old Columbia Pike continuing north of Industrial Parkway. There are no ADA-compliant crosswalks at Industrial Parkway or Tech Road intersections. There is a sidewalk along the east side of Prosperity Drive from Tech Road to approximately 240 feet south of the Cherry Hill Road intersection where it transitions to a sidepath to Cherry Hill Road. There is also a sidewalk along the west side of Prosperity Drive from approximately 1,100 feet south of Cherry Hill Road to Cherry Hill Road.

There are no existing bicycle facilities along Old Columbia Pike. Shoulders along most of the corridor are typically two to six feet wide with a mixture of curb and gutter and open section.

2.1.5 Public Transportation

WMATA / Ride On

There are several public transportation services within and near the project area. Montgomery County's FLASH Orange Bus Rapid Transit line operates along US 29 from WMATA's metro station in Silver Spring to the Briggs Chaney Park and Ride lot in Fairland. The FLASH Orange Route has stops in the vicinity of the project limits; however, it does not traverse Old Columbia Pike/Prosperity Drive. The Flash Orange Route operates every 15 minutes Monday through Sunday. Where routes overlap, service is every seven to eight minutes on weekdays during rush hour.

Montgomery County Ride On Bus Route No. 10 and WMATA Metro Bus Route Nos. Z6 and Z8 serve Stewart Lane near the intersection with Old Columbia Pike. Montgomery County Ride On Bus Route No. 10, 27 and WMATA Metro Bus Route No. Z6 service Industrial Parkway and Tech Road. See Figure 3 to Figure 5 below for transit maps.

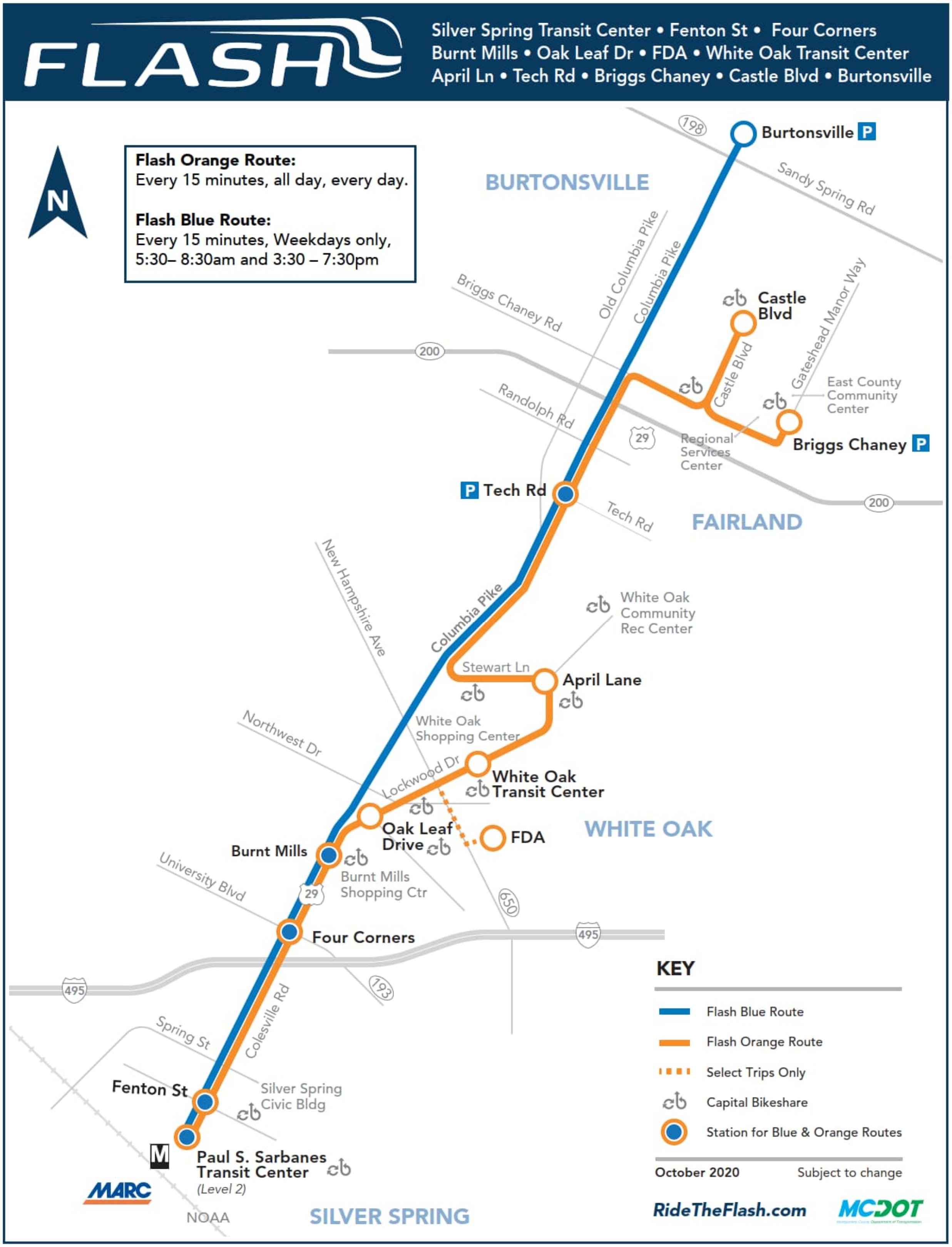


Figure 3: FLASH Orange Route Map

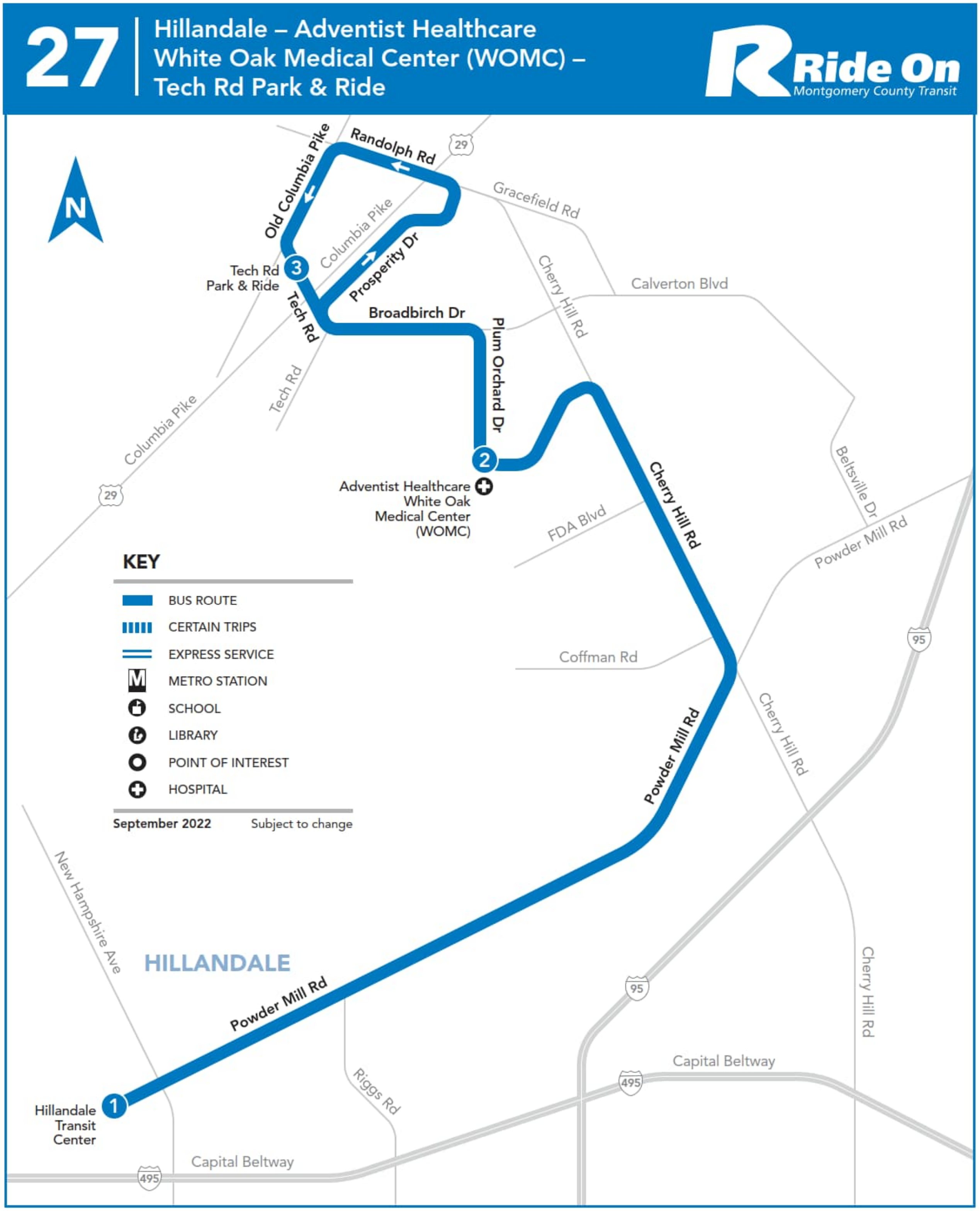


Figure 4: Ride On Route No. 27 Map

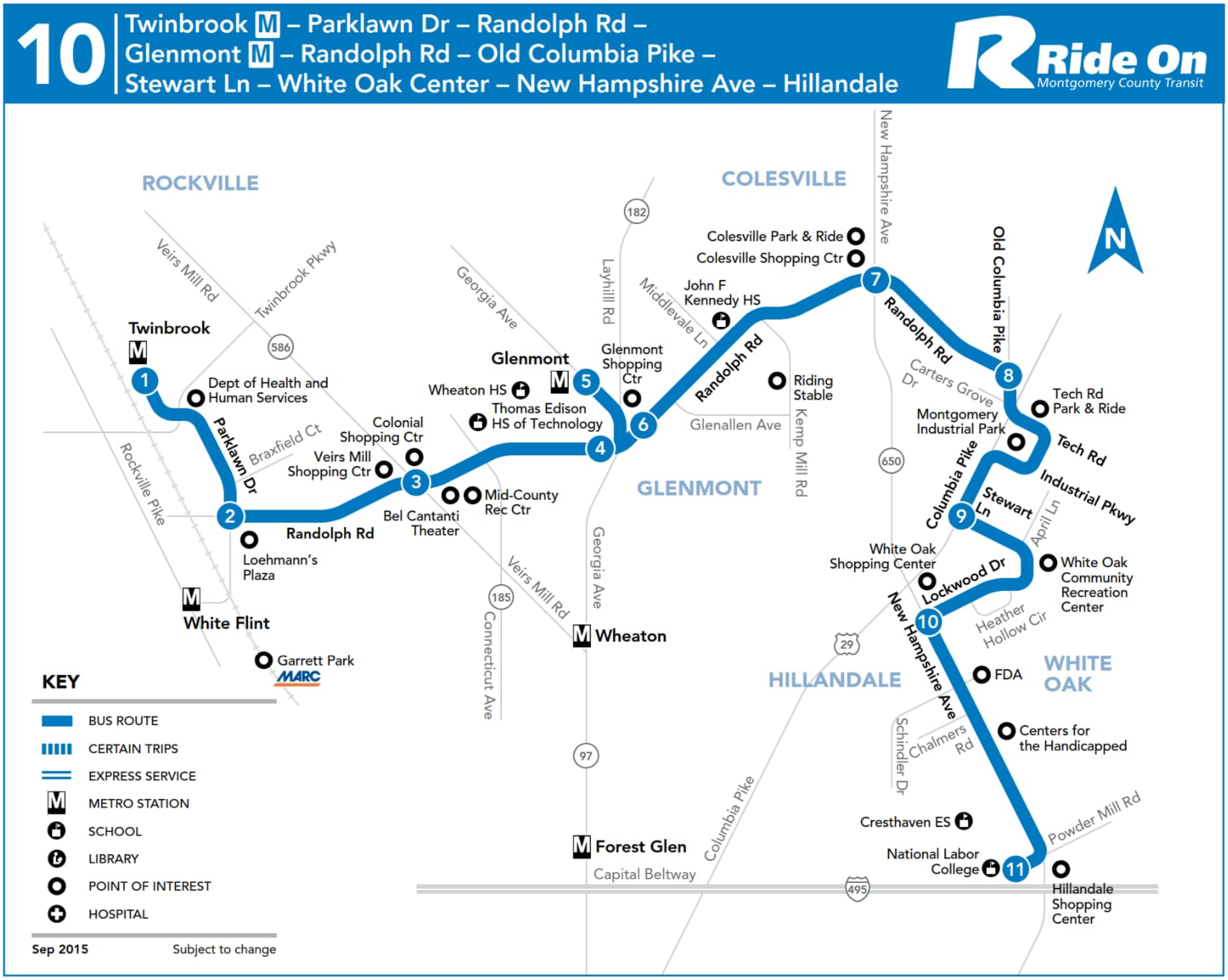


Figure 5: Ride On Route No. 10 Map

Montgomery County Schools

The Montgomery County Public Schools (MCPS) serves students north of Paint Branch to Galway Elementary School, Briggs Chaney Middle School, and Paint Branch High School; south of Paint Branch to Burnt Mills Elementary School, Francis Scott Key Middle School, and James Hubert Blake High School. Per MCPS' policy, residents within the project limits are eligible to receive transportation services. Per MCPS' bus route information, school buses traverse Old Columbia Pike and Stewart Lane intersection to access school bus stops at White Oak Towers Apartment (11700 Old Columbia Pike) and traverse Old Columbia Pike and Industrial Parkway intersection to access Columbia Towers Condominium (12001 Old Columbia Pike).

Capital Bikeshare

There are two Capital Bikeshare locations along Stewart Lane east of the intersection with Old Columbia Pike. One is located approximately 370 feet east of intersection of Old Columbia Pike and Stewart Lane and the second is located approximately 180 feet east of intersection of Stewart Lane and April Lane.

2.1.6 Traffic and Safety

Intersection capacity of the existing conditions is described in Table 2 below. Additional traffic related information is available in the *Old Columbia Pike/Prosperity Drive Improvements Project: Traffic Study Report*, which can be found in Appendix G.

Table 2: Intersection Capacity of Existing Intersections

Project Intersection	2022 Existing Condition Level of Service (LOS)	
	AM	PM
(1) Old Columbia Pike at Stewart Lane	A	B
(2) Old Columbia Pike at Industrial Parkway	A	A
(3) Old Columbia Pike / Prosperity Drive at Tech Road	A	A
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	A
(6) Prosperity Drive at Cherry Hill Road	A	C

Corridor crash history was provided by Maryland SHA and MCDOT for the five-year period from February 16, 2017 to December 22, 2021 for Old Columbia Pike and from April 7, 2017 to July 15, 2021 for Prosperity Drive. A total of 19 crashes along Old Columbia Pike and a total of six crashes along Prosperity Drive occurred during the study period. Nine of the 19 reported crashes along Old Columbia Pike occurred at project intersections, and eight of the 19 crashes occurred at night. All six reported crashes along Prosperity Drive occurred at project intersections, and all occurred during the daytime. The project limits include six intersections along Old Columbia Pike and Prosperity Drive listed below:

1. Old Columbia Pike at Stewart Lane (including the adjacent spur connection between Old Columbia Pike and US 29, approximately 350 feet north of Stewart Lane)
2. Old Columbia Pike at Industrial Parkway
3. Old Columbia Pike / Prosperity Drive at Tech Road
4. Prosperity Drive at Whitethorn Court
5. Prosperity Drive at Prosperity Terrace
6. Prosperity Drive at Cherry Hill Road

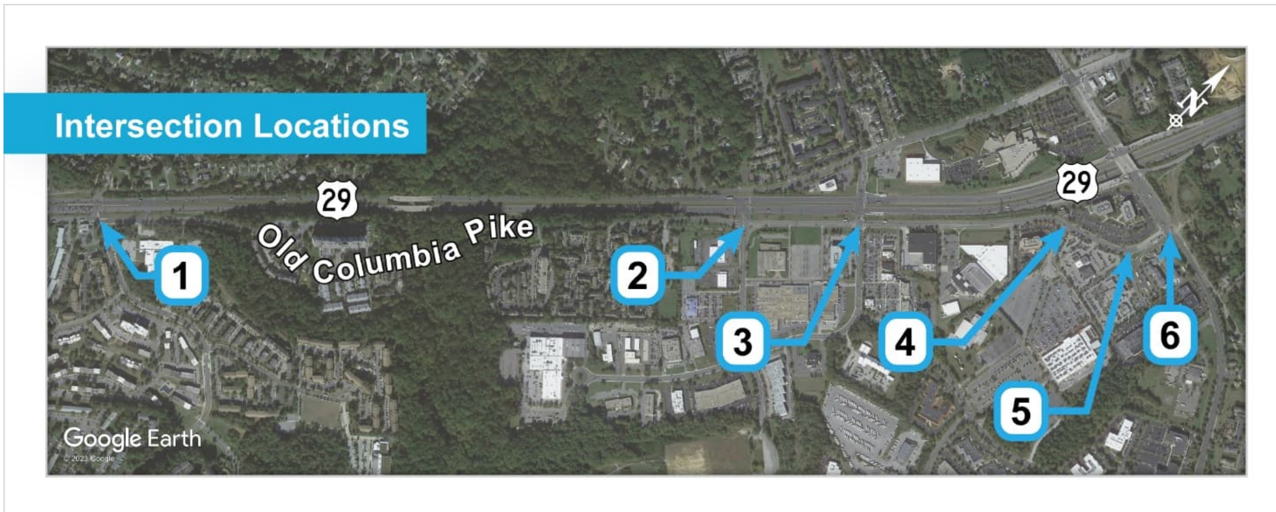


Figure 6: Intersection Locations

3 Alternatives Analysis

3.1 INTRODUCTION

Four alternatives including three Build and one No Build were developed to address the purpose and need identified for the Old Columbia Pike/Prosperity Drive Improvements project.

3.2 EXISTING CONDITIONS

3.2.1 Roadway

Functional Classification and Existing Lane Configurations

The *Montgomery County Master Plan of Highways and Transitways Functional Classification* (February 7, 2023) classifies Old Columbia Pike / Prosperity Drive:

- from 1,000 feet west of Stewart Lane to Industrial Parkway as a *Town Center Boulevard*
- from Industrial Parkway to Tech Road as a *Neighborhood Connector*
- from Tech Road to East Randolph Road as *Boulevard.*

However, the proposed Complete Streets Design Guide classification for Old Columbia Pike / Prosperity Drive designates:

- Old Columbia Pike from Stewart Lane to Industrial Parkway as *Neighborhood Connector*
- Old Columbia Pike / Prosperity Drive from Industrial Parkway to Cherry Hill Road as *Town Center Street*

According to the Montgomery County's *Complete Streets Design Guide*, *Neighborhood Connector* (*Figure 4*) includes:

- A travel lane in both directions with target speed of 25 mph
- Left turn lanes where appropriate
- Buffer between edge of vehicle travelway and sidewalk or sidepath
- Sidepath (default 10 feet wide; minimum 8 feet) on one side of the street and sidewalk (minimum six feet)

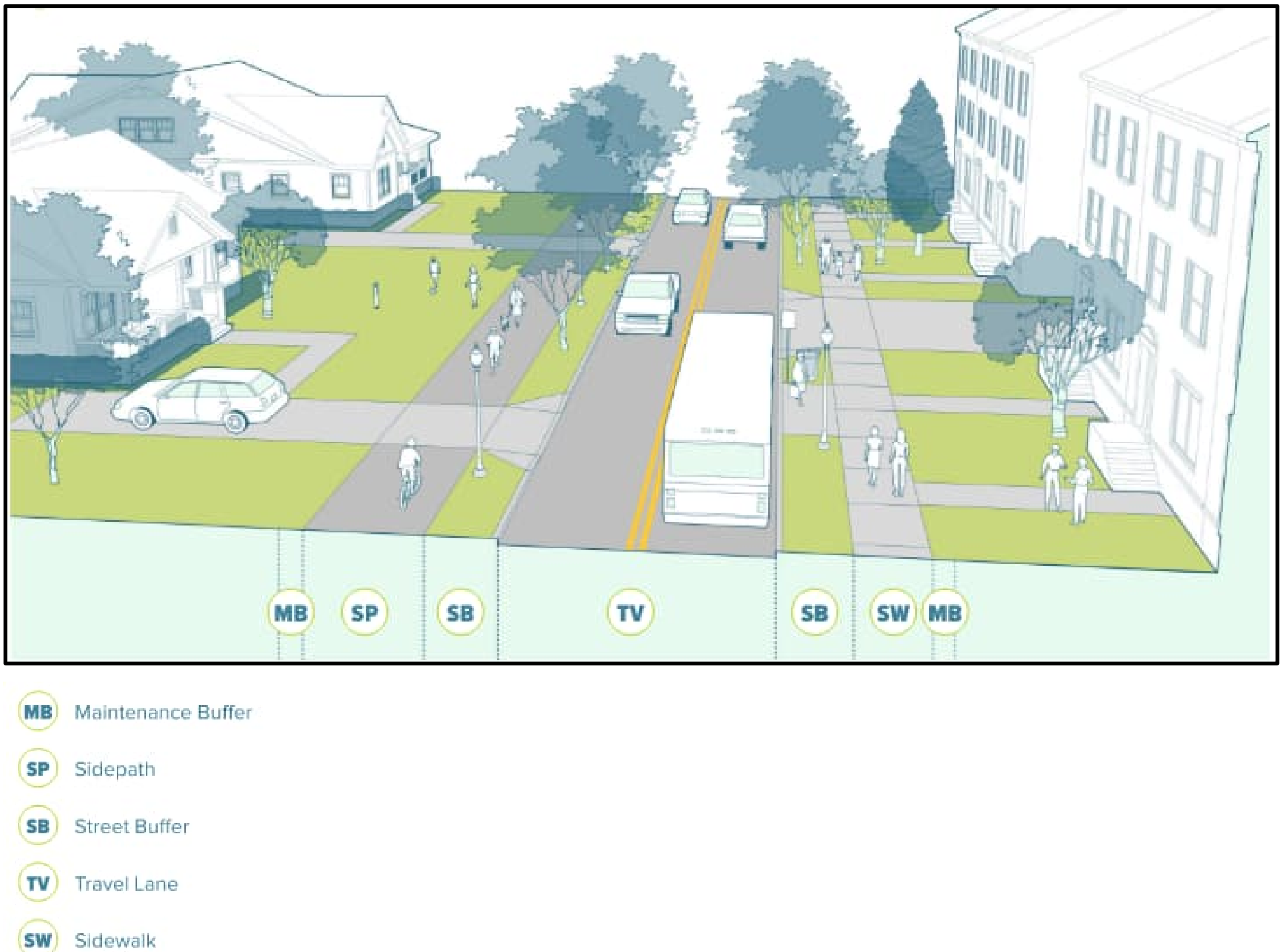


Figure 7: Typical Neighborhood Connector

According to the Montgomery County's [Complete Streets Design Guide](), *Town Center Street* (See *Figure 5*) includes:

- Two-lanes, one lane in each direction with target speed of 25 mph
- Center median is optional (but can range from six to 10 feet wide)
- Left turn lanes, where appropriate
- Street buffer between the edge of vehicle travelway and the sidewalk/sidepath (six feet wide)
- Sidepath and sidewalk (default 10 feet wide; minimum eight feet)

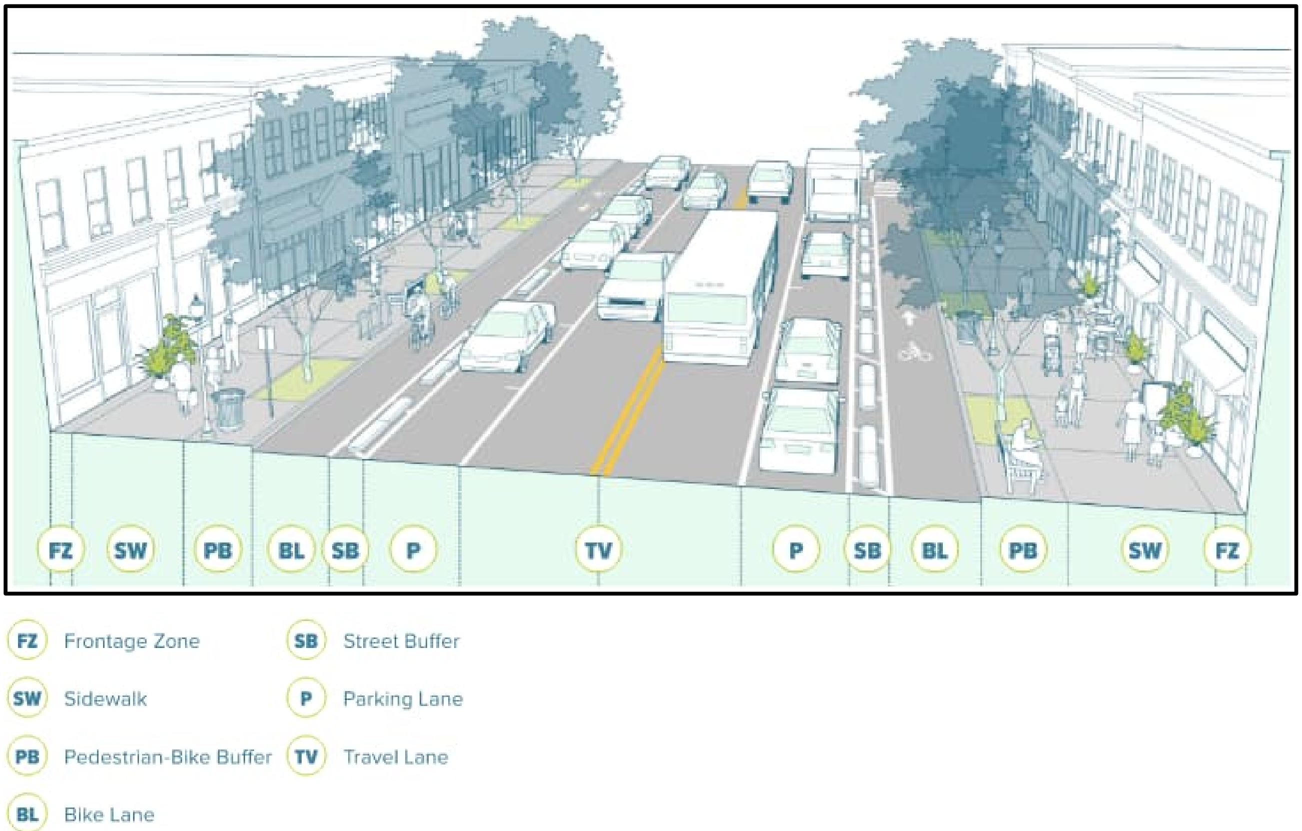


Figure 8: Typical Town Center Street

3.2.2 Traffic Control

Within the project area, there is only one signalized intersection at Prosperity Drive at Cherry Hill Road, which has three legs. The remainder of the intersections along the Old Columbia Pike/Prosperity Drive corridor are unsignalized and stop-controlled. Traffic analyses were performed for six intersections:

- Old Columbia Pike at Stewart Lane
- Old Columbia Pike at Industrial Parkway
- Old Columbia Pike/Prosperity Drive at Tech Road
- Prosperity Drive at Whitehorn Court
- Prosperity Drive at Prosperity Terrace
- Prosperity Drive at Cherry Hill Road

The results of the traffic analyses were used to determine lane configurations and available intersection capacity. The full traffic study is included in Appendix G.

3.2.3 Public Right-of-Way

The existing right-of-way width for Old Columbia Pike varies significantly. South of the bridge over Paint Branch, the right-of-way varies from about 60 to 100 feet wide. Near the bridge, it typically extends at least 35 feet on either side. From 250 feet north of the bridge over Paint Branch to Prosperity Drive at Whitehorn Court, the right-of-way width widens significantly to approximately 300 feet to 350 feet and includes US 29. The right-of-way has a continuous width of about 70 feet from Prosperity Drive at Whitehorn Court to Cherry Hill Road.

3.2.4 Transit

There are several public transportation lines that currently operate in or near the project area, but there are no public transportation lines servicing this project corridor.

3.2.5 Bicycle/Pedestrian Access

There are no bicycle facilities in the project area. Existing pedestrian access along the corridor is available but not continuous. Within the project area, bicyclists typically ride in the paved shoulders, but since shoulders vary in width, they will often ride within the roadway travel lanes.

3.3 ALTERNATIVES EVALUATION

3.3.1 Alternatives

The four alternatives were developed for evaluation based on the Master Plan recommendations, the project's purpose and need, traffic requirements, and safety. Only Alternatives 3 and 4 propose reconstructing the bridge over Paint Branch and open it to motor vehicle traffic as recommended in the *White Oak Science Gateway Master Plan*. Plan displays of the four alternatives can be found in Appendix H.

Alternative 1 – No Build

Alternative 1 would retain the existing lane configurations. No improvements would be made along Old Columbia Pike and Prosperity Drive. The existing bridge would remain closed to vehicular traffic and remain open to pedestrians and bicyclists.

Alternative 2 – Improve intersections, add sidewalk and sidepath, safety improvements to existing pedestrian/cyclist bridge

Alternative 2 would maintain Old Columbia Pike/Prosperity Drive's lane configurations as a two-way (one lane in each direction) roadway. Intersections along the project corridor would be upgraded with ADA compliant crosswalks, improving safety and operations of all modes of traffic. Sidewalks and sidepaths would be installed along Old Columbia Pike/Prosperity Drive. Lighting would be installed at warranted locations. The existing bridge over Paint Branch would remain closed to vehicular traffic and remain open to pedestrians and bicyclists.

Alternative 3 – Alternative 2 with bridge open to traffic

Alternative 3 would maintain Old Columbia Pike/Prosperity Drive's existing lane configurations as a two-way (one lane in each direction) roadway. Intersections along the project corridor would be upgraded with ADA compliant crosswalks, improving safety and operations for all modes of traffic. Sidewalks and sidepaths would be installed along Old Columbia Pike/Prosperity Drive. Lighting would be installed at warranted locations. The existing bridge would be replaced with a new bridge. The new bridge would be opened to two-way (one lane in each direction) vehicular traffic and include sidewalks and sidepaths for pedestrians and bicyclists.

Alternative 4 – 4 lanes with bridge open to traffic

Alternative 4 would widen Old Columbia Pike/Prosperity Drive to four lanes (two lanes in each direction). Intersections along the project corridor would be upgraded with ADA compliant crosswalks, improving safety and operations for all modes of traffic. Sidewalks and sidepaths would be installed along Old Columbia Pike/Prosperity Drive. Lighting would be installed at warranted locations. The existing bridge would be replaced with a new bridge. The new bridge would be opened to two-way (two lanes in each direction) vehicular traffic and include sidewalks and sidepaths for pedestrians and bicyclists.

3.3.2 Comparison of Alternatives

The alternatives were evaluated based on each alternative's ability to meet the purpose and need of the project, the degree of potential right-of-way impacts, the environmental impacts, estimated costs, and level of community support. Please see the following tables for a qualitative and quantitative comparisons of the alternatives:

- Table 3: Cost/Impacts summary of alternatives
- Table 4: Cost/benefit analysis of the alternatives
- Table 5: Alternatives comparison

Table 3: Cost/Impacts Summary of Alternatives

	1 – No Build	**2 – Improves Intersections, add sidewalk/sidepath**	**3 – Alternative 2 with bridge open to traffic**	**4 – Four lanes with bridge open to traffic**
Key features	Remains as is; only minimum safety improvements to bridge surface	Upgrade intersections to be ADA compliant; improve pedestrian/bicyclist connectivity	New bridge with two lanes of traffic; upgrade intersections to be ADA compliant; improve pedestrian/bicyclist connectivity	New bridge with four lanes of traffic; upgrade intersections to be ADA compliant; improve pedestrian/bicyclist connectivity
Forest Impact (SF)	N/A	22,000	87,000	240,000
Property impacts (SF)	N/A	44,500	44,500	172,000
Widening Needed?	N/A	Yes	Yes	Yes
Construction Cost (Estimated)	$160,000	$25 million	$40 million	$60 million
Bridge cost*	*[$160,000*]**	*[$2.2 million*]	*[$8.8 million*]	*[$11.6 million*]
Utility	N/A	$0.5 million	$0.6 million	$0.7 million
No. of impacted utility poles	N/A	26	32	37
Right-of-way cost	N/A	$4.5 million	$4.8 million	$20.3 million
Total	$160,000	$30 million	$45.4 million	$81 million

All costs are based on planning level documents and are subject to change as the design progresses. Inflation is not included.

* [*Bridge cost included in construction cost*] ** Bridge maintenance cost

Benefits Comparison

All alternatives aim to address the project's purpose and need including addressing safety needs along Old Columbia Pike/Prosperity Drive, addressing sidewalk and bicycle facility gaps along the corridor, resolving safety and capacity issues along the corridor, and complying with existing master plans.

Alternative 1 fails to address the purpose and need of the project as it does not improve pedestrian and bicycle connectivity along the corridor.

Alternative 2 addresses the safety, capacity, and connectivity goals of the project. It proposes safety and capacity improvements to intersections, upgrades intersections to be ADA-compliant, and reconstruct sidewalks and sidepaths along the corridor.

Alternative 3 addresses the safety, capacity, and connectivity goals of the project. It proposes safety and capacity improvements to intersections, upgrades intersections to be ADA-compliant, and reconstruct sidewalks and sidepaths along the corridor. It would further improve connectivity by opening the bridge to vehicular traffic.

Alternative 4 addresses the safety, capacity, and connectivity goals of the project. It proposes four-lanes of traffic, safety and capacity improvements to intersections, upgrades intersections to be ADA-compliant. It would further improve connectivity by opening the bridge to vehicular traffic. However, more lanes would create longer crossing distances for pedestrians, increasing the risk of conflicts for pedestrians. This alternative will improve traffic capacity and operations for vehicles but likely at the expense of pedestrians and bicyclists.

Alternatives 3 and 4 comply with what is recommended in the *White Oak Science Gateway Master Plan* which recommended the bridge over Paint Branch be rebuilt and reopened to vehicular traffic. This Master Plan also recommended that Old Columbia Pike be reconstructed as a four-lane arterial between Industrial Parkway and Stewart Lane as it would improve connectivity in the area and provide an alternative to US 29 for local travel, which is only proposed in Alternative 4.

Approximate costs were developed for the alternatives. Since Alternative 1 is the No Build alternative, no cost estimate was developed. Alternative 2 has the lowest estimated construction cost at approximately $25 million, including utility relocation and ROW costs, Alternative 2 would cost $30 million in total. Alternative 3 has an estimated construction cost of $40 million, including utility relocation and ROW costs, Alternative 3 would cost $45.4 million in total. Alternative 4 has the highest estimated construction cost at approximately $60 million, including utility relocation and ROW costs, Alternative 4 would cost $81 million in total.

Impacts Comparison

Property impacts are anticipated for Alternatives 2, 3, and 4. Alternative 1 would not require any right-of-way acquisition since it is maintaining existing conditions. Alternatives 2 and 3 would have similar property impacts since both would keep Old Columbia Pike/Prosperity Drive open to two lanes of traffic and would require about 44,300 square feet (13 properties) of right-of-way acquisition. Alternative 4, which would require significant widening of Old Columbia Pike/Prosperity Drive, would require about 171,600 square feet (25 properties) of right-of-way acquisition.

Similar impacts are anticipated to forestry for Alternatives 2, 3, and 4. Alternative 1 would have no forest impacts. Forest impacts to Alternatives 2, 3, and 4 are estimated at 0.5 acres, 1 acre, and 5.5 acres for respectively.

The impacts are subject to change as further design development progresses in future phases of the project.

Table 4: Cost/benefit Analysis of Alternatives

		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Costs	**Notes**	**Total Costs Incurred**			
Construction Cost (Estimated)	Spread over assumed 3-year project duration	$160,000	$30,000,000	$45,400,000	$81,000,000
Benefits	**Notes**	**Annual Benefits Claimed**			
Safety	Crash rate reduction achieved by signalizing Old Columbia Pike at Industrial Pkwy and at Tech Rd	$0	$92,000	$92,000	$92,000
Amenity	Expanding sidewalk (per person-mile walked), Providing Cycling Path (per cycling mile), Installing Pedestrian Signal (per use)	$0	$133,000	$133,000	$133,000
Health	Induced walking and cycling trips (i.e., converting from motorized trip)	$0	$1,246,000	$1,246,000	$1,246,000
Travel Time*	Less vehicular travel time between points on Old Columbia Pike north and south of bridge	$0	$0	$1,502,000	$1,502,000
Operating Cost*	Less vehicular travel distance between points on Old Columbia Pike north and south of bridge	$0	$0	$891,000	$891,000

Total Annual Benefits	$0	$1,471,000	$3,864,000	$3,864,000
Benefit/Cost Ratio 2025-2055 Analysis Period, 3% Inflation Rate	0	1.01	1.74	0.97

*Assumed all traffic using new bridge (4,200 ADT) would save an average of 3 minutes of travel time and 1.1 miles of travel distance. See Appendix H for further details on the benefits claimed. Appendix H includes the Benefit-Cost Analysis performed for Alternative 3. Alternative 2 has a lower construction cost but fewer claimed benefits, while Alternative 4 has a higher construction cost with the same amount of benefits claimed.

Table 5: Alternatives Comparison

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Pros	Minimum cost Bridge open to ped/bike No environmental impacts No ROW impact No utility relocation	Bridge open to ped/bike Least environmental impacts ADA compliant intersections Some traffic safety and ops improvement Continuous ped/bike connectivity	Bridge open to ped/bike/vehicle ADA compliant intersections Some traffic safety and ops improvement Shorter travel time Continuous ped/bike connectivity Adds lighting	Bridge open to ped/bike/vehicle ADA compliant intersections Most traffic safety and ops improvement Shorter travel time Continuous ped/bike connectivity Adds lighting Add redundancy to US 29 traffic Achieves recommendation in WOSG 2014
Cons	Exist gaps in ped/bike network Bridge closed to vehicles Exist traffic ops and safety problem	Bridge closed to vehicles More expensive than Alt 1 Some ROW impact Some utility relocations Some forest impacts Some SWM impacts	Some environmental impacts More expensive than Alt 2 More ROW impact than Alt 2 More utility relocations than Alt 2 More forest impact than Alt 2 More SWM impacts than Alt 2	Most environmental impacts Most expensive Most ROW impact Most utility relocations Most forest impacts Most SWM impacts Attracts more vehicular traffic More areas for surface parking Less safe for peds/bike

				Higher vehicular traffic speed Counter to Vision Zero Plan
Benefit	$0	$1,471,000 annually	$3,864,000 annually	$3,864,000 annually
Cost	$160,000	$30,000,000	$45,400,000	$81,000,000
Benefit/Cost Ratio	**0**	**1.01**	**1.74**	**0.97**

3.3.3 Old Columbia Pike at Industrial Parkway Intersection

During the development of the alternatives, reconfiguring the existing intersection of Old Columbia Pike at Industrial Parkway was identified to improve operations and safety within the intersection for all users, including vehicles, pedestrians, and cyclists. See Figure 9 for proposed improvements including:

- Relocating the westbound Industrial Parkway signal from US 29 to east of Old Columbia Pike. Currently, the westbound movement on Old Columbia Pike is stop-controlled. Moving the signal from US 29 to Old Columbia Pike will allow traffic to flow more smoothly.
- Removing one of the two right turn lanes from US 29 NB to Industrial Parkway and remove some of the extra pavement in that area. Channelizing islands will also be added to the intersection to clearly direct traffic.
- Installing signalized pedestrian crossings, high visibility crosswalk markings, protected intersection design, and pedestrian refuge islands to improve safety for pedestrians crossing at this intersection.

The future development of Viva White Oak, located approximately 0.75 mile east of this intersection, may attract significant volume of traffic from US 29 that may warrant two eastbound lanes along Industrial Parkway and this proposed improvement does not preclude this future condition.

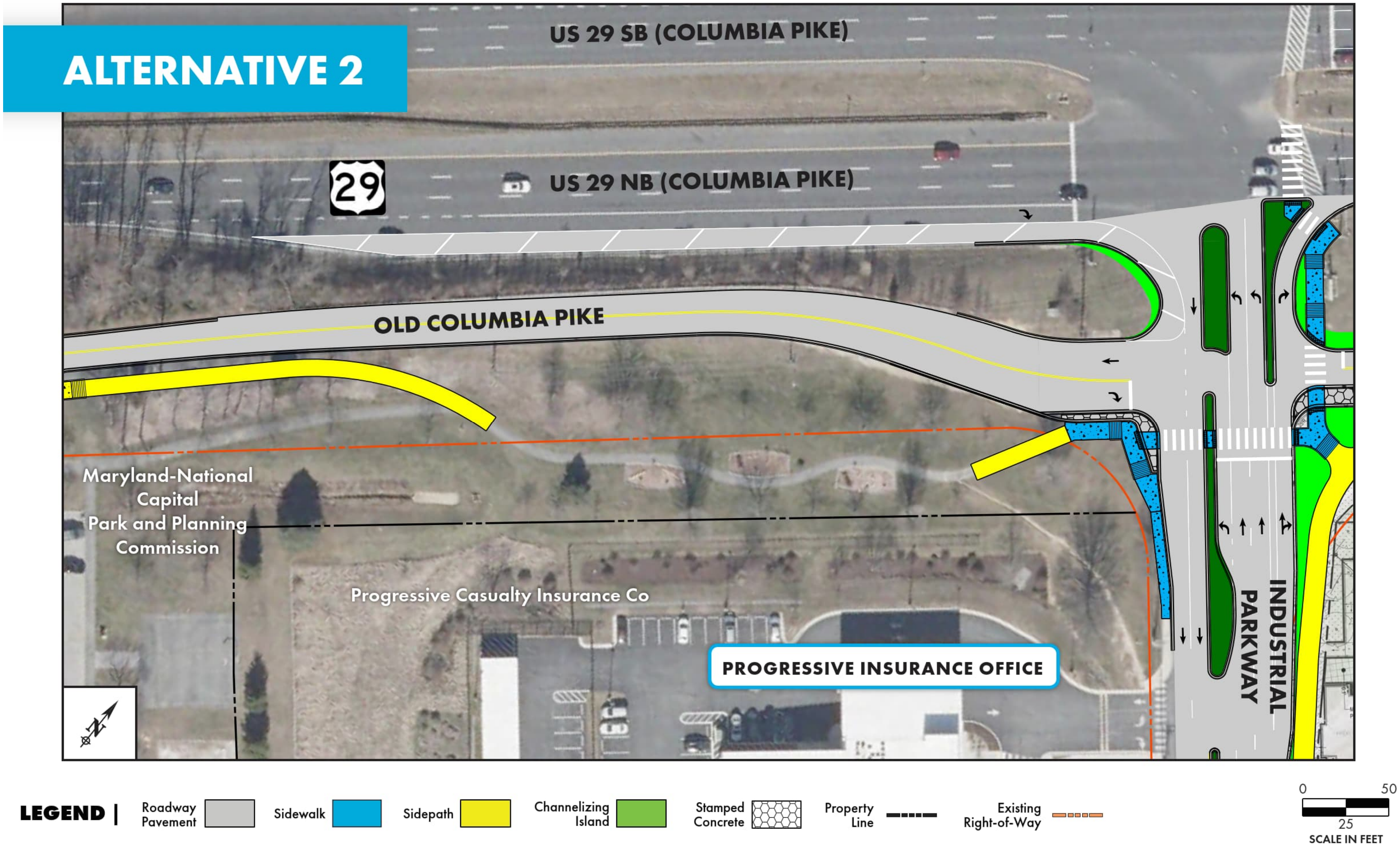


Figure 9: Old Columbia Pike and Industrial Parkway Intersection

3.3.4 Old Columbia Pike at Tech Road Intersection

As alternatives were developed, reconfiguring Old Columbia Pike/Tech Road intersection to improve traffic operations was also recommended. Currently, the intersection has unclear pavement markings, lacks ADA compliant pedestrian crossings, and sustains heavy traffic westbound Tech Road which builds up, forms a queue, and blocks both the intersection and entrances along Tech Road. See Figure 10 for proposed improvements including:

- Relocating westbound Tech Road signal from US 29 to east of Old Columbia Pike
- Installing signalized pedestrian crossings, high visibility crosswalk markings, protected intersection design, and pedestrian refuge islands to improve safety for pedestrians crossing at this intersection.
- Installing pavement marking to reduce two receiving lanes to one receiving lane along eastbound Tech Road, west of the Tech Road and Prosperity Drive intersection.

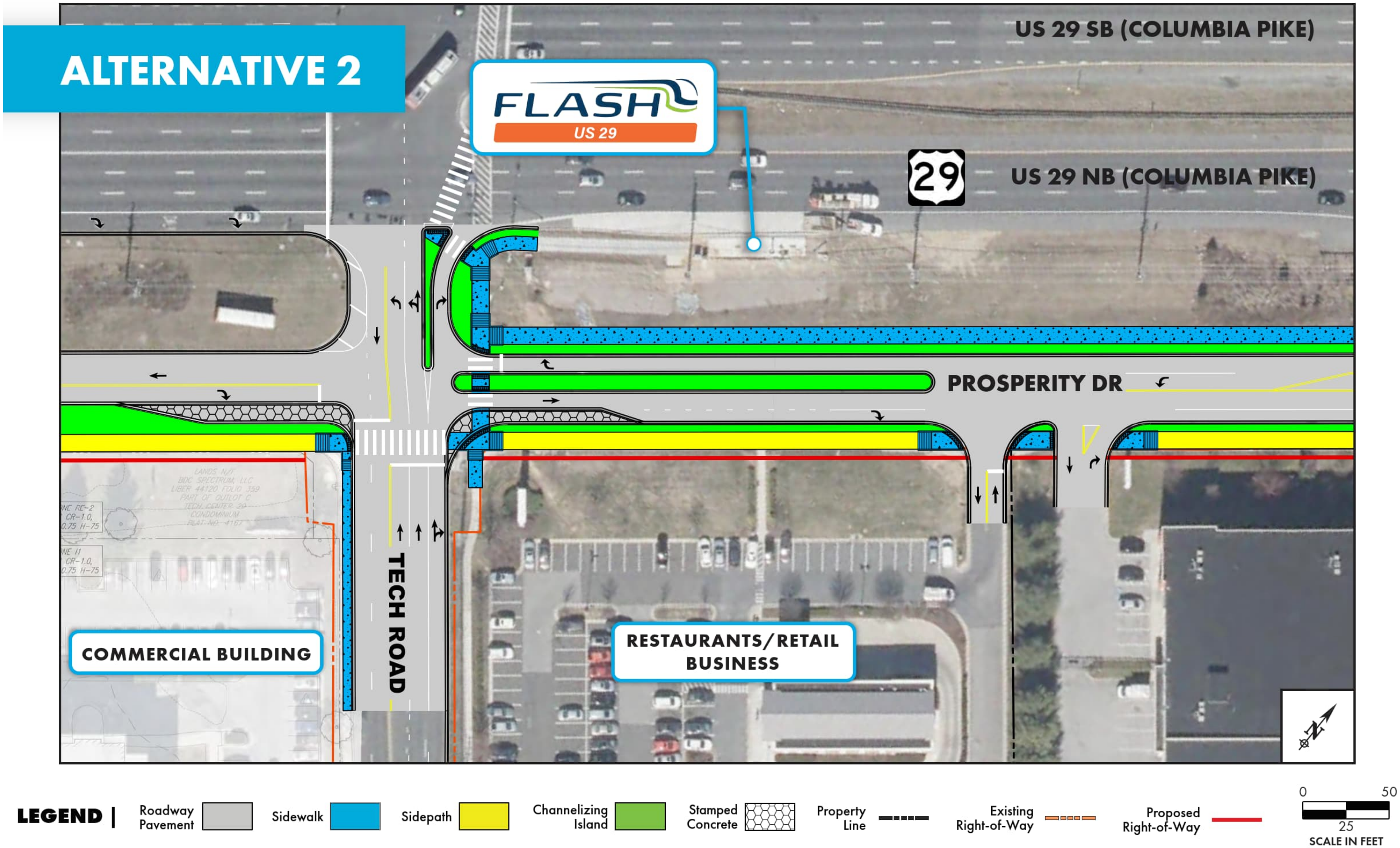


Figure 10: Old Columbia Pike/Prosperity Drive and Tech Road Intersection

4 Environmental Assessment

An inventory of the project area's natural, cultural, community and socioeconomic resources identified potential environmental impacts and enabled the development of environmentally sensitive alternatives. A complete assessment of the project's resources is included in *Old Columbia Pike, Facility Planning Project – Phase I Environmental Assessment Technical Memorandum* (June 2022) (See Appendix H). A brief description of the site resources and the potential impacts resulting from implementation of the preferred alternative follow. A summary of the estimated environmental impacts for the three Build alternatives is included in Table 4.

Table 6: Impacts of Alternatives

Item	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Erodible Soils	No	Yes		
Prime Farmland / Farmland of Statewide Importance	Not present			
Forest (Acres)	None	0.5	2.0	5.5
Specimen Trees (> 24" dbh)	None	12	16	50
Floodplains	No	No	Yes	Yes
Waters of the U.S.	None	None	100 LF – Bridge Replacement	150 LF – Bridge Replacement
Wetlands	No			
Special Protection Area	No			
Rare, Threatened and Endangered Species	No			
Forest Interior Dwelling Bird Habitat	No			
Historic and Archeological Resources	No	No	Yes – bridge over Paint Branch	Yes – bridge over Paint Branch
Parks and Recreational Facilities	No			Yes – Stonehedge Park
Community Facilities	None			
No. of Properties Impacted (each)	None	13	13	25
Area of Properties Impacted (square feet)	None	44500	44500	172000
Right-of-Way Required	None	1 acre	1 acre	4 acres
Displacements	None	None	None	None
Hazardous Material Sites	None	3	3	3
Utilities	None	26 utility poles, underground	32 utility poles, underground	37 utility poles, underground water,

		water, gas, sewer, telecommunication lines relocation	water, gas, sewer, telecommunication lines relocation	gas, sewer, telecommunication lines relocation

4.1 SOIL SURVEY

The Natural Resource Conservation Service (NRCS) and the United States Department of Agriculture (USDA) provide soil mapping through Web Soil Survey online database. The database provides mapping of soil types that are projected to be located on-site (Figure 11). Within project area there are several soil types present as shown in Figure 12 and Table 5. The soil type informs the typical hydric ratings (as shown on Figure 12) and the degree of erodibility as displayed by the k-factor in Table 5. Soils with a high K-Factor assigned to them are viewed as erodible. Based upon this mapping, the project contains projected hydric soils, which are often associated with wetland features. The project also contains soil types with high k-factors and are highly erodible. Both elements will be considered as design progresses to future phases.

Figure 11: Web Soil Survey

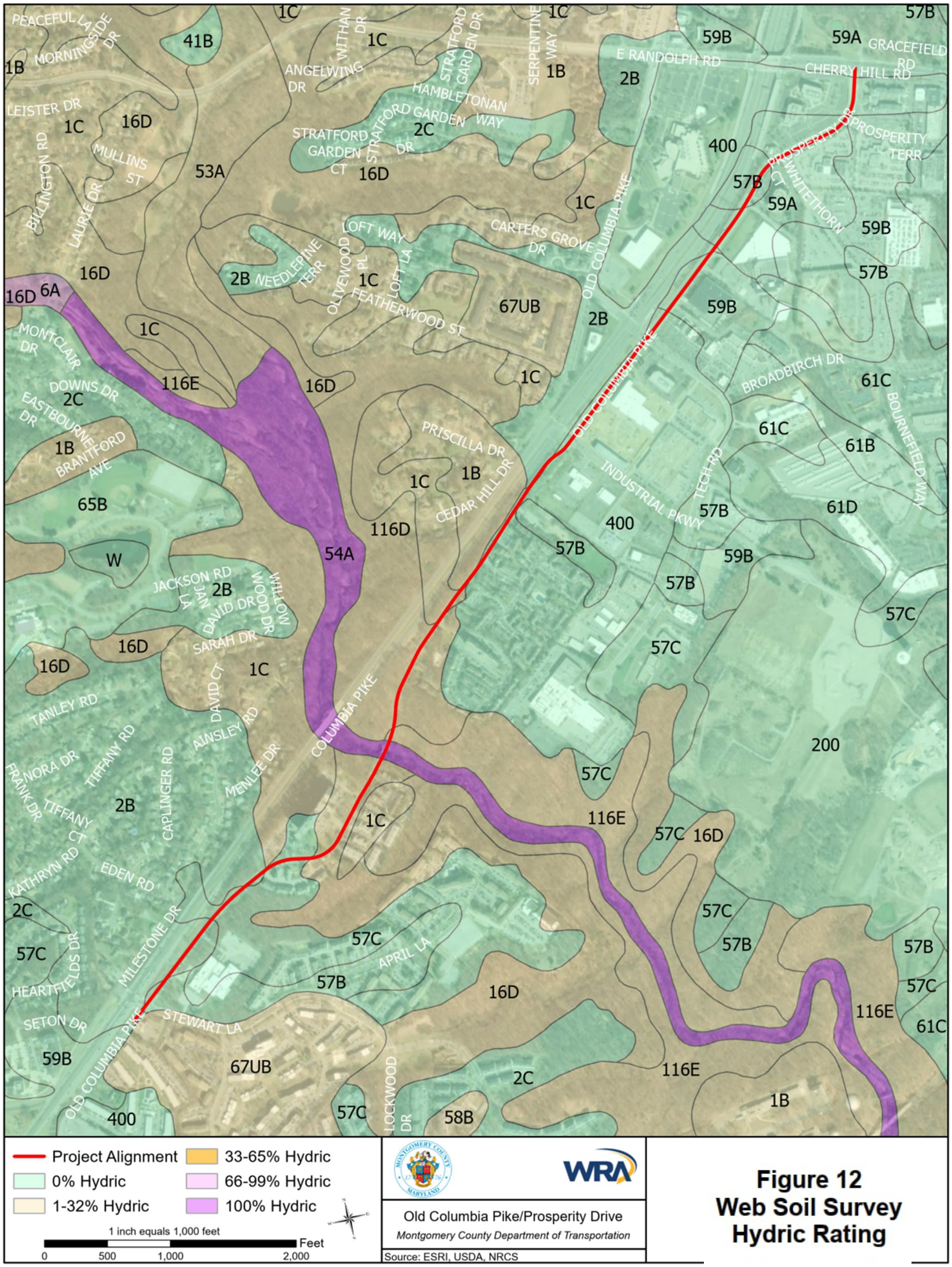


Figure 12: Web Soil Survey Hydric Rating

Table 7: NRCS/USDA Web Soil Survey Soil Types

Symbol	Soil Description	Hydric	K-Factor	Erodible
1B	Gaila silt loam, 3 to 8 percent slopes	Y	0.43	Y
1C	Gaila silt loan, 8 to 15 percent slopes	Y	0.43	Y
2B	Glenelg silt loam, 3 to 8 percent slopes	N	0.37	Y
16D	Brinklow-Blocktown channery silt loams, 15 to 25 percent slopes	Y	0.24	N
54A	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded	Y	N/A	N
57B	Chillum silt loam, 3 to 8 percent slopes	N	0.49	Y
57C	Chillum silt loam, 8 to 15 percent slopes	N	0.49	Y
59A	Beltsville silt loam, 0 to 3 percent slopes	N	0.37	Y
59B	Beltsville silt loam, 3 to 8 percent slopes	N	0.49	Y
67UB	Urban-land Wheaton complex, 0 to 8 percent slopes	Y	N/A	N
116D	Blocktown channery silt loam, 15 to 25 percent slopes, very rocky	Y	0.28	N
400	Urban Land	N	N/A	N

Merlin online mapping provides the USGS Topographic map overlays (Figure 13). The USGS topographic map may display historical conditions areas of concern such as streams or wetlands that were previously altered in the past. Based upon the Beltsville SW USGS topographic grid map, no apparent concerns has been observed.

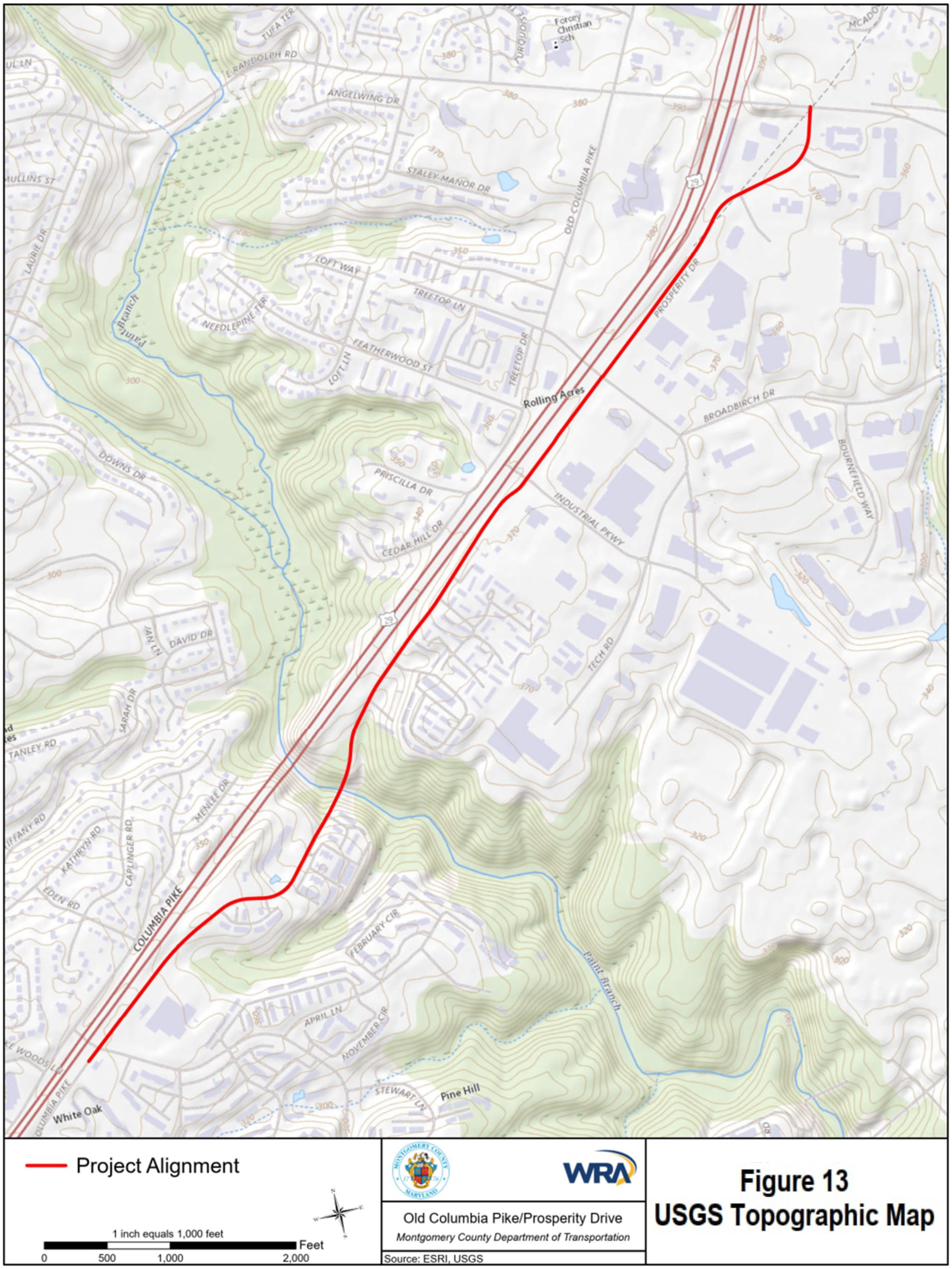


Figure 13: Merlin USGS Topographic Mapping and Grid

4.2 WETLANDS AND FLOODPLAINS

4.2.1 Wetlands

There is a freshwater forested/shrub wetland habitat, classified as PFO1A, approximately 1.04 ac. located adjacent to the project (Figure 14). PFO1A is palustrine forested broad-leaved deciduous, temporary flooded wetland. Per online databases, one perennial stream, Paint Branch, exists. MDE has assigned a Use III designation to Paint Branch. Use III streams are generally for non-tidal cold-water streams with a time of year restriction limited for October 1 to April 30. Paint Branch is associated with MD 8-digit code 02140205, and 12-digit federal HUC code 020700100202. Use III streams often increase the likelihood of requests from MDE for mitigation for impacts to streams and wetlands.

Merlin's wetland data draws from both the National Wetland Inventory (NWI) and the Department of Natural Resources (DNR) databases. NWI and DNR mapping is not a complete system of all wetlands, but a database of wetlands known to exist. An official wetland delineation will still be necessary to confirm the absence of wetlands and streams.

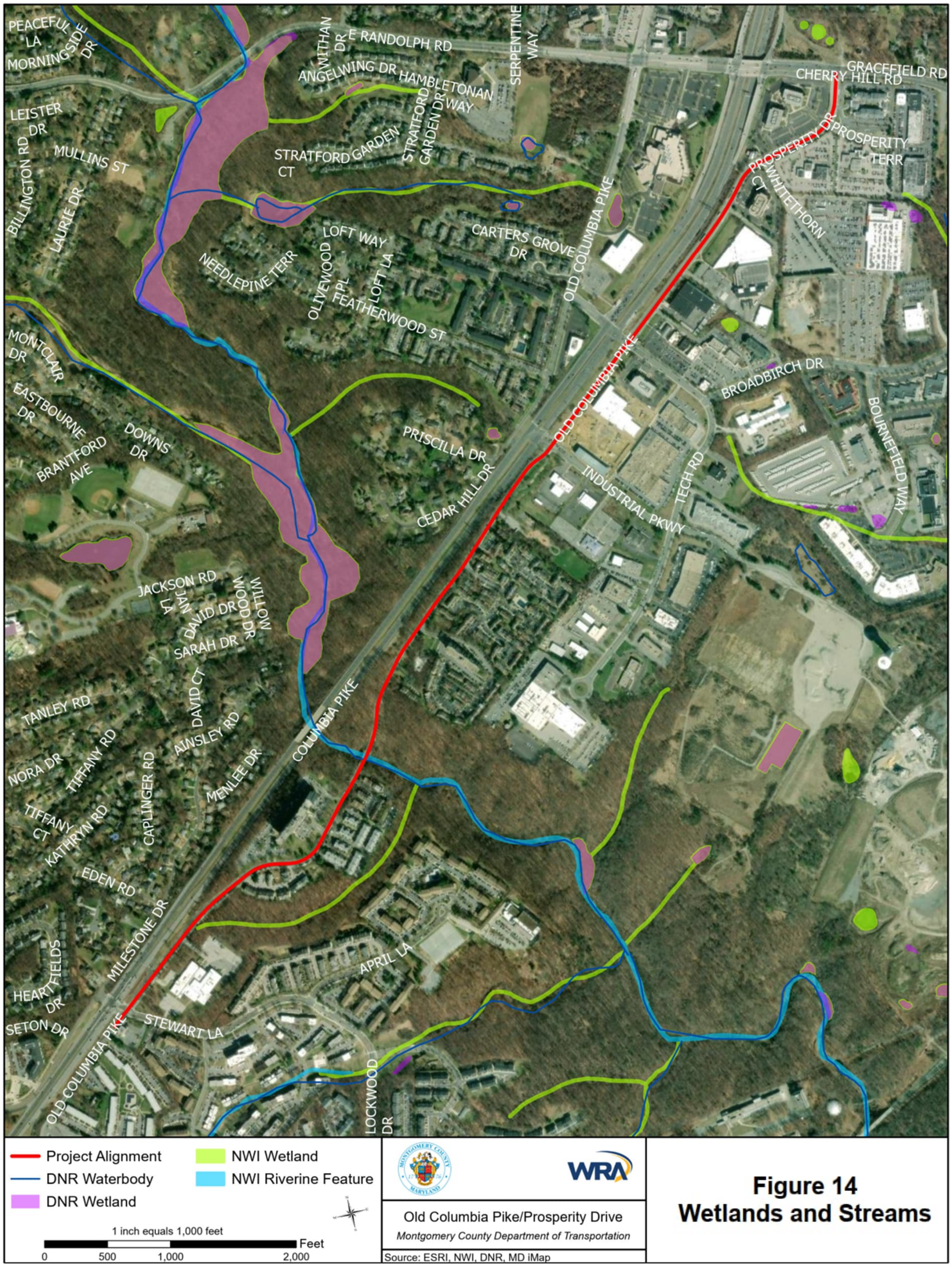


Figure 14: Wetland and Stream Mapping (NWI and DNR)

4.2.2 Floodplains

FEMA's floodplain mapping (Figure 15) indicates a 100-year floodplain associated with Paint Branch. Impacts to the 100-year floodplain are regulated by MDE and, therefore, require a Wetlands and Waterways Permit for associated impacts.

Figure 15: FEMA Floodplain Mapping

4.3 HISTORIC PROPERTIES

According to Merlin online mapping showing information from both the Maryland Inventory of Historical Places and the National Register of Historic Places (Figure 16), the following historical places/properties are within 500 feet of the project area. Descriptions from the Maryland Inventory of Historical Places are listed below.

4.3.1 Maryland Inventory of Historical Places

1. M-33-26 – Bridge No. 15035
2. M-34-11 – Cherry Hill Plant Research Farm
3. M-34-37 – Walter Ramsburg Property
4. M-34-25 – Charles Ramsburg House
5. M-34-9 – St. Mark's/Paint Chapel Episcopal Church and Cemetery
6. M-34-10 – Conley House/Green Ridge

4.3.2 National Register of Historic Places

There were no properties listed on the National Register of Historic Places. Correspondence was sent to the Maryland Historical Trust (MHT); a response was received on August 22, 2023 (see Appendix F). MHT requested as design progresses to provide additional information on how the project could affect historical structures and properties.

Figure 16: Historical Properties in Project Area

4.4 RARE, THREATENED, ENDANGERED SPECIES

A portion of the wooded areas surrounding Paint Branch are designated as a Forest Interior Dwelling Species (FIDS) area, designated by the olive-green shading (Figure 17). Maryland Department of Natural Resources (MD-DNR) and U.S. Fish and Wildlife Services (FWS) note that projects within a FIDS areas avoid and minimize impacts to forested areas. If impacts to forest are deemed unavoidable, then FIDS guidance requests that impacts take place on the outer edge of the forest stand. Impacts that bisect a forest stand are highly discouraged. An Information for Planning and Consultation (IPac) report was received from U.S. Fish and Wildlife Service (USFWS) on March 8, 2022(See Appendix F). An IPac report is a preliminary finding of the presence of habitat in a given area considered suitable by the USFWS for a “sensitive species”. It does not mean that the species is present. The Northern Long Eared Bat is the only sensitive species of concern reported. Impacts to wooded areas of clearing of less than 15 acres are unlikely to negatively affect this species.

The Maryland Department of Natural Resources (Maryland-DNR) responded in a letter dated June 17, 2022 to a request for information on sensitive species in the project area. The letter stated that no official endangered species are known to be in this area, however the Acuminate Crayfish if often found in this area and “is in need of conservation”. This letter is attached in Appendix F. MD-DNR requested that the design adhere stringently to best practices for erosion and sediment control. MD-DNR also emphasized the time of year restriction for in-stream work for a Use III stream (i.e., October 1 through April 30).

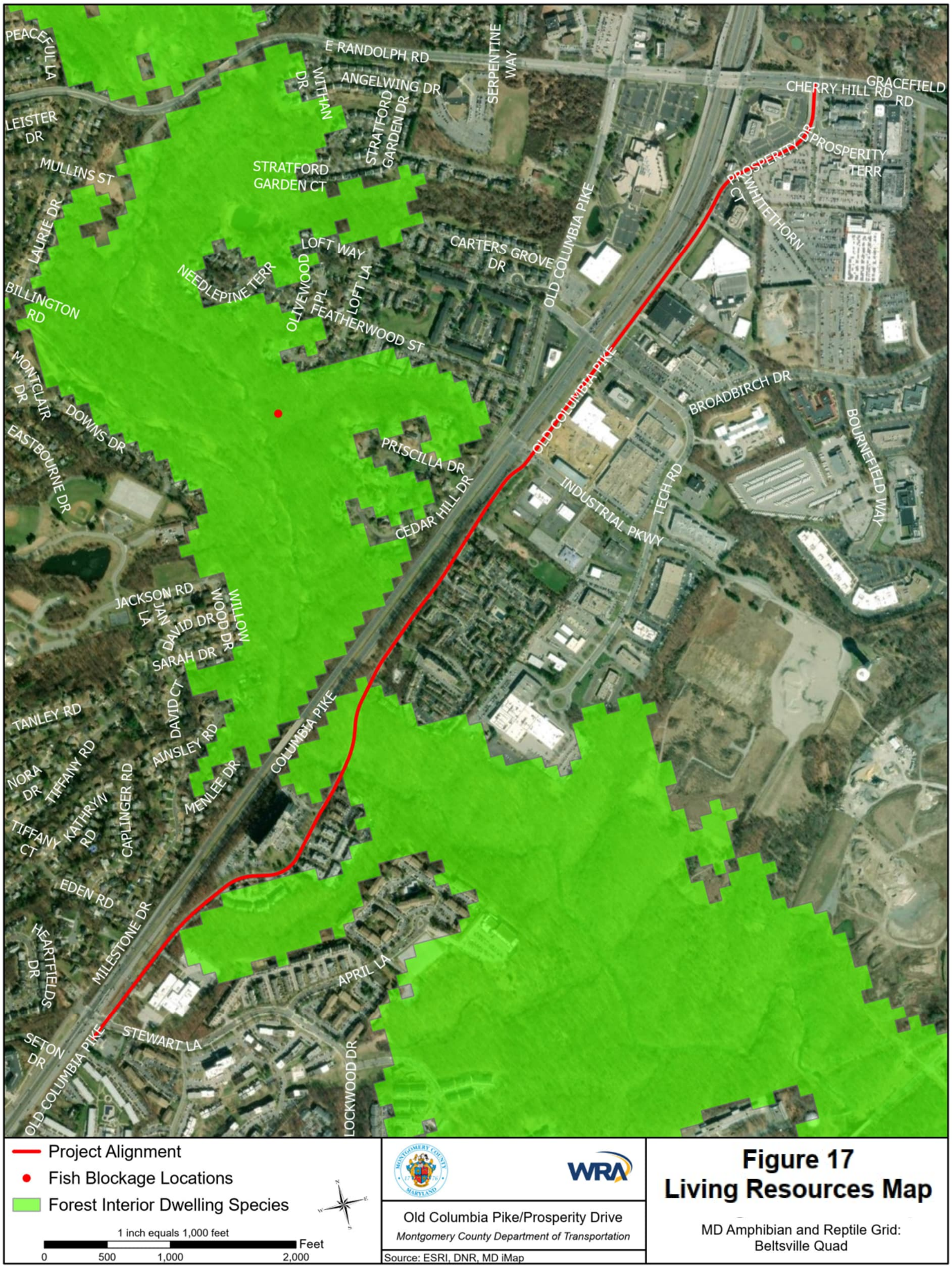


Figure 17: Sensitive Species/Living Resources

4.5 FOREST STANDS AND SPECIMEN TREES

Field investigations identified three forest stands and followed the forest sampling methodology outlined in the State Forest Conservation Technical Manual (Third Edition, 1997).

Forest Stand 1 area size is approximately 1.45 acres. It is dominated by Black Locust, Ash, Hickory, Red Maple, Pin Oak, Sassafras, and Tulip Poplar. The understory is comprised of Multi-Flora Rose, Honeysuckle, Black Raspberry, Daylilies, Poison Ivy, and Garlic Mustard. The stand is comprised of an average of 70% invasive cover. Stand 1 is in an early successional stage with established canopy and understory layers. It has an average of 300 stems per acre. The forest stand showed no major signs of disturbance via adjacent development and construction activities. The stand did appear to be impacted by the Emerald Ash Borer as most of the identified Ash trees within the sample areas were stressed or dying. There are approximately five standing dead trees per 1/10 of an acre within Stand 1 and a total of six specimen and significant trees. Stand 1 is adjacent to a stormwater management facility located between US 29 and Old Columbia Pike. The topography of the site is such that the forested area provides preliminary treatment for stormwater before runoff reaches the stormwater management facility. The forested area also provides a visual and sound buffer between US 29, the adjacent Columbia Towers Condominiums, and nearby townhouse parcels. See Table 6 for a summary of characteristics of Forest Stand 1.

Table 8: General Characteristic of Forest Stand 1

General Characteristic of Forest Stand 1	
Dominant species/Codominant species	Black Locust, Ash, Hickory, Red Maple, Pin Oak, Sassafras, and Tulip Poplar
Successional stage	Early Successional
Basal area in S.F. per acre	300
Size class of dominant species	6”-19.9”
Percent of canopy closure	65%
Number of tree species	10
Common understory species per acre	Multiflora Rose, Ash, Honeysuckle, Black Gum
Percent of understory cover 3 to 20 feet tall	40%
Common herbaceous species 0 to 3 feet tall	Black Raspberry, Daylily, Knotweed, Garlic Mustard, Poison Ivy, Greenbriar
Percent of herbaceous & woody plant cover 0 to 3 feet tall	58%
List of major invasive plant species & percent of cover	Multi-Flora Rose, Honeysuckle, Knotweed, Garlic Mustard 80%
Number of standing dead trees	10

The size of Forest Stand 2 area is approximately 0.89 acres. It is dominated by Red Maple, Tulip Poplar, Red Oak, White Oak, American Holly, Sassafras, Black Locust, Shagbark Hickory. The understory is comprised of Multi-Flora Rose, Honeysuckle, Bittersweet, and Japanese Barberry. The stand is comprised of an average of 62.5% invasive cover. Stand 2 is in an early successional stage with established canopy and understory layers. It contains an average of 305 stems per acre. The forest stand showed no major signs of disturbance from adjacent development and construction activities. There are approximately eight standing dead trees per 1/10 of an acre within Stand 2 and no specimen and significant trees. Stand 2 is located between US 29 and Old Columbia Pike, just south of the White Oak Towers Apartments. The forested area also provides a visual and sound buffer between US 29 and the adjacent nearby townhouse parcels. See Table 7 for a summary of characteristics of Forest Stand 2.

Table 9: General Characteristic of Forest Stand 2

General Characteristic of Forest Stand 2	
Dominant species/Codominant species	Red Maple, Tulip Poplar, Red Oak, White Oak, American Holly, Sassafras, Black Locust, Shagbark Hickory
Successional stage	Early Successional
Basal area in S.F. per acre	305
Size class of dominant species	3”-5.9”
Percent of canopy closure	62.5%
Number of tree species	9
Common understory species per acre	Multiflora Rose, Honeysuckle, Bittersweet, Japanese Barberry
Percent of understory cover 3 to 20 feet tall	44.5%
Common herbaceous species 0 to 3 feet tall	Virginia Creeper, Poison Ivy, Fescue
Percent of herbaceous & woody plant cover 0 to 3 feet tall	38%
List of major invasive plant species & percent of cover	Multi-Flora Rose, Honeysuckle, Bittersweet 63%
Number of standing dead trees	8

Forest Stand 3 area size is approximately 6.57 acres. It is dominated by Tulip Poplar, Sassafras, Black Gum, Red Maple, Red Oak, Shagbark Hickory, White Oak, Hornbeam, Dogwood. The understory is comprised of Multi-Flora Rose, Honeysuckle, Japanese Euonymus, Bittersweet, Maple Leaf Viburnum, and Wineberry. The stand is comprised of an average of 57.5% invasive cover. Stand 3 is in an early-mid successional stage with established canopy and understory layers. It has an average of 325 stems per acre. The forest stand showed no major signs of disturbance via adjacent development and construction activities. There are approximately seven standing dead trees per 1/10 of an acre within Stand 3 and a total of 27 specimen and significant trees. Stand 3 is located between US 29 and Old Columbia Pike, just south of the White Oak Towers Apartments. The forested area also provides a visual and sound buffer between US 29 and the adjacent nearby townhouse parcels. See Table 8 for a summary of characteristics of Forest Stand 3.

Table 10: General Characteristic of Forest Stand 3

General Characteristic of Forest Stand 3	
Dominant species/Codominant species	Tulip Poplar, Sassafras, Black Gum, Red Maple, Red Oak, Shagbark Hickory, White Oak, Hornbeam, Dogwood
Successional stage	Early-mid Successional
Basal area in S.F. per acre	325
Size class of dominant species	3”-5.9”
Percent of canopy closure	57.5%
Number of tree species	9
Common understory species per acre	Multiflora Rose, Honeysuckle, Japanese Euonymus, Bittersweet, Maple Leaf Viburnum, Winterberry
Percent of understory cover 3 to 20 feet tall	40%
Common herbaceous species 0 to 3 feet tall	Virginia Creeper, Jack-in-the-Pulpit, Christmas Fern, Mayapple, Solomon’s Seal
Percent of herbaceous & woody plant cover 0 to 3 feet tall	49.5%
List of major invasive plant species & percent of cover	Multi-Flora Rose, Honeysuckle, Japanese Euonymus 58%
Number of standing dead trees	7

See Appendix F for the Natural Resource Inventory (NRI)/Forest Stand Delineation (FSD) report for the project area. The NRI/FSD report documented the vegetative communities present onsite, as well as other environmental features. The NRI/FSD report will be used as a basis for a Forest Conservation Plan (FCP) to comply with Maryland Forest Conservation Law as the design progresses.

4.6 SOCIOECONOMIC FEATURES

4.6.1 Zoning

Based upon Montgomery County Mapping the project area crosses through several zoning categories (Figure 13). Zoning and land uses include but are not limited to offices, residential, warehouse, parks, and vacant property. The commercial and residential zoning designations are the most prevalent within the project area and are primarily located north of Industrial Parkway. Mixed commercial/residential is designated by yellow shading in Figure 18 and is located along Old Columbia Pike/Prosperity Drive, north of Industrial Parkway to Cherry Hill Road. The green and orange shading represents different densities of residential zoning. The proposed project is consistent with the zoning.

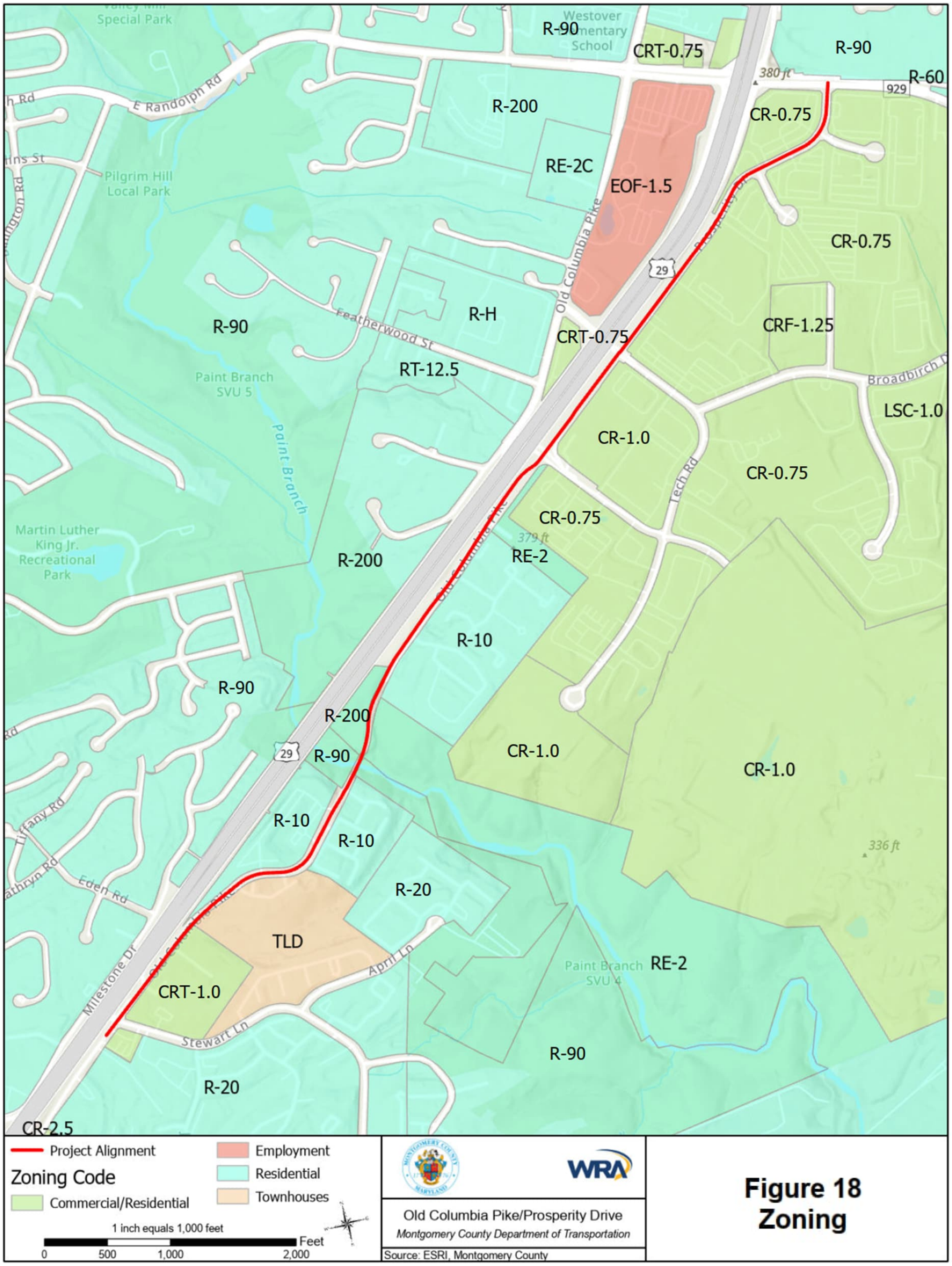


Figure 18: Zoning

4.7 COMMUNITY FACILITIES

4.7.1 Existing Parklands

MCAtlas, provided by M-NCPPC, displays parkland and recreation facilities. Paint Branch Stream Valley Park (Unit 4), Old 29'er Trail, and Stonehedge Local Park all fall within the project area.

MD Inventory of Existing Parklands (Figure 19):

1. Paint Branch Stream Valley Park (Unit 4)
2. Old 29'er Trail
3. Stonehedge Local Park

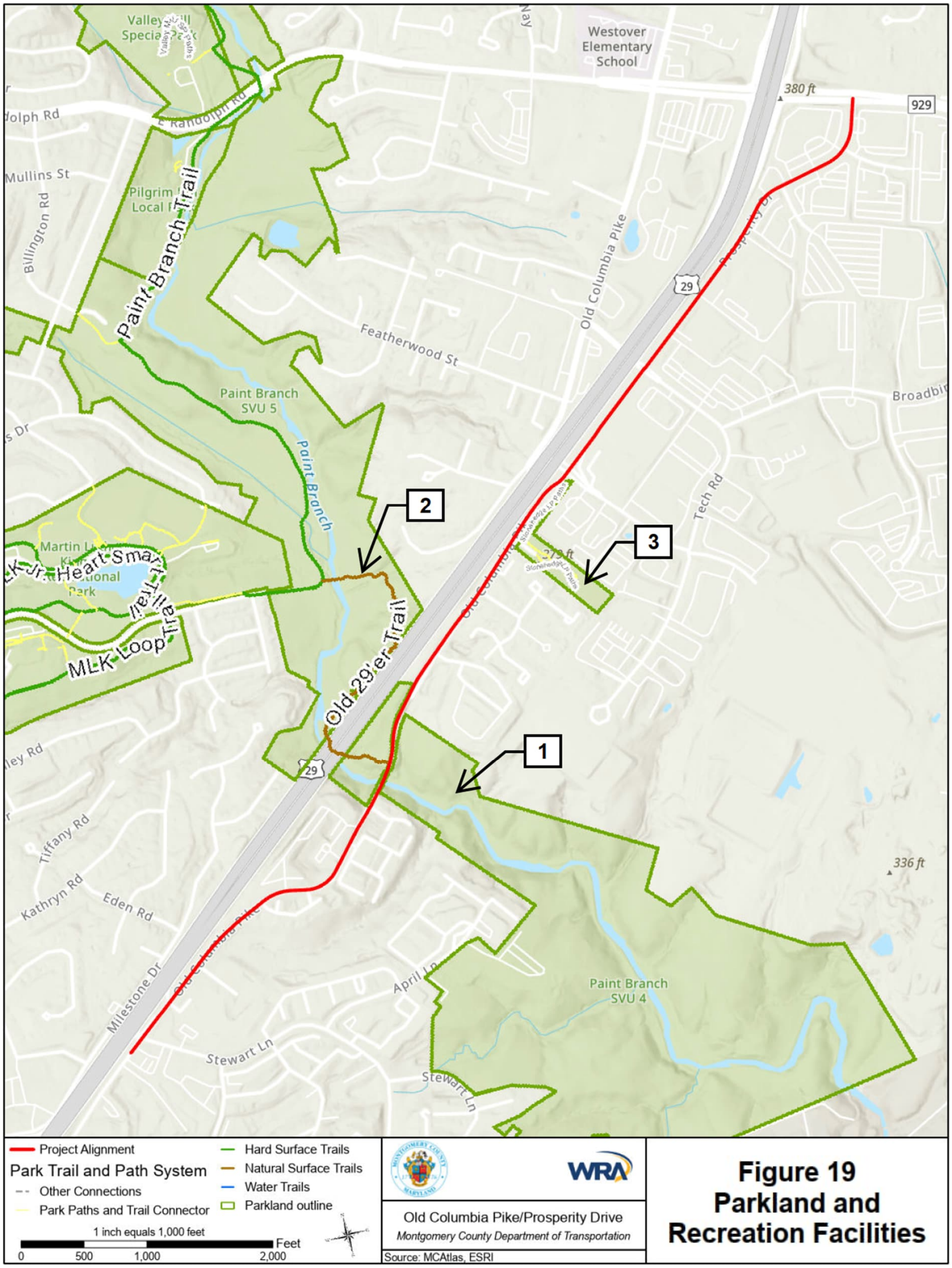


Figure 19: Parkland and Recreational Facilities

4.7.2 Emergency Facilities

No fire departments, police stations, or hospitals are located within or adjacent to the project area. However, several facilities are known to exist within three to five miles of the project area.

4.8 PROPERTY IMPACTS

The preferred alternative will impact approximately 13 properties along Old Columbia Pike/Prosperity Drive. Temporary construction and grading easements will also be required. Right-of-way acquisition is necessary to accommodate widening to the east to provide new sidepath and buffer space.

Some of the property required may be acquired under the ongoing Maryland SHA Project MO8445176 US 29 at Stewart Lane Intersection Improvements project which is currently under development.

4.9 HAZARDOUS MATERIALS

A desktop review of hazardous materials related sites within 0.5 miles of the project was performed per EPA EnviroAtlas and UST (Underground Storage Tank) Finder (see Figure 20) and found the following information related to hazardous materials:

- Of the 36 Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Sites:
  - 31 are active
  - 5 are inactive
- 13 past Hazardous Materials releases (improper leak, spillage, discharge, or disposal)
  - All received determinations of “no further action required”
- 22 sites with underground Storage
  - 19 tanks that are in current use or open
  - 41 tanks that have been closed permanently

Due to the RCRA hazardous waste management sites located along the project corridor as shown in Table 9, it is recommended that further field environmental assessment will be performed to evaluate if any special soil and groundwater-handling specifications may be required during excavation, for site worker health and safety exposure concerns and environmental protection requirements.

Table 11: RCRA Hazardous Waste Management

Site No.	Name	Address
6	Dow Jones and Company	11501 Old Columbia Pike
26	Prosperity Drive Data Center, LLC	12401 Prosperity Drive
30	Lexus of Silver Spring	2505 Prosperity Drive

All previous hazardous materials release sites have been cleaned up to meet federal and local environmental requirements and no further action is required. All active and inactive sites that handles hazardous waste materials and has underground storage tanks such as gas stations, car wash facilities, dry cleaners, automobile mechanic and body shops, hospitals, paint shops, etc. must comply with federal and local maintenance and monitoring requirements.

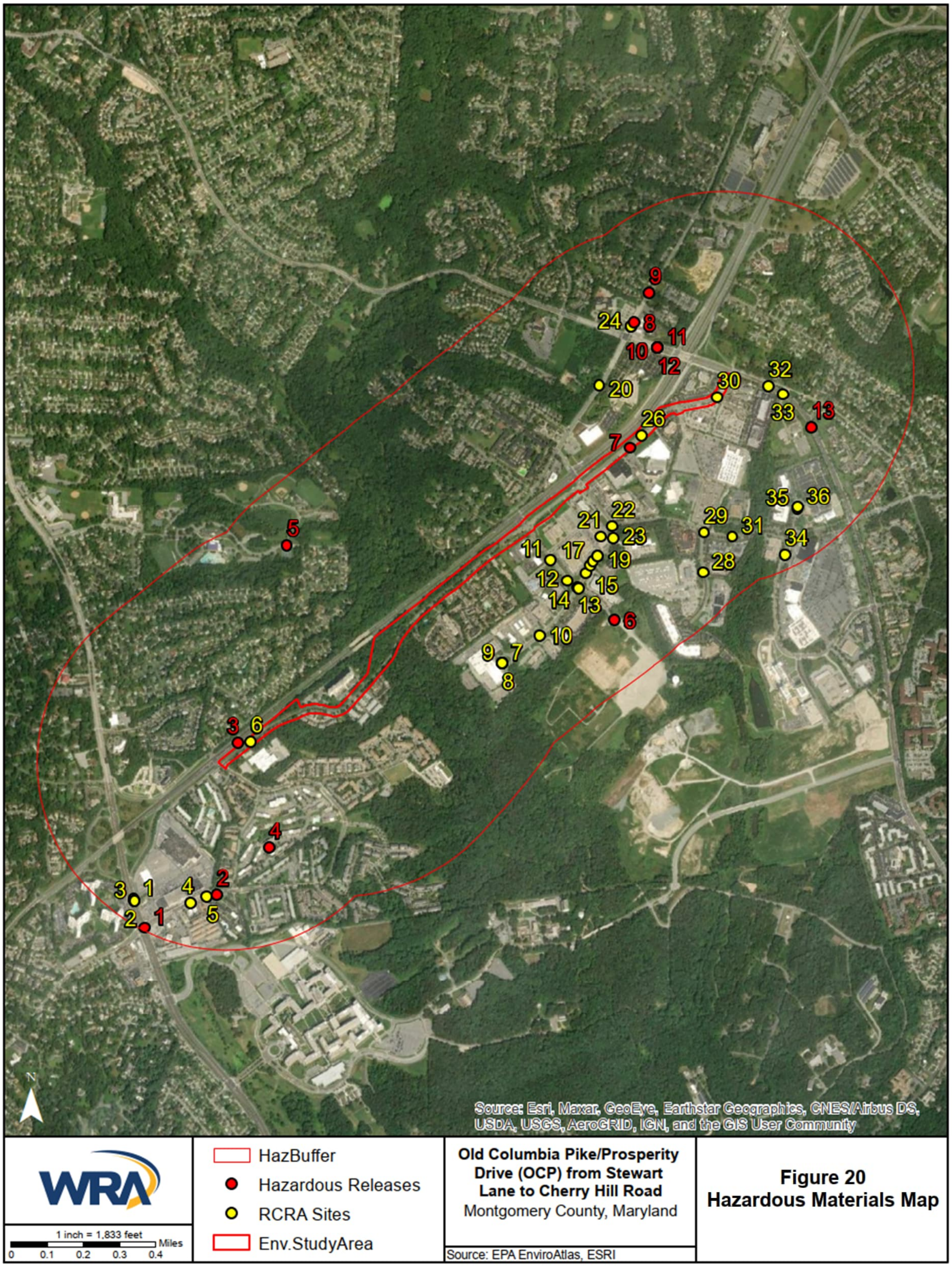


Figure 20: Hazardous Materials Map

4.10 UTILITIES

An inventory of existing utilities in the project area was performed by contacting MISS Utility for a listing of known utilities in the project area, collecting record plans from public and private utilities, and through field observation. A list of the inventoried utilities and status of records received is presented in Table 10.

Table 12: Existing Utility Inventory

Owner	Utility	Status of Record Plans
Washington Gas Light	Gas	Received
WSSC	Water & Sanitary	Received
Verizon	Telecommunications	Received
Comcast	Cable Television	Received
PEPCO	Electricity	Received
Crown Castle	Telecommunications	Received
DF&I	Telecommunications	Received
MCI	Telecommunications	Received
FiberLight	Telecommunications	Received
Century Link	Telecommunications	No facilities within project limits

There are utility poles supporting overhead utility lines that run parallel along both sides of Old Columbia Pike from Stewart Lane to the south end of the bridge over Paint Branch. There are fire hydrants observed along the project corridor. There are gas lines along the project corridor that are owned by Washington Gas Light Company. There are fiber optic lines in the project area that are owned by various companies. There are also water and sanitary lines owned by Washington Suburban Sanitary Commission (WSSC) in the project area.

5 Public Participation

5.1 PROJECT WEBSITE

A website for the project is hosted by Montgomery County at: https://www.montgomerycountymd.gov/dot-dte/projects/OldColumbiaPike/index.html

On the project website, the following information is available to the public:

- Project description
- Schedule
- Project documents
    - Public meeting recordings
    - Public meeting newsletters
    - Comment forms
    - Registration forms (meeting sign up forms to estimate number of attendees)
    - Concept alternative displays
    - Renderings
- MCDOT Project Manager's contact information

5.2 NEWSLETTER

MCDOT sends newsletters to notify residents living in the vicinity of the project area at least three weeks before the public meeting. A copy of the newsletters promoting each of the public meetings discussed below are included in Appendix B.

5.3 PUBLIC MEETINGS

Community feedback is an important aspect of MCDOT's Facility Planning process. MCDOT's Division of Transportation Engineering hosted two public meetings to inform residents about the status of the Old Columbia Pike/Prosperity Drive Improvements Project. Letters describing the project were mailed to homeowner's associations (HOA) and property owners adjacent to the project area as determined by the County's Geographical Information System (GIS) Database to inform residents of upcoming meetings (Appendix B).

The first public meeting was held virtually via Zoom on March 16, 2023. During the meeting, the MCDOT project manager, Yasamin Esmaili, and consultant team presented the project background, purpose and need, and the four alternatives under consideration. MCDOT decided to have a second public meeting that is both in-person and online to provide community residents another opportunity to provide feedback because not everyone has access to technology equipment to participate in the first virtual meeting. The 71 attendees provided comments via chat box, asked questions verbally, and emailed the contact provided on the project information website. The recording of this meeting is available on the project website and at: https://youtu.be/QZrDCUOg_uI?feature=shared.

The second public meeting was held on November 14, 2023, at the White Oak Community Recreation Center and concurrently over Zoom Meeting. At this meeting, display boards showed the proposed sidewalk and sidepath improvements, intersection improvements, and typical sections for the four proposed alternatives. All presentation materials were made available to the public on the project website before and after the meeting. The presentation introduced the design team, explained the purpose and need for the project, and reviewed the preliminary design findings and concepts. Approximately 20 citizens attended in-person and 81 citizens attended online. Everyone was encouraged to share their comments at the meeting, via email, or through the public comments form at the meeting or on the project website. Following the meeting, all the presentation materials were posted on the project website. The recording of this meeting is available on the project website and at: https://youtu.be/WUMlJ1eVN1Y?feature=shared.

Public meeting, November 14, 2023

5.4 PUBLIC COMMENTS

At the first public meeting, 12 comments were received in the chat box, 4 comments received via the online comment form, and 2 emails were received. The general feedback and concerns received at the meeting included:

- Disliked the bridge over Paint Branch being reopened to vehicles.
- Concerned about US 29 traffic spilling over to Old Columbia Pike if the bridge is opened to vehicles.
- Does not want traffic to increase around the residential homes adjacent to Paint Branch.
- Concerned about vehicles speeding along Old Columbia Pike; desires speed humps or other traffic calming devices along Old Columbia Pike.
- Noted that there are school buses serving the residential area along Old Columbia Pike, and the lack of pedestrian facilities puts students walking at risk.
- Demanded more lighting be installed.

- Preferred Alternative 2 in which the bridge remains open to pedestrians and intersection improvements along the project corridor.
- Enjoys the current natural serenity of the environment and wants a minimum of environmental impacts.
- Noted that it is difficult to turn right from northbound Old Columbia Pike to eastbound Stewart Lane due to competing traffic turning into Stewart Lane from US 29.
- Noted that it is difficult to access US 29 for residents south of Stonehedge Park.
- Concerned about crashes at Tech Road and Prosperity Drive intersection.
- Suggested a new crossing over Paint Branch be built to connect White Oak Community Recreation Center (south of Paint Branch) and White Oak Town Center (north of Paint Branch).
- Wanted project to focus on pedestrian connectivity.
- Wanted to see improvements at Industrial Parkway and Tech Road intersections in the project corridor.
- Noted that at the end of every month, traffic from Motor Vehicle Administration (MVA) and Vehicle Emissions Inspection Program (VEIP) facilities spill onto Stewart Lane, blocking traffic.
- Would like legalized parking on the west side of Old Columbia Pike.

Public comments are included in Appendix C. Below is a summary of comments received during or after the second public meeting.

The public comment period extended from November 14 to November 28, 2023. MCDOT received 20 verbal comments, 17 written comments from the Zoom chat box, and nine written comments from emails and the comment form on project website. Most comments indicated that they would like MCDOT to focus primarily on making safety and capacity improvements to the Industrial Parkway and Tech Road intersections. Most comments also noted they strongly prefer the bridge over Paint Branch remain closed to vehicles since they do not want more traffic and congestion along Old Columbia Pike.

The summary of comments are as follows:

- Do not want the bridge over Paint Branch open to vehicles as it would lead to Old Columbia Pike becoming a bypass route for US 29 commuter traffic when US 29 is congested, leading to more traffic on Old Columbia Pike and make the corridor less safe for bicyclists and pedestrians. Majority solicitated comments disapproved Alternatives 3 and 4.
- Requested to have green color pavement markings for shared use traffic through the intersections and over driveways to improve safety.
- Requested to have signage to warn bicyclists when they are approaching steep grades downhill.
- Suggested having a pedestrian bridge at Old Columbia Pike and Tech Road as this intersection is very busy and there have been several near misses with pedestrians.
- Questioned what traffic modeling parameters were used and suggested ensuring the full buildout of the Viva White Oak be taken into consideration in the traffic modeling.
- Need to coordinate with the developers of the Viva White Oak project to make sure proposed intersections work with expected capacity after Viva White Oak is developed.
- Noted the need for Bus Rapid Transit (BRT) to serve Tech Road and Industrial Parkway.
- Suggested saving the money that was proposed to reconstruct and open the bridge over Paint Branch to vehicles and put it towards improving the intersections along Old Columbia Pike.
- Suggested adding a traffic signal at Old Columbia Pike and Industrial Parkway as people have a hard time leaving their neighborhoods at this intersection due to the high volume of traffic.

- Suggested considering the full buildout of Viva White Oak from a planning perspective to ensure sufficient capacity at the intersections connected to the future Viva White Oak development.
- Suggested focusing efforts on the intersections at Tech Road and Industrial Parkway and to prioritize pedestrian safety.
- Requested another public meeting to review the final proposed alternatives.
- Requested considering grade-separated interchanges as recommended in the Fairland and Briggs Chaney Master Plan.
- Suggested adding a connection to the trail that passes under the bridge over Paint Branch Creek. Would like to improve the trail to make it so that bicyclists can use as well.
- Supported the opening the bridge over Paint Branch to motorized traffic to provide people with access to the future Viva White Oak development. Today there are not enough access points to support the increase in traffic. For the success of all the future development in the White Oak area, including Viva White Oak, White Oak Town Center, Montgomery College, and the new White Oak apartments, all will need as many access points as possible at US 29 and Old Columbia Pike.
- Noted accessing Old Columbia Pike from the residential neighborhoods can be very difficult due to high traffic volumes, especially in the morning hours. Opening the bridge over Paint Branch would make it worse.
- Noted accommodations are needed for pedestrians to walk across US 29 at Tech Road. The existing conditions are very dangerous.
- Not in favor of adding additional lanes for vehicles as people will use it as a cut through to US 29 as they are currently doing now, using Tech Road and Old Columbia Pike.
- Demanded more lighting be installed.
- Suggested having pedestrian/bicyclist sidepath connections to nearby trail systems.
- Concerned about vehicle speeding along Old Columbia Pike. Wants speed humps or other traffic calming devices along Old Columbia Pike.

In conclusion, the messages received from both public meetings were consistent. The message is:
- Prefers Alternative 2 - Improve intersections, add sidewalk and sidepath.
- Desires bridge over Paint Branch to remain open to pedestrians and bicyclists and closed to vehicles.
- Desires more lighting.
- Desires prioritizing safety and connectivity for pedestrians and bicyclists.
- Desires focus on improving user safety and traffic operations at Industrial Parkway and Tech Road intersection along the project corridor.

Appendix A

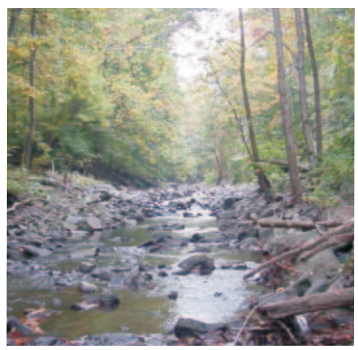
Master Plan Excerpts

Excerpts from

JULY 2014

White Oak Science Gateway Master Plan

APPROVED AND ADOPTED



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THE PLAN

Opportunities and Challenges

This Plan reflects the aspirations that many people have for White Oak. Some community members feel that this area is under-served with retail amenities and services as well as jobs. Residents have to travel to Silver Spring, Bethesda, Rockville, or other locations for quality restaurants and retail shopping. Others have expressed frustration that the area has not been allowed to achieve its potential and has been held back by County policies, including a development moratorium (from 1986-2002) due to a lack of transportation capacity. Many want to see reinvestment in this community and are hopeful that the public and private sectors will work together to turn things in an upward direction. There is great interest in seeing "things happen" in the east County.

At the same time, there are significant challenges. The area is not currently served by high-quality transit. Traffic congestion is a persistent problem and a possible deterrent to growth. US 29, the east County corridor that parallels I-95, carries heavy volumes of regional traffic, including significant amounts from Howard County. Funding for expanding transportation infrastructure is not available now or in the foreseeable future. Although I-495 and I-95 are nearby, physical constraints limit opportunities to improve local circulation as well as connectivity to other areas. Streets wind through the residential neighborhoods with few through streets to interconnect communities, which forces local traffic onto the major roads. The large Federal Research Center, which includes the FDA headquarters campus, does not allow public access through the property. With the exception of the Plan's recommendation to rebuild and reopen the Old Columbia Pike bridge over the Paint Branch, there are no options for additional, new vehicular crossings of the Paint Branch, Northwest Branch, and I-495.

The area does not have a central core, but has several separate centers. With the exception of the FDA, there is no critical mass of a particular employment sector, such as life sciences, technology, or media and communications that serve to attract similar businesses. There is no significant academic presence. Market demand for new offices in the area has been limited.

Increasing opportunities for new economic development and reinvestment in existing centers are critical elements to enhancing this area and improving its quality of life. Ideally, the FDA will be a catalyst for additional development. The County is pursuing development of a major life sciences center on its 115-acre Site 2 property, and has partnered with Percontee, owners of the adjacent 185-acre site, to create the potential for a 300-acre mixed-use development. Adjacent to both these parcels is a nearly 50-acre property for the planned relocation of Washington Adventist Hospital (WAH).

This Plan's overriding goal is to transform the built environment from auto-oriented single-purpose nodes into vibrant mixed-use centers. Some stakeholders believe new job creation in White Oak should emphasize life sciences or biotechnology. Such employment is certainly welcome, hence the Plan's name; however, new opportunities for high quality jobs should not be limited to a particular sector. The best approach for this area is land use and zoning that is inclusive, allowing for a wide variety of possibilities that can respond to the market. The Plan recommends rezoning commercial areas to the Commercial-Residential (CR) Zones, which allow a broad range of commercial uses, including general offices, technology and biotechnology, research and development, hospitals, educational institutions, some manufacturing and production, as well as multi-family residential and supportive retail services to create a complete community.

Land Use Supported by Transit

A Bus Rapid Transit system is essential to achieve the vision of this Master Plan. Improving transit service within existing corridors is intended to reduce congestion and reliance on automobiles while improving transportation capacity and meeting demands for existing and future land uses. The 2013 *Countywide Transit Corridors Functional Master Plan* identifies the corridors and right-of-way requirements for a Bus Rapid Transit (BRT) system.

Proposed BRT corridors in the WOSG Plan area include US 29, New Hampshire Avenue, and Randolph/Cherry Hill Road. This Plan's goal is for future growth to be supported by a BRT system that will serve the local area while connecting it to major destinations and to the existing and proposed transit services in the region. A BRT system with proposed stations at the Plan's centers could help spur reinvestment and redevelopment, as well as support new growth, by providing a more efficient transit alternative in an area that has been stymied due to a lack of road capacity and underserved by high quality transit. The urban design framework combines the BRT system with the locations of the existing commercial centers to promote development within areas centered on future transit nodes (see Figure 1).

The US 29 BRT corridor extends from the Silver Spring Transit Center to Burtonsville. The New Hampshire Avenue corridor extends from the Colesville Park and Ride Lot to the Fort Totten Metrorail Station. This Plan recommends a transit station at the White Oak Center that could serve as a transfer hub between the BRT routes on US 29 and New Hampshire Avenue. Along New Hampshire Avenue, the Plan recommends BRT stations at FDA's main entrance and at Hillandale (see Map 13 on page 62). The BRT corridor along Randolph Road and Cherry Hill Road would connect White Oak with Glenmont and White Flint/Rockville Pike. In addition, enhanced local bus service, perhaps a circulator bus loop, is expected to link the communities of White Oak to the BRT stations to better serve the entire area.

TRANSPORTATION

The White Oak area is near a number of major, regional roadways that serve both regional and local traffic (see Map 12). Interstate 95 parallels US 29 two and a half miles to the east in Prince George's County. I-495 forms the southern boundary of the Plan area, with an interchange at New Hampshire Avenue. The 18-mile Intercounty Connector (MD 200) runs east-west between I-95 and I-270 with access via full interchanges on US 29 and New Hampshire Avenue and a partial interchange at Briggs Chaney Road (entrance only for westbound traffic).

In the Plan area, two major highways – US 29 and New Hampshire Avenue – intersect at an interchange and connect the communities of White Oak to each other and to the surrounding region. US 29, the major north-south transportation facility in the eastern County, extends 26 miles from the Maryland/Washington, D.C. line to Howard County. New Hampshire Avenue, which originates in Washington, D.C., traverses Prince George's County before it crosses into Montgomery County where it extends about 25 miles from the County line to MD 108. US 29 is the most critical roadway for this Plan due to its potential impacts on development and the area's future.

Transportation problems, and attempts to solve or relieve traffic congestion, have characterized the eastern County for 30 years. The 1981 *Master Plan for Eastern Montgomery County Planning Area* devised a concept called "transit serviceability" that was deemed problematic and no longer appropriate by the 1997 Master Plans. In 1986, the County imposed a development moratorium in the eastern County through the Adequate Public Facilities Ordinance. In 1990, the County Council adopted a Trip Reduction Amendment to the 1989 Plan. Development has continued to the north in Howard County, increasing regional travel demand and traffic volumes in the US 29 corridor.

Like many suburban locales, the White Oak area has limited options for new vehicular connections. This area is particularly constrained by existing development, ownership patterns, the large federal property, and environmental resources. These physical constraints limit opportunities to improve circulation and connectivity, which forces all local traffic onto the major highways. The federal government will not allow public access through the Federal Research Center, which could otherwise provide a local connection between New Hampshire Avenue and Cherry Hill Road.

The transportation network serving this area will require high quality transit improvements as well as additional road infrastructure to support the potential development envisioned by this Plan. The Plan recommends major infrastructure projects, including a Bus Rapid Transit network.

Transportation Standards

This Plan recommends that in light of the County's economic objectives and its ownership interest in the Life Sciences property, the Plan area be considered an economic opportunity center, similar in form and function to areas around a Metro Station or a central business district with an ultimately urban character, and that the roadway and transit adequacy standards used in the Subdivision Staging Policy for areas that are currently designated as Urban be applied to the Plan area. Currently the Urban roadway standard is a minimum 40 percent ratio of forecast speed to uncongested speed (the borderline between Levels of Service "D" and "E") averaged over all arterials and roads of higher classifications.

This Plan recommends the Local Area Transportation Review (LATR) standard be raised from 1475 critical lane volume (CLV) to 1600 CLV (1.00 volume/capacity) within the Plan area. The rationale for a 1600 CLV (1.00 volume/capacity) standard stems from the Plan-recommended BRT network that would serve the area and offer a viable alternative to automobile travel. This is consistent with the County's policy of accepting greater levels of roadway congestion in areas where high quality transit options are available.

Intersection performance, assuming the Master Plan Development Scenario with the *full complement* of un-programmed improvements, is described below and shown on Figure 5. The full complement of the un-programmed improvements assumed in support of the intersection analysis includes:

- BRT Network
- Old Columbia Pike Bridge opened to vehicular traffic
- Planned US 29 grade-separated interchanges
- New local roads proposed in the Life Sciences/FDA Village Center
- Intersection geometric improvements

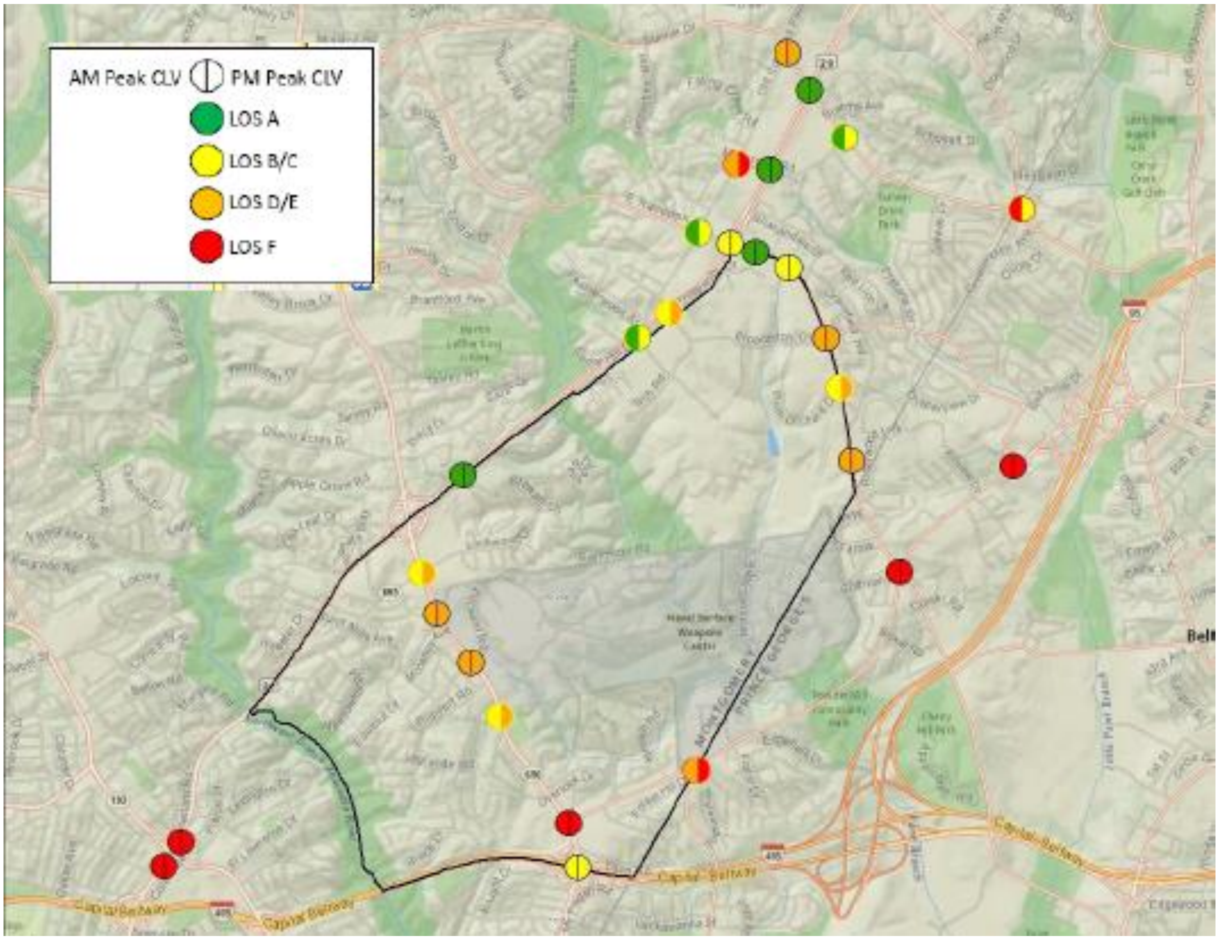
All intersections outside of project limits

This Plan includes the following intersection improvements:

- Cherry Hill Road at Broadbirch Drive/Calverton Boulevard: on Broadbirch Drive, add an eastbound left-turn lane and an eastbound through lane; on Calverton Boulevard, change the westbound right-turn lane to a westbound right-turn and through lane; and on Cherry Hill Road, add a northbound left-turn lane and a southbound right-turn lane.
- MD 650 at Powder Mill Road: from Holly Hall, add an eastbound left-turn lane; on Powder Mill Road, add a westbound right-turn lane; and on MD 650, add a southbound left-turn lane.
- MD 650 at Lockwood Drive: on Lockwood Drive, add an eastbound left-turn lane.
- Powder Mill Road at Riggs Road: on Powder Mill Road, add a second eastbound left-turn lane.
- Old Columbia Pike at Musgrove Road: on Old Columbia Pike, add a southbound left-turn lane; and on Musgrove Road, add a westbound right-turn lane.

These specific improvements are a guide to right-of-way reservations at these intersections. The need for each intersection improvement will be revisited as part of specific development plan LATR reviews.

Figure 5: Intersection Analysis–Development Scenario with Full Complement of Additional Un-programmed Improvements



The Street Network

The Plan recommends increasing connectivity for all users of the road and pedestrian/bikeway network. Layering networks of auto, transit, bike, and pedestrian facilities will improve mobility and access in the Plan area where design, safety, and community objectives require a multi-faceted approach to place-making.

The grade-separated interchanges previously recommended in the 1997 Fairland and White Oak Master Plans are necessary to accommodate the full level of potential development recommended by this Plan's proposed zoning. This Plan recommends that the Old Columbia Pike bridge over the Paint Branch stream valley be rebuilt and reopened to vehicular traffic, and that Old Columbia Pike be reconstructed as a four-lane arterial between Industrial Parkway and Stewart Lane, which would improve connectivity in the area and provide an option to US 29 for local travel. Should widening Old Columbia Pike and reopening the bridge over Paint Branch precede the US 29/Stewart Lane interchange, then the intersection of Stewart Lane with Old Columbia Pike, US 29, and Milestone Drive likely will need to be reconstructed. The bridge has been closed to vehicular traffic for over 30 years, but is open to pedestrians and cyclists. Reopening the bridge to vehicular traffic will have impacts for residents on Old Columbia Pike, but this Plan considers improvements to local connectivity and circulation to be of overriding importance.

To further improve circulation between the White Oak Center and Life Sciences/FDA Village, the County should work with the General Services Administration to identify a route and funding for public access on a four-lane roadway between New Hampshire Avenue and FDA Boulevard that would also maintain the security of FDA's campus.

The Plan recommends extending Old Columbia Pike as a four-lane arterial from Stewart Lane near the edge of or through the White Oak Shopping Center property, terminating at Lockwood Drive near New Hampshire Avenue. This extension will relieve some of the traffic that would otherwise be on Lockwood Drive and Stewart Lane through the multi-family residential area east of the shopping center.

In the Life Sciences/FDA Village Center, the Plan recommends that Industrial Parkway, Tech Road (between US 29 and Industrial Parkway), and Prosperity Drive be classified as four-lane arterials. The Plan also recommends that Broadbirch Drive and Plum Orchard Drive be reclassified from Industrial Roads to Business District Streets. Industrial roads are intended for commercial vehicle circulation, with minimal allowances for pedestrians. A change in classification from industrial to business street, while still allowing for commercial vehicle movement, introduces additional amenities (such as wider sidewalks, green buffer zones, and potential on-street parking) aimed to promote pedestrian activity and create an attractive streetscape that is appropriate for mixed-used centers.

The Plan recommends that Industrial Parkway be extended through Site 2 and connect with FDA Boulevard when development occurs (see A-106 on Map 12). Extensions of other roads in this Center would improve connectivity and intersection performance. When redevelopment occurs, the Plan recommends a new road connecting Plum Orchard Drive and FDA Boulevard.

North of Broadbirch Drive, Plum Orchard Drive ends in a cul-de-sac as does Whitehorn Court south of Prosperity Drive. If redevelopment occurs, the Plan recommends that a new vehicular connection be made between these two cul-de-sacs (see B-6 on Map 12). Also, a new road between proposed B-6 and Cherry Hill Road would improve access and mobility options (see B-7 on Map 12).

The Plan's transportation modeling assumed the following roadway improvements to support the proposed level of development contemplated in the alternative Plan scenario (see Table 3 and Map 12):

Roadway improvements within the Plan boundaries:

- Old Columbia Pike bridge over the Paint Branch rebuilt and open to vehicular traffic
- Grade-separated interchange at US 29 and Stewart Lane
- Grade-separated interchange at US 29 and Industrial Parkway/Tech Road
- Reconstructed interchange at US 29 and New Hampshire Avenue to provide three continuous southbound lanes through the interchange

Roadway improvements outside the Plan boundaries:

- Grade-separated interchange at US 29 and Musgrove Road
- Grade-separated interchange at US 29 and Fairland Road
- Grade-separated interchange at US 29 and Greencastle Road
- Grade-separated interchange at US 29 and Blackburn Road

It is recognized that future social and technological changes may allow for equivalent mobility and capacity to be achieved without building additional grade-separated interchanges. Such mobility and capacity enhancements would need to be considered as alternative solutions to a grade-separated interchange during a transportation project planning study, or the review of a land development project. These enhancements include, without being limited to, increased transit services, implementation of a robust street system that promotes walking and bicycling, managed parking supply, provision of proactive travel demand management services, and operational improvements to at-grade intersections, streets, arterials and highways. Emerging state and federal sustainable community initiatives incorporating climate change and energy concerns may significantly reduce future demand for single occupancy vehicle travel, potentially reducing the need for interchanges.

The Plan recommends the following:

- Extend Industrial Parkway through Site 2/Percontee to connect with FDA Boulevard and designate as a four-lane arterial.
- Reclassify roads in the Life Sciences/FDA Village Center from Industrial Roads to Business District Streets.
- Provide additional vehicular connections in the Life Sciences/FDA Village Center if redevelopment occurs.
- Designate Road Code Urban Areas (see Map 15) to utilize road standards that allow narrower travel lane widths and provide wider sidewalk areas.

Table 3 Street and Highway Classifications

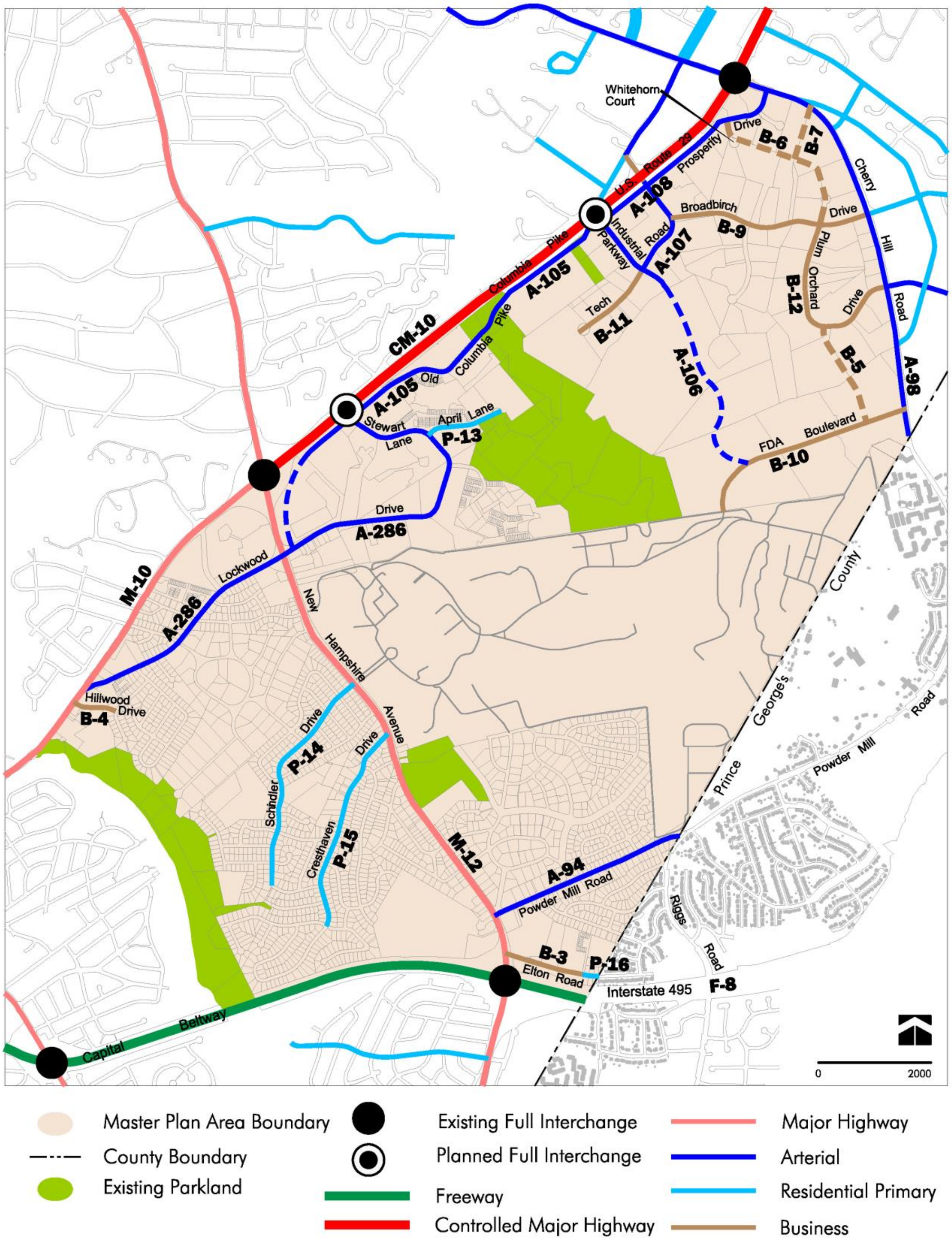
Master Planned Streets	From	To	Master Plan of Highways Number	Minimum Right of Way (Feet)[1]	Number of Through Travel Lanes[2]	Design Standard
Freeways						
Capital Beltway (I-495)	Northwest Branch Stream Valley	Prince George's County Line	F-8	300	8-10 - Divided	N/A
Major Highways						
Columbia Pike (US 29)	East Randolph Road/Cherry Hill Road	Paint Branch Stream Valley	CM-10	100 – 200	6 - Divided	2008.08 modified
	Paint Branch Stream Valley	New Hampshire Avenue (MD 650)	CM-10[3]	200	6 - Divided	2008.08 modified
	New Hampshire Avenue (MD 650)	Northwest Branch Stream Valley	M-10	122	6 - Divided	2008.08 modified
New Hampshire Avenue (MD 650)	Columbia Pike (US 29)	Capital Beltway (I-495)	M-12	120-130[4]	6 - Divided	2008.01 modified
Arterials						
Cherry Hill Road	Columbia Pike (US 29)	Prince George's County Line	A-98	80	4	2004.01
Old Columbia Pike	Lockwood Drive	Industrial Parkway	A-105	80	4	2004.08
Powder Mill Road	New Hampshire Avenue (MD 650)	Prince George's County Line	A-94	80-90	4	2004.03
Lockwood Drive (MD 895)	Columbia Pike (US 29)	400 Feet West of New Hampshire Avenue (MD 650)	A-286	80	2	2004.20
Lockwood Drive	400 Feet West of New Hampshire Avenue (MD 650)	West Side of White Oak Shopping Center	A-286	90	2	2004.04
Lockwood Drive	West Side of White Oak Shopping Center	Lockwood Drive Extended	A-286	90	2	2004.04
Lockwood Drive Extended	Lockwood Drive	Stewart Lane	A-286	90	2	2004.04
Stewart Lane	Lockwood Drive Extended	Columbia Pike (US 29)	A-286	90	2	2004.04
Industrial Parkway and Industrial Parkway Extended	Columbia Pike (US 29)	FDA Blvd.	A-106	100	4	2004.08 modified
Tech Road	Columbia Pike (US 29)	Industrial Parkway	A-107	100	4	2004.08 modified
Prosperity Drive	Industrial Parkway	Cherry Hill Road	A-108	80	4	2004.08 modified
Business District Streets						
Elton Road	New Hampshire Avenue (MD 650)	Avenel Gardens Lane	B-3	80	2	2005.02
Hillwood Drive	Columbia Pike (US 29)	500 Feet East	B-4	80	2	2005.02
Tech Road	Industrial Parkway	1,600 feet Southwest of Industrial Parkway	B-11	100	4	2005.03 modified
FDA Boulevard	Cherry Hill Road	FDA Gate	B-10	100	4	2005.03
Broadbirch Drive	Cherry Hill Road	Tech Road	B-9	100	4	2005.03 Modified
Plum Orchard Drive	Cherry Hill Road	Broadbirch Drive	B-12	80	2	2005.02 Modified

[1] Reflects minimum right-of-way, and may not include lanes for turning, parking, acceleration, deceleration, or other purposes auxiliary to through travel. Rights-of-way are considered to be measured symmetrically based upon roadway right-of-way centerline.
[2] The recommended number of lanes refers to the number of planned through travel lanes for each segment.
[3] Reclassified as a freeway when the grade separated interchanges at Stewart Lane, Industrial Parkway/Tech Road, and Fairland Road/Musgrove Road are completed.
[4] New Hampshire Ave Right-of-Way: 130 feet from Lockwood Drive to Oaklawn Drive; 120-130 feet from Oaklawn Drive to Powder Mill Road; 130 feet from Powder Mill Road to I-495.

Master Planned Streets	From	To	Master Plan of Highways Number	Minimum Right of Way (Feet)[1]	Number of Through Travel Lanes[2]	Design Standard
Proposed Road	Plum Orchard Drive	FDA Boulevard	B-5[5]	70	2	2005.02
Proposed Road	Plum Orchard Court Extended (B-6)	Whitehorn Court	B-6	70	2	2005.02
Proposed Road	Cherry Hill Road	Plum Orchard Court Extended (B-6)	B-7	70	2	2005.02
Primary Residential Streets						
April Lane	Stewart Lane	0.3 Miles East	P-13	70	2	2003.12
Schindler Drive	Crest Park Drive	New Hampshire Avenue	P-14	70	2	2003.12
Cresthaven Drive	Devere Drive	New Hampshire Avenue	P-15	70	2	2003.12
Elton Road	Avenel Gardens Lane	Montgomery-Prince George's County Line	P-16	70	2	2003.12

[5] The portion of Proposed Road B-5 from Plum Orchard Drive to the property line between the Washington Adventist Hospital site and the Percontee property is approved as a private street with a 60-foot minimum right-of-way on Washington Adventist Hospital's Site Plan Number 820080210.

Map 12 Street Network



Transit Network

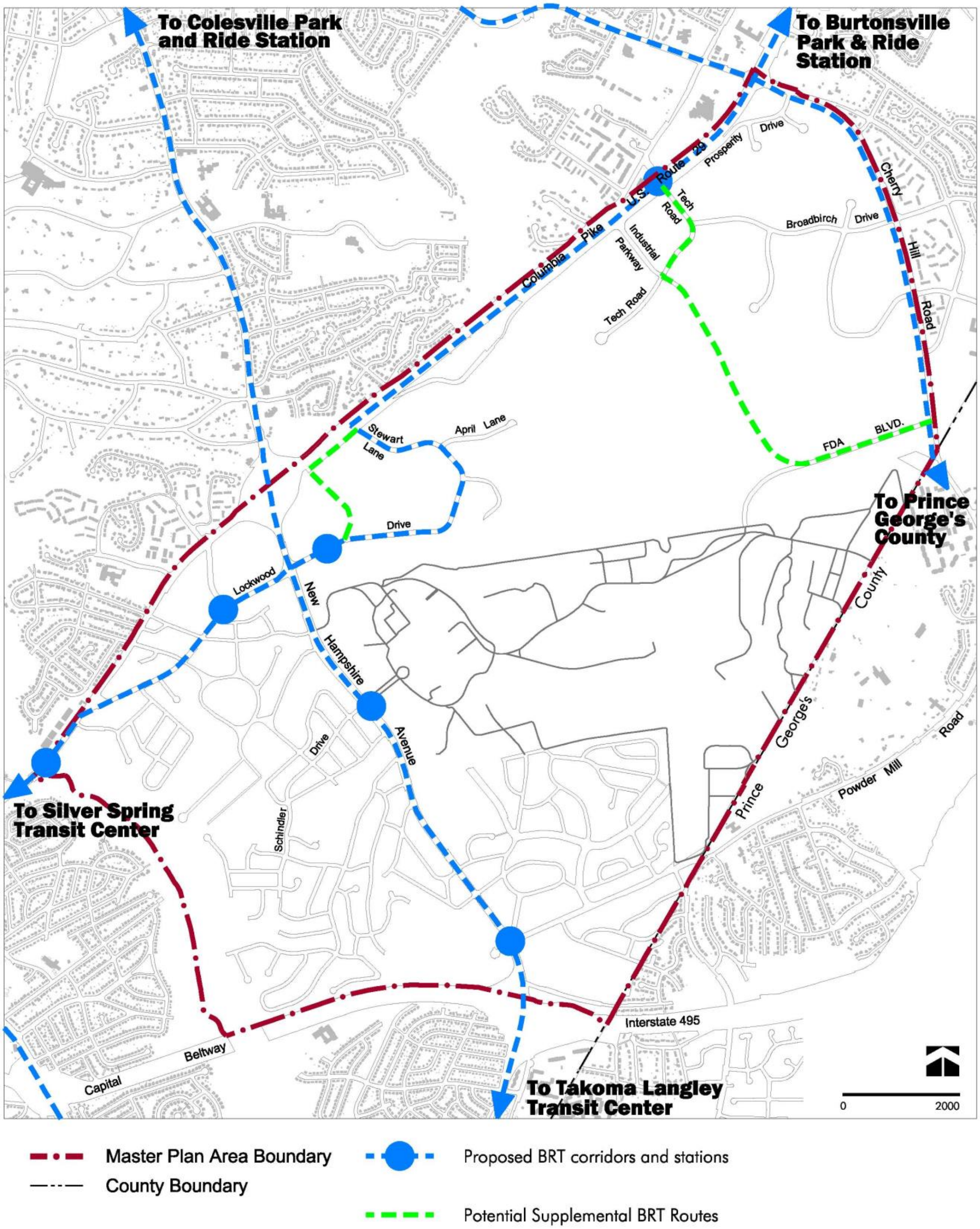
The Plan relies on an efficient and attractive transit network to achieve the vision of transforming this area into a vibrant mixed-use center. The type and level of growth needed to achieve this vision cannot be supported by road improvements alone; there must be a robust transit network that connects the area to the rest of the eastern County and the region's transit and highways.

The overall BRT network to serve the Plan area (see Map 13) generally is described in the *Countywide Transit Corridors Functional Master Plan*. That network consists of the following corridors:

- US 29
- New Hampshire Avenue
- Randolph Road

This Plan includes an extension of the Randolph Road BRT from its current planned terminus at US 29/Randolph Road east along Cherry Hill Road to FDA Boulevard, with the potential to extend further into Prince George's County. It also includes a spur off of the mainline US 29 BRT route into Life Sciences/FDA Village via Tech Road/Industrial Parkway. In both cases, BRT would run in mixed traffic with no dedicated lanes, no added transit lanes, and no widening beyond the otherwise planned right-of-way. One or more stations should be planned for Life Sciences/FDA Village.

Map 13 Bus Rapid Transit Conceptual Alignments



The Bikeway Network and Pedestrian Circulation

It is important that the increased emphasis on transit and connectivity be complemented by bikeway and pedestrian networks that also support the overall goal of reducing trips by single occupant auto drivers. Well-designed, safe, and interconnected bike and pedestrian facilities reinforce the commitment to travel options and visually communicate that the area is transitioning to a place where people can get from one activity to another without necessarily depending upon auto travel for every trip (see Table 4 and Map 14). This Plan designates Bike-Pedestrian Priority Areas (see Map 15).

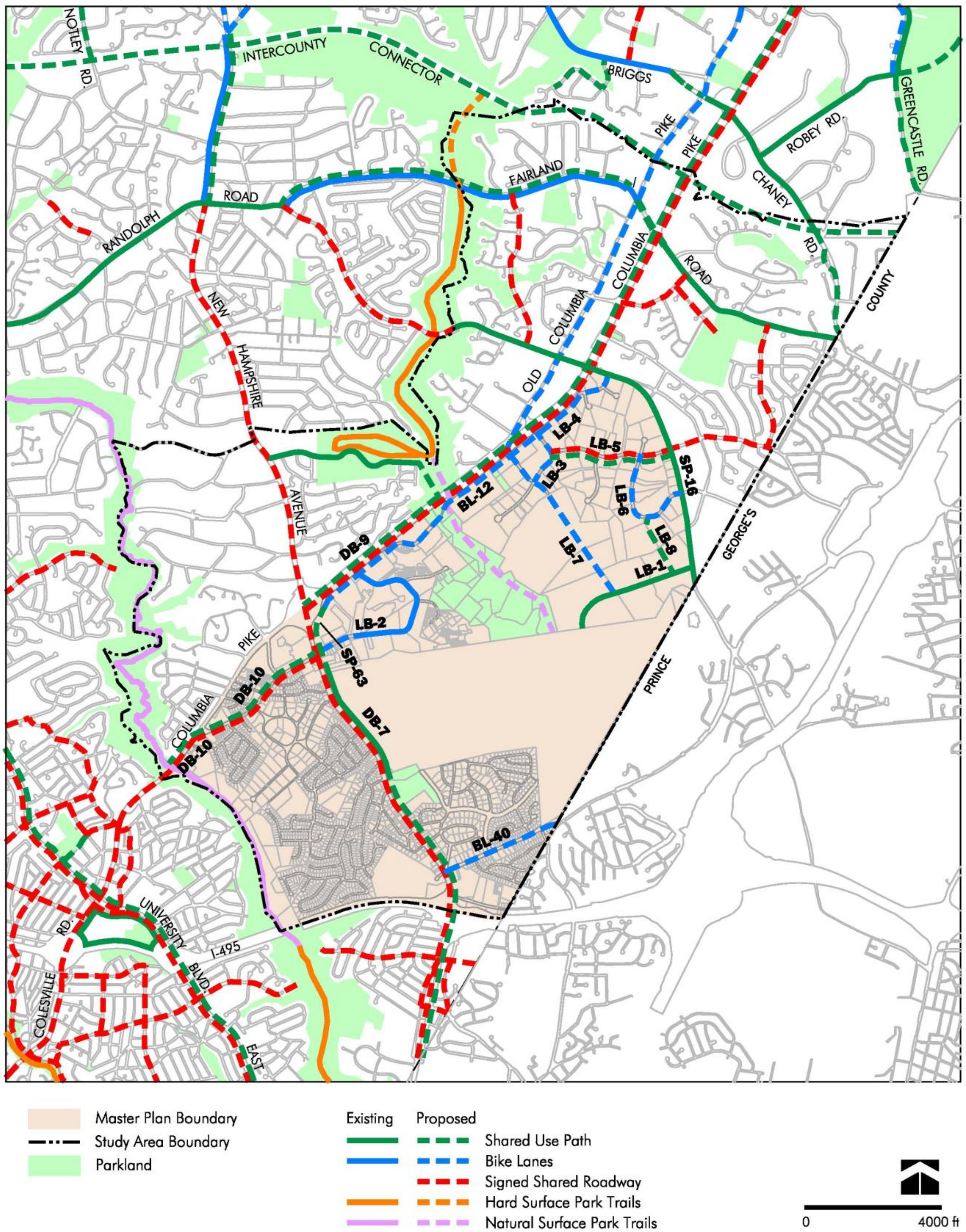
The following new bike routes are recommended:

- Shared Use Path on FDA Boulevard (LB-1)
- Bike Lanes on Prosperity Drive (LB-4)
- Bike Lanes on Powder Mill Road (BL-40)
- Bike Lanes on Plum Orchard Drive (LB-6)
- Bike Lanes on Industrial Parkway (LB-7)
- Bike Lanes on Proposed Road B-5 (LB-8)
- Shared Use Path and Signed Shared Roadway on Broadbirch Drive (LB-5)

Table 4 Bikeway Facilities

Name and Type	From	To	Route Number	Status
Dual Bikeways (DB) Shared Use Path and Signed Shared Roadway				
Columbia Pike (US 29)	Randolph/Cherry Hill Rd	New Hampshire Avenue	DB-9	Proposed
Columbia Pike (US 29)	Northwest Branch	Lockwood Drive	DB-10	Proposed
Lockwood Drive	White Oak Shopping Center	Columbia Pike (US 29)	DB-10	Proposed
New Hampshire Avenue	US 29	Capital Beltway (I-495)	DB-7	Partially Existing
Broadbirch Drive	Tech Road	Cherry Hill Road	LB-5	Proposed
Shared Use Paths (SP)				
Cherry Hill Road	US 29	Prince George’s County	SP-16	Existing
White Oak Shopping Center	US 29	Lockwood Drive	SP-63	Proposed
FDA Boulevard	Cherry Hill Road	FDA Entrance Gate	LB-1	Existing
Bike Lanes (BL)				
Old Columbia Pike	White Oak Shopping Center	Industrial Parkway	BL-12	Proposed
Powder Mill Road	New Hampshire Avenue	Prince George’s County	BL-40	Proposed
Stewart Lane	US 29	Lockwood Drive	LB-2	Existing
Lockwood Drive	New Hampshire Avenue	Stewart Lane	LB-2	Proposed
Tech Road	US 29	Industrial Parkway	LB-3	Proposed
Prosperity Drive	Industrial Parkway	Cherry Hill Road	LB-4	Proposed
Plum Orchard Drive	Cherry Hill Road	Broadbirch Drive	LB-6	Proposed
Industrial Parkway	US 29	FDA Boulevard	LB-7	Proposed
Proposed Road (B-5)	Plum Orchard Drive	FDA Boulevard	LB-8	Proposed

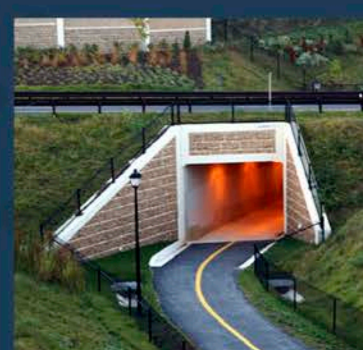
Map 14 Existing and Proposed Bikeways and Trails



Fairland and Briggs Chaney MASTER PLAN

APPROVED AND ADOPTED

DECEMBER
2023



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2. Prioritize public benefit points for MPDUs and two- and three-bedroom units as part of Optional Development Method residential development projects in the Commercial/Residential family of zones (CR) to provide larger and additional affordable housing units within the plan area (see also Section 5.C).
3. Add more housing units and housing types to accommodate a diversity of incomes and households, including families, seniors, and persons with disabilities.
4. Preserve existing naturally occurring affordable housing where possible and strive for no net loss of naturally occurring affordable housing in the event of redevelopment.
5. Explore and leverage partnerships and incentives to preserve and expand housing affordability in the plan area and to enable properties to redevelop as mixed-income communities serving a broad spectrum of incomes.
6. When public properties are redeveloped with a residential component, provide a minimum of 30% MPDUs, with 15% affordable to households earning at the standard MPDU level of 65-70% or less of Area Median Income (AMI) and 15% affordable to households earning at or below 50% of AMI.
7. When feasible, developers of private residential projects should work with nonprofit partners and the Montgomery County Department of Housing and Community Affairs (MCDHCA) to reach deeper levels of affordability by providing affordable housing below 65% of the AMI.
8. In the event of redevelopment, priority should be given to existing eligible residents for the units under market-affordable rental agreements. Property owners should work with the MCDHCA and tenants so that eligible residents receive support and assistance to mitigate the impacts of relocation.
9. Support the development of permanent and temporary supportive housing for unhoused populations in the plan area.
10. New housing developments in the plan area should strive to increase the quality and quantity of housing units that are accessible to people with disabilities and older adults.

3.C TRANSPORTATION

3.C.1. Transportation Goals

This Master Plan envisions a sustainable, equitable, safe, and resilient transportation future. In this vision, priority is placed on the movement of people over personal vehicles, both within and between communities. Ultimately, the Plan envisions the Columbia Pike corridor centered on high-quality transit with safe connectivity for those who walk, bike, and roll; where neighborhoods and major destinations are connected by high-quality trails and paths; and where travel is a safe and enjoyable experience for all.

The county's significant investments in the Flash Bus Rapid Transit (BRT) system along the Colesville Road/Columbia Pike (U.S. 29) corridor, as a complement to the existing local bus network, and advocacy of Vision Zero initiatives signal the prioritization of transit service over single-occupancy vehicles to reduce commute times and traffic volumes on U.S. 29. The Plan's corridor-focused vision seeks to leverage infill development opportunities at prime intersections with BRT stops to enhance neighborhood connectedness and overall resiliency.

Another major aspect of the plan area's transportation vision is a contiguous trail and path network, building from recommendations from the bicycle and pedestrian master plans. Such a network would expand upon existing trails and paths on public parkland, public rights-of-way, and private property, of both natural- and hard-surface construction, through the completion of missing connections. As illustrated in the Concept Framework Plan, an outer and inner loop of continuous pathways, accessible by radial connectors, might consist of natural-surface and paved trails, boardwalks, and side paths. Public amenities could be provided as a part of this network, including resting areas, community gathering and event spaces, linear parks, community gardens, historical and cultural wayfinding, and public art, with connections provided via radial paths to Activity Centers along Columbia Pike (U.S. 29) and Old Columbia Pike. This concept is a continuation of the 1*997 Fairland Master Plan*, which recommended such a pathway along Old Columbia Pike up to MD 198.

The transportation goals for this Plan are:

- Provide realistic solutions for transportation cost-burdened residents beyond driving.
- Make transit services more efficient and frequent to reduce travel times for lower-income and vulnerable populations that are more dependent on public transit within the Master Plan Area.
- Provide amenities for walking and rolling to serve the needs of all ages and abilities, from wheelchair access to bicycle pathways and bicycle racks to areas accessible to skateboarding.
- Address the needs and trip patterns of vulnerable populations and reduce barriers to accessing transit.
- Promote economic development by providing high-quality transit connectivity to major regional job, housing, and Activity Centers.
- Promote sustainable, resilient transportation options.

3.C.2. Street Network Recommendations

1. Apply the ‘Downtown’ and ‘Town Center’ area and street types of the Complete Streets Design Guide (CSDG) to Activity Centers in the plan area, as shown in Map 19.
2. New street connections should be achieved in conjunction with future development projects and/or capital improvement projects to further enhance multimodal circulation throughout the plan area, to achieve the vision of Complete Communities, specifically adding the following connections (see also Map 19 and Table 5):
    a. Castle Boulevard to Ballinger Drive
    b. Aston Manor Drive to Robey Road
    c. Sheffield Manor Drive to Greencastle Road
    d. Robey Road to Automobile Boulevard
    e. Gateshead Manor Way to the southernmost point of Automobile Boulevard
3. New development applications should provide reasonable new public street connections to enhance neighborhood multimodal interconnectivity.
    a. New developments resulting in cul-de-sac and non-through roads are strongly discouraged.
    b. For nonresidential streets, applicants should provide a grid of streets based on the “Maximum Spacing for Protected Crossings” in the Complete Streets Design Guide (CSDG) for each street type. The CSDG provides a targeted framework for evaluating the sufficient spacing needed

for protected intersections based on the classification of the identified road and the area type. For example, protected crossings on neighborhood connectors within a Downtown or Town Center context have a maximum spacing of 600 feet. In contrast, a suburban area type increases the spacing measurement to a high of 1,200 feet.

   c. Block lengths exceeding 300 feet in any dimension are similarly discouraged.

4. Remove from the *Master Plan of Highways and Transitways* proposed grade-separated interchanges on Columbia Pike (U.S. 29), previously recommended by the 1997 *Fairland Master Plan*, at the following intersections (see also Map 19): Greencastle Road, Fairland Road, Musgrove Road, and Tech Road. These existing signalized intersections should remain at-grade and should be improved for greater safety, mobility, and comfort for all transportation users as recommended in this Plan.

   a. The recommendation for a grade-separated interchange at Tech Road/ Industrial Parkway as recommended by the 2014 *White Oak Science Gateway Plan* should be amended to be placed only at Industrial Parkway. This plan recommends that an additional needs and/or facility study be conducted to explore the need for this interchange in light of current policies and priorities. If it is not found to be needed, the *White Oak Science Gateway Plan* and supporting White Oak Local Area Transportation Improvement Program should be amended.

5. Retain the signalized intersection of Musgrove Road and Columbia Pike (U.S. 29). Previous plans and studies have considered eliminating this intersection to reduce the number of road crossings on Columbia Pike (U.S. 29). This Plan affirms the intersection as a valuable access point for the land uses and neighborhoods on either side of Columbia Pike (U.S. 29). This intersection should be improved to protected intersection standards.

6. Configure all existing at-grade intersections on Columbia Pike (U.S. 29) within the plan area to maximize non-automobile mode safety and comfort (see Map 19). Practical solutions may include shrinking the footprint of an intersection through travel-lane narrowing or elimination, removing left turn lanes, providing median pedestrian refuges, and adding protected crossings (see also Recommendation 3.C.3.7).

7. MCDOT and MDOT SHA should seek opportunities to maximize safety, comfort, and rights-of-way for bicycle, pedestrian, and rolling travel on the East Randolph Road/ Cherry Hill Road bridge and the Briggs Chaney Road bridge by converting space dedicated to vehicles to non-vehicular use and buffers, eliminating unprotected pedestrian crossings (e.g., ‘hot rights’), and slowing travel speeds through road design (see also Map 19).

8. Montgomery Planning and MCDOT should study the feasibility of implementing road diets on main arterials within the plan area, such as Briggs Chaney Road, Fairland Road, East Randolph Road, and Old Columbia Pike, to slow speeds, provide wider street buffers, provide dedicated transit lanes, calm traffic, and create new space for safe and comfortable pedestrian and bike movement. If found to be feasible at these or other locations, a determination should be made on how they should be constructed.

9. Montgomery Planning and MCDOT should

study the feasibility of implementing roundabouts in lieu of signalized intersections to reduce the use of turning lanes, improve intersection throughput, increase road safety, and reduce paved surfaces. Suggested intersections for study include Castle Boulevard/Briggs Chaney Road, Robey Road/Briggs Chaney, Robey Road/Greencastle Road, and Briggs Chaney Road/Old Columbia Pike. If found to be feasible at these or other locations, a determination should be made on how they should be constructed.

10. Consolidate, relocate, or remove driveways on Downtown Boulevards, Town Center Boulevards, Boulevards, Area Connectors, and across separated bike lanes. If needed, driveways and service access points should be located on alleys, Downtown Streets, Town Center Streets, and other side streets.

11. Establish electric car charging and car sharing stations that are evenly distributed throughout the plan area. This may be accomplished through public-private partnerships within each Activity Center.

12. Continue to accommodate freight traffic along U.S. 29 in support of the highway's designation as a federal freight corridor.

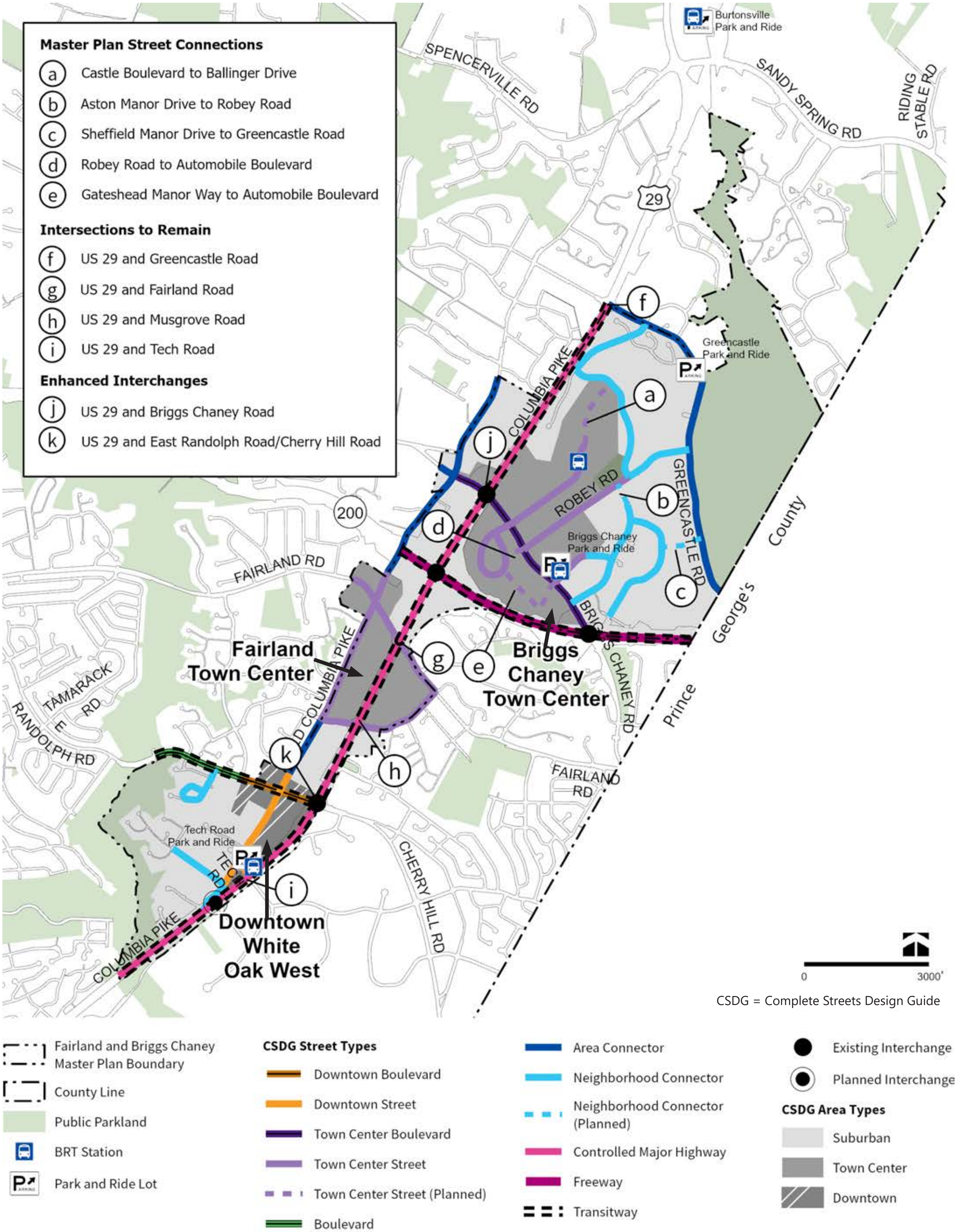
Castle Boulevard at Briggs Chaney Road

TABLE 5: Street Classification and Right-of-Way (ROW) Recommendations (sorted by County Classification)						
Street	From (east or north)	To (west or south)	Minimum Planned ROW (ft)	Existing Lanes	Planned Lanes	Target Speed (mph)
Downtown Boulevard						
East Randolph Road	**Columbia Pike**	**Serpentine Way**	**120**	**4**	**4**	**25**
Downtown Street						
Old Columbia Pike	**150 feet south of Ruxton Road**	**Featherwood Street**	**80**	**2**	**2**	**25**
Tech Road	**Columbia Pike**	**Old Columbia Pike**	**80**	**4**	**4**	**25**
Boulevard						
East Randolph Road	Serpentine Way	Paint Branch stream/western plan boundary	80	5	4	35
Town Center Boulevard						
Briggs Chaney Road	**Intercounty Connector (MD 200)**	**Old Columbia Pike**	**120**	**4**	**4**	**30**
Town Center Street						
Automobile Boulevard	**Briggs Chaney Road**	**Automobile Boulevard**	**80**	**2**	**2**	**25**
Castle Boulevard (proposed) (a)	**Ballinger Drive**	**Fairland Crossing Apartments**	**80**	**2**	**2**	**25**
Castle Boulevard	**Fairland Crossing Apartments**	**Briggs Chaney Road**	**80**	**2**	**2**	**25**
Fairland Road	**Musgrove Road**	**western plan boundary**	**80**	**2**	**2**	**25**
Gateshead Manor Way	**Parkford Manor Drive**	**Briggs Chaney Road**	**70**	**2**	**2**	**25**
Gateshead Manor Way (proposed) (e)	**Briggs Chaney Road**	**Automobile Boulevard**	**70**	**2**	**2**	**25**
Musgrove Road	**Fairland Road**	**Old Columbia Pike**	**80**	**2**	**2**	**25**
Old Columbia Pike	**400 feet south of Edfinn Road**	**Musgrove Road**	**80**	**2**	**2**	**30**
Robey Road	**Ballinger Drive**	**Briggs Chaney Road**	**70**	**2**	**2**	**25**
Robey Road (proposed) (d)	**Briggs Chaney Road**	**Automobile Boulevard**	**70**	**2**	**2**	**25**
Area Connector						
Briggs Chaney Road	Old Columbia Pike	western plan boundary	80	2	2	25
Greencastle Road	Columbia Pike (U.S. 29)	eastern plan boundary	80	2	2	25
Old Columbia Pike	northern plan boundary	400 feet south of Edfinn Road	80	2	2	25
Old Columbia Pike	Musgrove Road	150 feet south of Ruxton Road	80	2	2	25
Neighborhood Connector						
Aston Manor Way (proposed) (b)	**Robey Road**	**Colgate Way**	**70**	**2**	**2**	**25**
Aston Manor Way	Colgate Way	Briggs Chaney Road	70	2	2	25
Ballinger Drive	Wexhall Drive	Robey Road	70	2	2	25
Featherwood Street	Old Columbia (Old U.S. 29)	Loft Lane	70	2	2	25
Gateshead Manor Way	Aston Manor Drive	Parkford Manor Drive	70	2	2	25
new street (proposed) (c)	**Greencastle Road**	**Sheffield Manor Drive**	**70**	**2**	**2**	**25**
Old Columbia Pike	Featherwood Street	Cedar Hill Drive	80	2	2	25
Robey Road	Greencastle Road	Ballinger Drive	70	2	2	25
Sheffield Manor Drive	Aston Manor Drive	Guilford Run Lane	70	2	2	25
Stratford Garden Drive	East Randolph Road	Stratford Garden Drive	70	2	2	25
Wexhall Road	Greencastle Road	Ballinger Drive	70	2	2	25
Controlled Major Highway						
Columbia Pike (U.S. 29)	Greencastle Road	Paint Branch stream/southern plan boundary	200	6	6 + 2 Transit Lanes	45-55
Freeway						
Intercounty Connector (MD 200)	eastern plan boundary	western plan boundary	300	6	6	55<

Notes:

1. On Downtown Streets, Town Center Streets, and Neighborhood Connectors, safety and utility for pedestrians and bicyclists will have the highest priority when determining space allocation within the right-of-way. Street trees should be allocated adequate space in which to thrive and expand the tree canopy.
2. Minimum planned rights-of-way do not include lanes for turning, parking, acceleration, deceleration, or other purposes auxiliary to through travel. Additional rights-of-way may also be needed to accommodate spot master planned and required pedestrian, bicycle and transit facilities, including protected intersections, the envelopes of transit stations, pedestrian crossing refuges, and footprints associated with grade separation. Rights-of-way are considered by default to be measured symmetrically based upon right-of-way centerline.
3. The number of existing and planned through lanes for each segment, not including lanes for turning, parking, acceleration, deceleration, or other purposes auxiliary to through travel.
4. **Bold** rows are recommended amendments to the Complete Streets Design Guide street type classifications for a given street segment.
5. Letters in parentheses next to proposed streets refer to letter call-outs on Map 19: Existing and Planned Roadways.

MAP 19: EXISTING AND PLANNED ROADWAYS



3.C.3. Bicycle and Pedestrian Network Recommendations

1. Establish a continuous trail and path network, as illustrated in the Concept Framework Plan (Section 2.F) and Map 23, connecting Activity Centers, neighborhoods, parks, open spaces, community facilities, and bus stops within and beyond the plan area.
    a. Depending on location and property ownership, responsible parties may include Montgomery County Department of Transportation, Montgomery Parks, and Homeowners' Associations and other private property owners. Completion of the network may be through capital expenditures in the public right-of-way, public park improvement projects, grants or funding to private property owners, and/or conditions of approval for applicable private development (see also Section 3.E.2).
2. Expand the Briggs Chaney Road bridge over Columbia Pike (U.S. 29) to include a wide, linear pathway and/or public plaza, with small-scale retail, entertainment, shade trees and landscaping, and other activated uses to improve the safety, comfort, and interest of the Briggs Chaney Road crossing over Columbia Pike. This project should be considered for federal planning and construction grants to support reconnecting the communities on either side of U.S. 29 for greater safety, comfort, and activation of the streetscape for all travel modes.
    a. As an interim measure, reconfiguration of the existing road facilities at the bridge should be explored by MCDOT and Montgomery Planning and implemented to create a safer and more comfortable bridge crossing experience in the heart of the plan area.

I-95 bridge with trees and landscaping in Philadelphia, PA

3. Establish publicly accessible trail connections through HOA common area properties, other private property, public parkland, and road rights-of-way to connect neighborhoods, Activity Centers, public parks, and recreation centers. Possible methods might include through public easements, shared access agreements, and wayfinding signage.
4. Provide sidewalks or sidepaths along all public roads, as required by Montgomery County Code Chapter 49 and/or the Complete Streets Design Guide. Achieve a Pedestrian Level of Comfort score of at least 2 on all roads within the plan area.
5. Complete the Breezeway Network along U.S. 29 and MD 200 within the plan area, as recommended by the *Bicycle Master Plan* (see Map 21). These breezeways would provide a continuous 'bike highway' connecting the Burtonsville commercial center with the Viva White Oak development and points south, as well as providing an important east-west link for plan area communities to central Montgomery County and Prince George's County.
6. Micro-mobility is expected to grow within the plan area for travel modes such as bicycles, scooters, electric-assist bicycles, and electric

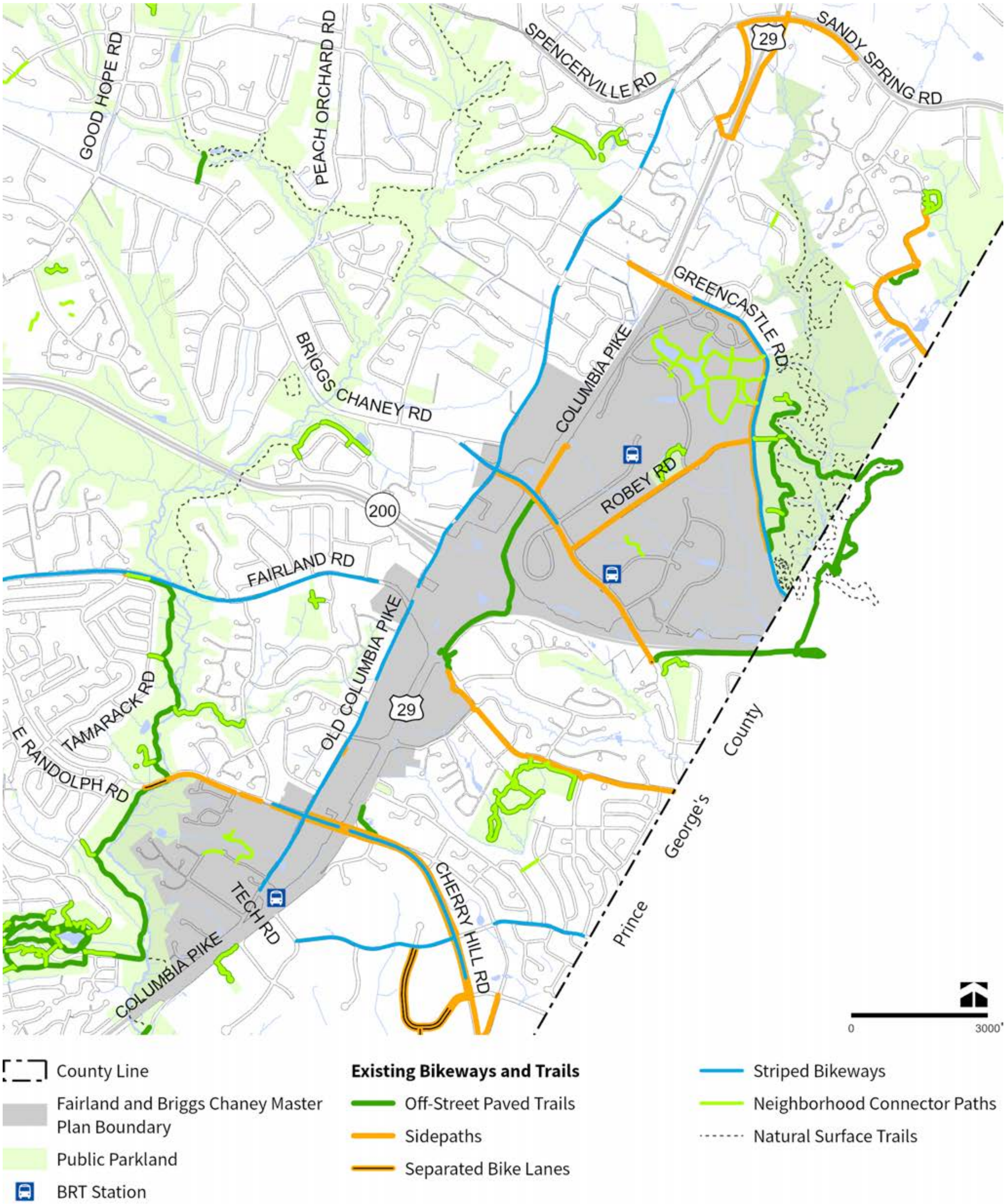
scooters. More micro-mobility parking corrals should be provided so they are widely and conveniently available and riders learn to see them as an easy way to park the devices safely, conveniently, and in a way that does not hinder pedestrian access. Corrals should be built in accordance with MCDOT location and design specifications, including concrete pads, u-racks, scooter racks, lighting, and charging capability for both e-scooters and e-bikes. Improve the distribution of secure short-term bicycle parking facilities at existing public and commercial facilities, consistent with requirements outlined in Section 6.2.4C of the Montgomery County Zoning Ordinance. While new development projects are required to adhere to the code's bicycle parking calculations, current facilities lack sufficient bicycle parking. Providing safe bicycle facilities encourages cycling as a viable transportation option for all.

7. Improve major intersections to protected intersection standards. Priority should be given to intersections with a history of injuries and fatalities to pedestrians and cyclists and along high-injury segments of roadways. These include but are not limited to: Tech Road and U.S. 29, Fairland Road and U.S. 29, Fairland Road and Old Columbia Pike, East Randolph Road and Old Columbia Pike, Greencastle Road and U.S. 29, and all intersections on Briggs Chaney Road from Old Columbia Pike to Aston Manor Drive (see also Recommendation 3.C.2.6).

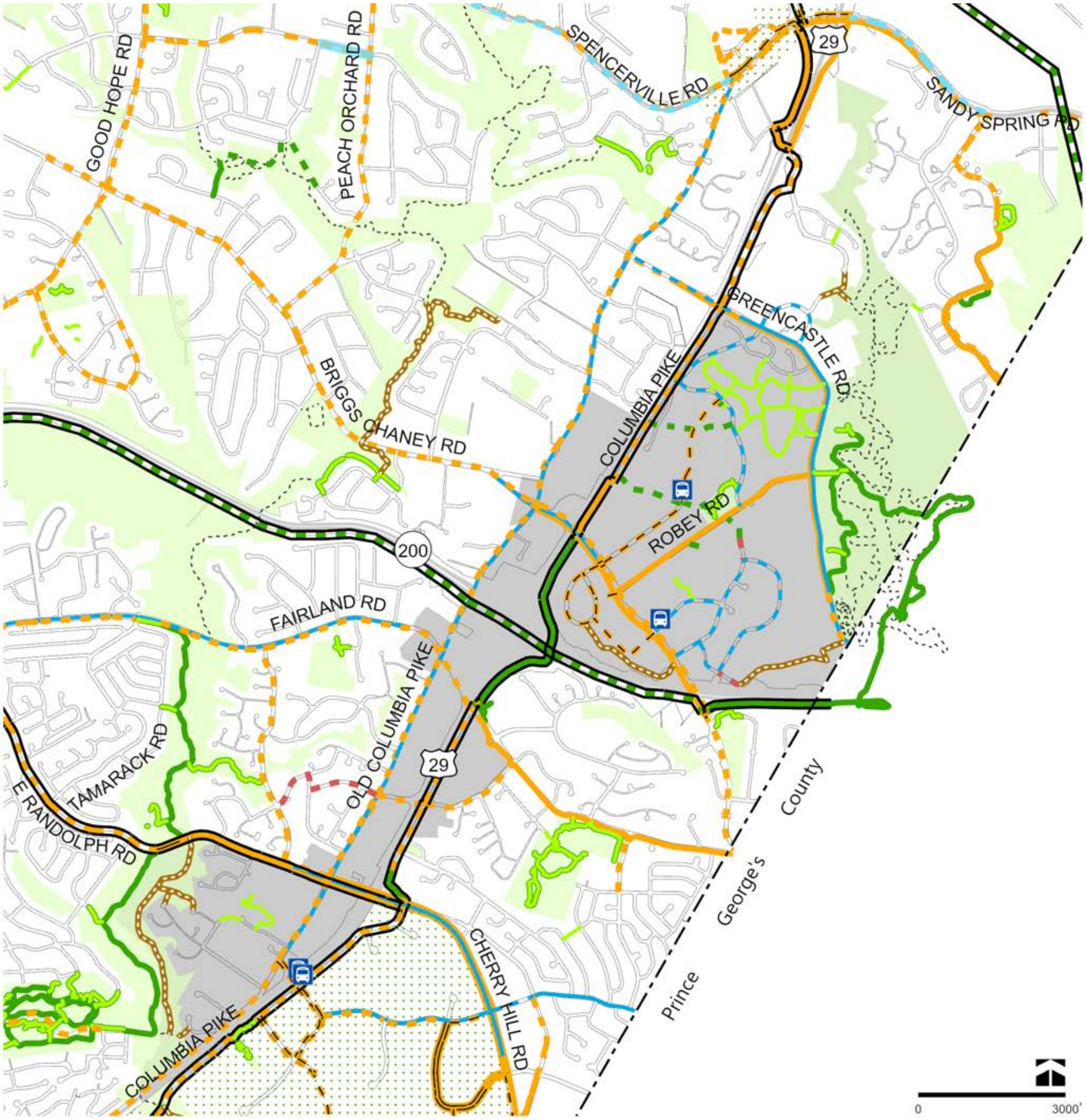
8. Advance investment in Bicycle and Pedestrian Priority Areas (BiPPAs) and corridors in the Master Plan Area, particularly along the Briggs Chaney Road 'main street' corridor to prioritize funding and construction that enhances pedestrian and bicyclist traffic, safety, and comfort with improved safe bicyclist and pedestrian access to adjacent neighborhoods (see also Section 4.B.2).

9. Add new pedestrian and bicycle connections across U.S. 29 to improve connectivity between each side of U.S. 29. Each connection should be designed to be safe, convenient, comfortable, and accessible and to fit contextually with land uses along each approach to the connection. Connections should ideally be implemented as part of private development.

MAP 20: EXISTING BIKEWAYS



MAP 21: EXISTING AND PLANNED BIKEWAYS



- County Line
- Fairland and Briggs Chaney Master Plan Boundary
- Public Parkland
- BRT Station
- Breezeways (existing and planned)
- Bicycle Pedestrian Priority Areas (BiPPA)

Existing Bikeways and Trails
- Off-Street Paved Trails
- Sidepaths
- Separated Bike Lanes
- Striped Bikeways
- Neighborhood Connector Paths
- Natural Surface Trails

Planned Bikeways and Trails
- Off-Street Paved Trails (proposed)
- Sidepaths (proposed)
- Separated Bike Lanes (proposed)
- Striped Bikeways (proposed)
- Bikeable Shoulders (proposed)
- Shared Roads (proposed)
- Natural Surface Trails (proposed)

TABLE 6: Bicycle Facility Recommendations					
Street	From (east or north)	To (west or south)	Facility Type	Bikeway Type	Tier
Aston Manor Drive (1)	northern end of street (circle)	Sheffield Manor Road	Shared Road	Neighborhood Greenway	5
Aston Manor Drive (2)	Sheffield Manor Drive	Briggs Chaney Road	Striped Bikeway	Conventional Bike Lane (both sides)	5
Automobile Boulevard	Briggs Chaney Road	Automobile Boulevard	Separated Bikeway	Separated Bike Lane (both sides)	4
Ballinger Drive	Wexhall Drive	Robey Road	Striped Bikeway	Buffered Lane (both sides)	5
Briggs Chaney Road	Eastern Plan Boundary	Western Plan Boundary	Separated Bikeway	Sidepath (both sides)	3
Castle Boulevard	Ballinger Drive	Briggs Chaney Road	Separated Bikeway	Separated Bike Lane (both sides)	3
Columbia Pike (U.S. 29) (1)	Northern Plan Boundary	Briggs Chaney Road	Separated Bikeway	Sidepath (Breezeway) (east side)	5
Columbia Pike (U.S. 29) (2)	Briggs Chaney Road	Fairland Road	Trail	Off-Street Trail (Breezeway) (east side)	4
Columbia Pike (U.S. 29) (3)	Fairland Road	Deer Park Drive	Separated Bikeway	Sidepath (Breezeway) (east side)	5
East Randolph Road (1)	Columbia Pike (U.S. 29)	Serpentine Way	Separated Bikeway	Separated Bike Lane (both sides) (Breezeway south side)	3
East Randolph Road (2)	Serpentine Way	Western Plan Boundary	Separated Bikeway	Sidepath (both sides) (Breezeway south side)	5
Fairland Road	Musgrove Road	Western Plan Boundary	Separated Bikeway	Sidepath (both sides)	4
Gateshead Manor Drive	Aston Manor Drive	Automobile Boulevard	Striped Bikeway	Buffered Bike Lane	5
Greencastle Road	Eastern Plan Boundary	Old Columbia Pike	Striped Bikeway	Conventional Bike Lane (both sides); Sidepath (south side)	3
Guilford Run Lane (1)	Sheffield Manor Drive	Aston Manor Drive	Striped Bikeway	Conventional Bike Lane	5
Guilford Run Lane (2)	eastern end of street	Sheffield Manor Drive	Shared Road	Neighborhood Greenway	5
Intercounty Connector (MD 200)	Eastern Plan Boundary	Western Plan Boundary	Trail	Off-Street Trail (Breezeway) (South Side)	3
Musgrove Road	Fairland Road	Old Columbia Pike	Separated Bikeway	Sidepath	5
Old Columbia Pike (east side)	Northern Plan Boundary	Tech Road	Striped Bikeway; Separated Bikeway	Buffered Bike Lane (both sides); Sidepath (west side)	4
Robey Road	Greencastle Road	Automobile Boulevard	Separated Bikeway	Sidepath (east side)	5
Sheffield Manor Drive	Aston Manor Drive	Guilford Run Lane	Striped Bikeway	Buffered Bike Lane (both sides)	5
Tech Road	Eastern Plan Boundary	Old Columbia Pike	Separated Bikeway	Separated Bike Lane (both sides)	1
Wexhall Drive	Greencastle Road	Ballinger Drive	Striped Bikeway	Buffered Bike Lane (both sides)	5
Park Trails and Neighborhood Connectors (the facilities below may be on public or private property, or a mix of both)					
unnamed trail (Paint Branch Stream Valley Park)	East Randolph Road	Old 29er Trail	Trail	Natural Surface Trail	n/a
unnamed path (Fairland Recreational Park)	Blackburn Road	Wexhall Drive	Trail	Natural Surface Trail	n/a
unnamed path	Sir Thomas Drive	Robey Road	Trail	Neighborhood Connector	n/a
unnamed path	Robey Road	Aston Manor Drive	Trail	Neighborhood Connector	n/a
unnamed path	Edgewood Neighborhood Park	Columbia Pike (U.S. 29) sidepath	Trail	Neighborhood Connector	n/a
unnamed path	Ballinger Drive	Columbia Pike (U.S. 29) sidepath	Trail	Neighborhood Connector	n/a
unnamed path	Greencastle Road	Guilford Run Lane	Trail	Natural Surface Trail	n/a
unnamed path	Briggs Chaney Road	Automobile Circle	Trail	Natural Surface Trail	n/a
unnamed path	Cedar Hill Drive	Old 29er Trail	Trail	Natural Surface Trail	n/a

Notes:

1. Facility and Bikeway Types are recommended for both sides of a street, unless otherwise indicated.
2. Numbered streets represent a section of the street within the plan area.
3. Tier represents the level of prioritization for completion of a recommended bikeway. Tier 1 are bikeways in the following Bicycle and Pedestrian Priority Areas (BiPPAs): Downtown Bethesda, Downtown Silver Spring, Friendship Heights, Life Sciences Center, Wheaton, White Flint, and White Oak, as well as neighborhood greenways leading into these areas; Tier 2 are bikeways in all other BiPPAs; Tier 3 are remaining neighborhood greenways and the highest demand bikeways outside of BiPPAs; Tier 4 are all remaining bikeways that are anticipated to be completed in the life of the Plan; Tier 5 are bikeways that are unlikely to be constructed in the life of the Plan.

3.C.4. Transit Network Recommendations

1. MCDOT and MDOT SHA should jointly produce a comprehensive corridor study and plan that considers the following recommended solutions to realize the Plan's vision for a 'transit-first' Columbia Pike (U.S. 29) north of Tech Road:

   a. MCDOT and MDOT SHA, as transportation implementation agencies, and Montgomery Planning, through the review of development applications, should prioritize transit movement on U.S. 29 over single-occupancy vehicles.

   b. Build high-quality, dedicated Bus Rapid Transit (BRT) lanes on U.S. 29 and Briggs Chaney Road through the master plan corridor and connect to transitways beyond. As studies are conducted for future phases of the corridor's Flash BRT system, median-running dedicated transit lanes should be prioritized in order to match the expected future BRT lane configuration south of Tech Road.

   c. Complete high-quality, frequent BRT service on East Randolph Road, connecting to rail stations, BRT transitways, and local bus routes. Determination on the preferred location for a future Randolph Road BRT station interchange with the U.S. 29 Flash BRT service, either at the Tech Road intersection with U.S. 29 or the East Randolph Road/Cherry Hill Road U.S. 29 overpass, should be made at the time of its planning and design. Dedicated BRT lanes should be strongly considered for the future Randolph Road BRT route.

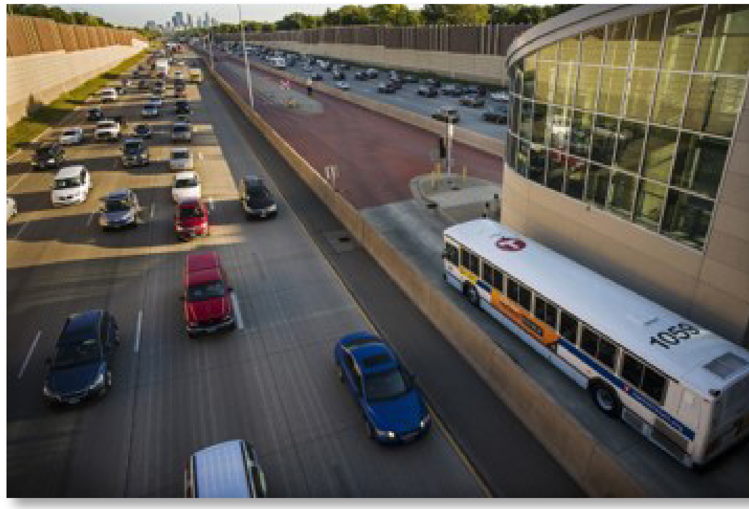
   d. MDOT SHA and Howard County Office of Transportation should build the extension of the U.S. 29 Flash BRT service north from Burtonsville to Columbia, MD and greater Howard County, in coordination with MCDOT and Montgomery Planning.

   e. Expand on the BRT stations recommendations of the *Master Plan of Highways and Transitways* to establish additional or enhance existing BRT stations at key Columbia Pike intersections: Tech Road (existing), East Randolph Road/Cherry Hill Road (proposed), Fairland Road (proposed), Briggs Chaney Road (proposed), and Greencastle Road (proposed). Proposed new BRT stations at U.S. 29 would provide access to BRT routes running in mixed or dedicated lanes on U.S. 29 without the need for bus vehicles to divert from the highway. Facility feasibility studies should be conducted to determine the phasing of implementation to ensure that land use supports the construction of proposed new stations. Major new developments within a quarter-mile of a proposed new station location producing 200 or more peak-hour person trips should conduct a feasibility study to determine if stations are warranted (see Map 22).

   f. Enhance future station designs or modify existing BRT stations to provide greater all-weather protection, access, and comfort.

   g. MDOT SHA should explore tools and policies that reduce the demand for single-occupancy vehicle travel, such as incentive programs for the use of public transit, carpooling, or non-automobile travel modes, establishing high-occupancy vehicle lanes in the place of existing travel lanes on U.S. 29 and distance- or congestion-based pricing programs.

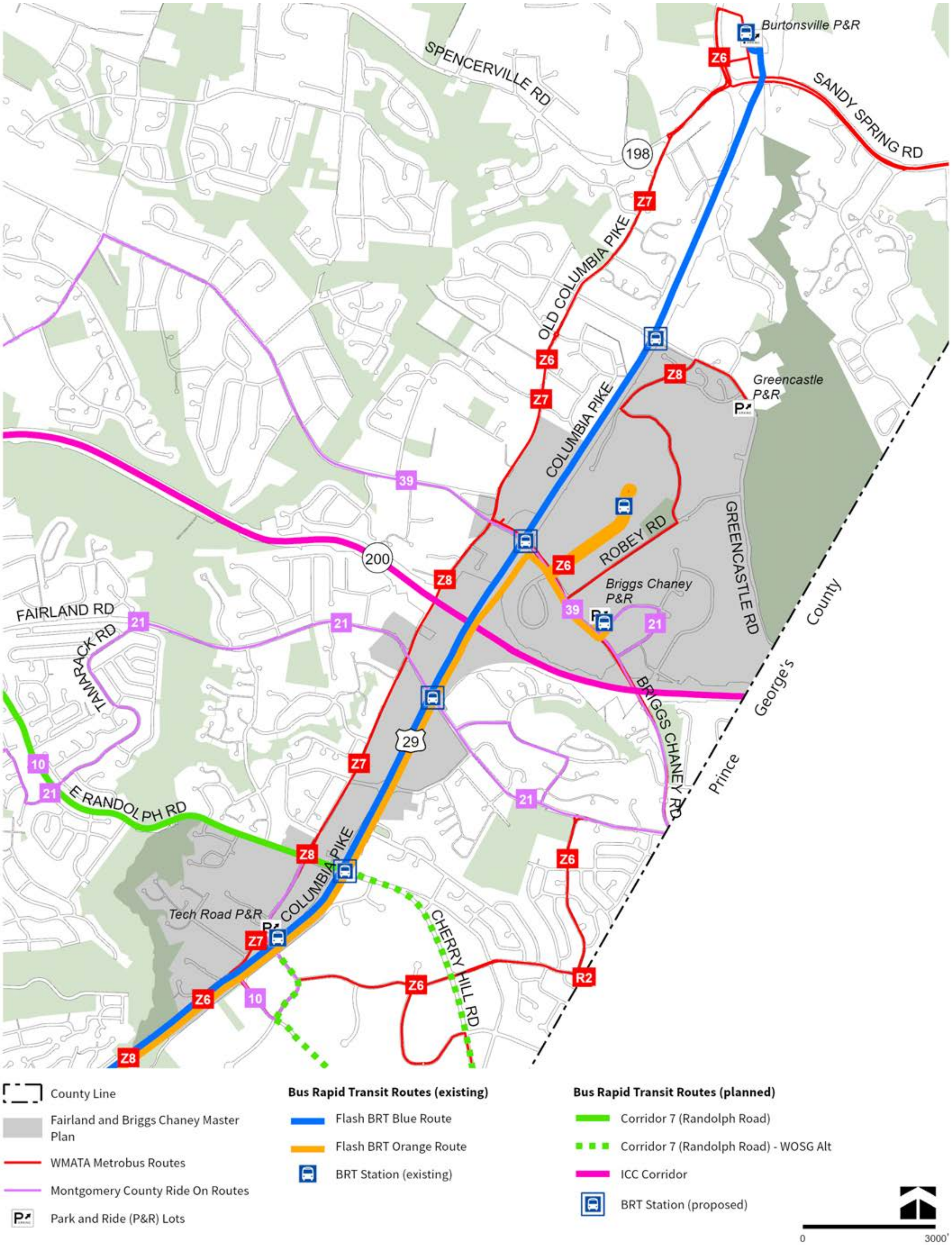
2. MCDOT should study re-routing the U.S. 29 Flash BRT service along Robey Road and Greencastle Road to replace the existing alignment on Castle Boulevard. In addition to the existing BRT station at the East County Community Recreation Center, new BRT stations should be considered along this route at or near the intersections of Robey Road/Ballinger Road and Robey Road/Greencastle Road, and at the Greencastle Road Park and Ride lot.
3. Enhance existing BRT stations and park-and-ride facilities as "mobility hubs" for multi-modal, last-mile connectivity options to transform and contribute to the character of the surrounding neighborhood, including public artworks, interpretative signage, adequate seating, electric vehicle charging stations at park-and-ride lots, bicycle storage, green space, shade, and solar panels.
4. All BRT stations should include short- and long-term bike parking to meet parking goals set by the *Bicycle Master Plan*, with a minimum of 20 long-term and 6 short-term spaces.



Bus station in a highway median in Minneapolis, MN

Median Bus Rapid Transit station in Richmond, VA

MAP 22: EXISTING AND PLANNED TRANSIT



3.C.5. Transportation Analysis

In the fall of 2020, the County Council adopted a new Growth and Infrastructure Policy (GIP) that focuses on two primary tasks:

- Identify opportunities to incorporate the county's Vision Zero travel safety objectives into the Local Area Transportation Review process, and
- Reintroduce a policy area-level-review to evaluate a master plan's balance between transportation capacity and land-use travel demand.

The policy area-level metrics to evaluate the transportation adequacy of master plans are composed of five transportation system performance measures. These metrics and how they are derived and interpreted are briefly described below. For the purposes of this Plan, these metrics were calculated for the Fairland/Colesville Policy Area, in which the plan area is situated.

Accessibility is defined as the number of jobs that can be reached in the Washington, D.C. metropolitan region within 45 minutes by auto and by transit at the time of buildout. Adequacy is achieved if the master plan improves average accessibility, based on a Traffic Analysis Zone-level, population-weighted average, for the plan area relative to the currently adopted master plan.

Travel time is defined as the average time by auto and by transit, considering all trip purposes during all times on a weekday at time of buildout, reported as vehicle hours traveled (VHT) and person hours traveled (PHT), respectively. Adequacy is achieved if the master plan improves average travel time for the plan area relative to the currently adopted master plan.

Vehicle miles traveled (VMT) per capita is defined as the sum of the weekday VMT from trips that both start and end within the plan area and half the weekday VMT from trips that either start or end within the plan area. Adequacy is achieved if the Plan improves (i.e., reduces) average VMT per capita for the plan area relative to the currently adopted plan.

Non-auto-driver mode share (NADMS) is defined as the non-auto-driver mode share for the journey to work in the plan area. This is the meaning of the measure in current master plans, the 2020–2024 GIP, and the goals used by the county regulating transportation demand management. Adequacy is achieved if the Plan confirms the relevant pre-established journey-to-work NADMS goal for the plan area.

Low-stress bicycle accessibility is defined as the percentage of potential bicycle trips that can be accommodated on a low-stress (LTS-2) bikeway network. Adequacy is achieved if the Plan meets or improves the average for the percentage for the county at the time of buildout.

Transportation System Performance Metrics

The transportation performance metrics pertaining to job accessibility for the year 2045 adopted plan scenario (i.e., the 1997 *Fairland Master Plan*, updated with current zoning district) and the year 2045 proposed plan scenario (this Master Plan) indicates an approximate 6% decrease in accessibility by auto, yet an increase in job accessibility by transit of about 14%. This divergence is due in part to a shift in projected land-use development within the plan area from employment-oriented development to a more residential-heavy mix of development because of a change in recommended zoning districts in the Plan. Recommendations for enhanced transit service, through dedicated transit lanes and additional stations on U.S. 29, explain much of the increase in projected job accessibility by transit.

The transportation performance metrics pertaining to travel time (VHT and PHT) and VMT per capita analyzed for the year 2045 adopted plan scenario (i.e., the 1997 *Fairland Master Plan* updated with current zoning district) and the year 2045 proposed plan scenario (this Master Plan) each show a slight improvement, with an approximate 4% decrease in VHT and PHT and a nearly 9% decrease in VMT. These projections indicate that this Master Plan achieves transportation adequacy for these metrics at buildout.

The projected change in NADMS from the currently adopted plan to the proposed plan indicate a policy area-level rise in non-automobile mode share by about 4%, to a projected 29% by 2045. This estimate is nearly consistent with the recommended 30% NADMS goal of the proposed plan, a difference that is expected to be resolved by even a slight shift in travel behavior rather than policy-based solutions. With additional effort to encourage travel within the policy area, this Master Plan is expected to be able to achieve adequacy for this metric at buildout.

As previously stated, the low-stress bicycle accessibility metric is derived from the application of Montgomery Planning's Bicycle Travel Demand Model. Using this tool, this Plan's recommendations are projected to increase year 2045 countywide connectivity from 82.7% to 83.0%. Low-stress bicycle accessibility in the Fairland/Colesville Policy Area is projected to increase from 92% to 95%. These results indicate that this Plan achieves adequacy for this metric at buildout.

3.C.6. Travel Demand Management

1. This Plan recommends a 30% Non-Auto Driver Mode Share (NADMS) for all new development, residential and commercial, in all designated town center and downtown areas of the Plan based on the area's future transit service and connectivity opportunities. The NADMS goal for suburban designated areas is 25%.

3.D COMMUNITY HEALTH AND CULTURE

3.D.1. Community Health and Culture Goals

This Master Plan envisions greater systems of accountability that minimize disparities and enhance the well-being of all residents. Networks are sustained and considered successful when public resources are leveraged with working partnerships that reinforce social resilience and foster healthy community development.

The goals of the Plan's community health and culture recommendations apply an equity lens to the living conditions and local economy (e.g., education, business development, employment, housing, and income) of the people who live, work, shop, play, and visit the plan area, especially in the aftermath of a pandemic.

Goals of the Plan's community health and culture recommendations are to:

- Develop Sustainable and Supportive Healthy Food Systems—space for local food production, manufacturing, distributing, community-scale composting, public training facilities, drinking fountains, wayfinding, signage, solar panels, and greenhouses.
- Increase Access to Resources and Community Connectedness—identifiable and accessible Activity Centers, public facilities that strengthen a sense of community, cultural resources, community landmarks, public artworks, outdoor seating, community engagement, and multicultural/multigenerational programming.
- Support Job Growth and Business Development—workforce development, financing, increased awareness and support for local businesses and artists, training opportunities for entrepreneurs, job growth, and increased opportunities to earn higher wages.

Master Plan of Highways and Transitways Functional Classification - Effective 02/07/2023 (Excerpt)

Name	From Location	To Location	Classification	Master Plan	Existing Lanes	Planned Lanes	ROW (Feet)	Target Speed	Designation
Oak Hill Rd	Spencerville Rd	end-of-road	Rustic Road	Rustic Roads / Cloverly	2	2	70		R-64
Oaklyn Dr	Persimmon Tree Rd	Falls Rd	Area Connector	Potomac	2	2	80		A-39
Oakmont Ave	Oakmont St	Washington Grove Ave	Boulevard	Shady Grove Sector Plan	N/A	4	80		A-255
Oakmont Ave	Shady Grove Rd	Oakmont St	Area Connector	Shady Grove Sector Plan	2	2	80		A-255
Oakmont Ave	E Diamond Ave	Plan Boundary	Area Connector	Great Seneca Science Corridor	N/A	2	80	30	A-255
Oakview Dr	New Hampshire Ave	Northwest Branch Park	Neighborhood Connector	East Silver Spring	2	2	60		P-6
Observation Dr	Goldenrod Ln	Middlebrook Rd	Boulevard	Countywide Transit Corridors	4	4 + 0T	80	25	A-19
Observation Dr	Woodcutter Dr	Little Seneca Creek	Boulevard	Corridor Forward	N/A	4D + 2T	150	35	A-19
Observation Dr	Dorsey Mill Rd	Germantown Rd	Boulevard	Corridor Forward	4D	4D + 2T	150	35	A-19
Observation Dr	Woodcutter Dr	Dorsey Mill Rd	Boulevard	Corridor Forward	4D	4D + 2T	150	35	A-19
Observation Dr	Germantown Rd	Goldenrod Ln	Boulevard	Germantown Employment Area Sector Plan (2009)	N/A	4	80	25	A-19
Observation Dr	Dorsey Mill Rd	Germantown Rd	Boulevard	Corridor Forward	4D	4D + 2T	150	35	A-19
Observation Dr Connector (Planned)	Goldenrod Ln	Observation Dr	Town Center Street	2018 MPOHT Technical Update	0	2	80		B-26
Observation Dr Extended	Little Seneca Creek	West Old Baltimore Rd	Boulevard	Corridor Forward	N/A	4D + 2T	150		A-19
Observation Dr Extended	West Old Baltimore Rd	Roberts Tavern Dr	Boulevard	Corridor Forward	N/A	4D + 2T	150		A-19
Observation Dr Extended	Roberts Tavern Dr	Stringtown Rd	Boulevard	Corridor Forward	2	4D + 2T	150		A-19
Observation Dr Extended	Stringtown Rd	Clarksburg Rd	Town Center Boulevard	Corridor Forward	N/A	4D	150	25	A-251
Observation Dr Extended	80' SE of Stringtown Rd	Stringtown Rd	Town Center Boulevard	Ten Mile Creek Area Limited Amendment (2014)	2	4D + 2T	150		A-251
Observation Dr Extended (1994 alignment)	Clarksburg Rd	Frederick Rd (MD 355)	Town Center Street	Corridor Forward	N/A	2	130	25	A-251
Observation Dr Extended (2014 alignment)	Clarksburg Rd	Frederick Rd (MD 355)	Town Center Street	Corridor Forward	N/A	2	130	25	A-251
Odendhal Ave	Montgomery Village Ave	Oden'Hal Ave		Montgomery Village Master Plan	4	4	100		A-18
O'fallon St	Shannandale Dr	Cherry Hill Rd	Neighborhood Connector	Fairland	2	2	70		P-37
Old Baltimore Rd	Georgia Ave	Olney-Laytonsville Rd	Area Connector	Olney	2	2	70		A-312
Old Baltimore Rd	Gold Mine Rd	Olney-Laytonsville Rd	Neighborhood Connector	Olney	2	2	70		P-2
Old Bucklodge Ln	Bucklodge Rd	White Ground Rd	Rustic Road	Rustic Roads	2	2	70		R-30
Old Clarksburg Rd	Gosnell Farm Rd	Whelan Ln	Industrial Street	2018 MPOHT Technical Update	2	2	60	25	I-2
Old Club Rd	Farmland Dr	Tilden Woods Park	Neighborhood Connector	North Bethesda/Garrett Park	2	2	70		P-10
Old Columbia Pike	Approx. 1000' west of Stewart Ln	Industrial Pkwy	Town Center Boulevard	2018 MPOHT Technical Update	4	4	80	25	A-105
Old Columbia Pike	Spencerville Rd (MD 198)	Tolson Pl	Neighborhood Connector	Burtonsville Crossroads	2	2	70	25	P-25C
Old Columbia Pike	Approx. 1000' west of Stewart Ln	Industrial Pkwy	Town Center Boulevard	2018 MPOHT Technical Update	4	4	80	25	A-105
Old Columbia Pike	Tech Rd	East Randolph Rd	Boulevard	Fairland	4	4	80		A-99
Old Columbia Pike	Industrial Pkwy	Tech Rd	Neighborhood Connector	Fairland	4	4	80		P-25a
Old Columbia Pike	Lockwood Dr	Approx. 1000' west of Stewart Ln	Town Center Boulevard	2018 MPOHT Technical Update	4	4	80	25	A-105
Old Columbia Pike	Briggs Chaney Rd	Spencerville Rd	Area Connector	2018 MPOHT Technical Update	2	2	70		MA-29
Old Columbia Pike	East Randolph Rd	Briggs Chaney Rd	Area Connector	2018 MPOHT Technical Update	2	2	80		MA-29
Old Columbia Pike	Tolson Pl	Spencerville Ct	Area Connector	2018 MPOHT Technical Update	2	2	70	25	MA-29
Old Columbia Pike	Business 29	Old Columbia Pike	Town Center Boulevard	Burtonsville Crossroads	4	4D	120	30	M-76
Old Columbia Pike	1140' west of Clifftondale	Industrial Pkwy	Downtown Boulevard	2018 MPOHT Technical Update	4	4	80	25	A-105
Old Frederick Rd	Stringtown Rd	Clarksburg Rd (MD 121)	Town Center Street	Ten Mile Creek Area Limited Amendment (2014)	2	2	50	25	B-1
Old Frederick Rd	Roberts Tavern Dr	Stringtown Rd	Town Center Street	Ten Mile Creek Area Limited Amendment (2014)	2	2	50		B-1
Old Frederick Rd	Clarksburg Rd (MD 121)	Snowden Farm Pkwy / Observation Dr Extended	Town Center Street	Ten Mile Creek Area Limited Amendment (2014)	2	2	50	25	B-1
Old Georgetown Rd (MD 187)	830' north of Nicholson Ln / Market St	Executive Blvd / Towne Rd	Downtown Boulevard	White Flint 2 Sector Plan	6D	6D + 1T	150	25	M-4
Old Georgetown Rd (MD 187)	Tuckerman Ln	Nicholson Ln	Boulevard	Countywide Transit Corridors	6D	6D + 1T	126		M-4
Old Georgetown Rd (MD 187)	Cheshire Dr	Rock Spring Dr	Downtown Boulevard	Rock Spring	6D	6D	120		M-4
Old Georgetown Rd (MD 187)	140' west of Battery Ln	Cheshire Dr	Boulevard	North Bethesda/Garrett Park	6D	6D	130		M-4
Old Georgetown Rd (MD 187)	Nicholson Ln	830' north of Nicholson Ln / Market St	Downtown Boulevard	White Flint 2 Sector Plan	6D	6D + 1T	150	25	M-4
Old Georgetown Rd (MD 187)	Wisconsin Ave	Moorland Ln	Downtown Boulevard	Bethesda Downtown Plan	3	4	80	25	M-4
Old Georgetown Rd (MD 187)	400' east of Towne Rd	Rockville Pike (MD 355)	Downtown Boulevard	Countywide Transit Corridors	4D	4D	120	25	M-4
Old Georgetown Rd (MD 187)	Wilson Ln	Cordell Ave	Downtown Boulevard	Bethesda Downtown Plan	3	4	86	25	M-4
Old Georgetown Rd (MD 187)	Towne Rd	400' east of Towne Rd	Downtown Boulevard	White Flint Sector Plan	4D	4D	120	25	M-4
Old Georgetown Rd (MD 187)	Nebel St	Rockville Pike	Downtown Boulevard	White Flint Sector Plan	2	4	90	25	B-2
Old Georgetown Rd (MD 187)	Cordell Ave	140' west of Battery Ln	Downtown Boulevard	Bethesda Downtown Plan	4	4	100	25	M-4
Old Georgetown Rd (MD 187)	Moorland Ln	Wilson Ln	Downtown Boulevard	Bethesda Downtown Plan	3	4	82	25	M-4
Old Georgetown Rd (MD 187)	I-270	Tuckerman Ln	Boulevard	Countywide Transit Corridors	6D	6D + 1T	130		M-4
Old Georgetown Rd (MD 187)	Rock Spring Dr	I-270	Downtown Boulevard	Rock Spring	6D	6D + 2T	150		M-4
Old Hundred Rd	Barnesville Rd	Frederick Rd	Rustic Road	Clarksburg / Rustic Roads	2	2	80		R-1
Old Orchard Rd	Ednor Rd south	end-of-road	Rustic Road	Cloverly	2	2			R-65
Old River Rd	Montevideo Rd	River Rd	Rustic Road	Rustic Roads	2	2	70		R-31
Old Stage Rd	Dinwiddie Dr	Tilden Ln	Neighborhood Connector	North Bethesda/Garrett Park	2	2	70		P-9
Old Vic Blvd	Olney-Sandy Spring Rd	Batchellors Forest Rd	Neighborhood Connector	Olney	2	2	70		P-16
Olney Mill Rd	Olney-Laytonsville Rd	Wickham Road	Country Road	2018 MPOHT Technical Update	2	2	70		P-9
Olney Mill Rd	Gold Mine Rd	Olney-Laytonsville Rd	Neighborhood Connector	Olney	2	2	70		P-9
Olney-Laytonsville Rd (MD 108)	Approx. 250' north of Olney Mill Rd	Georgia Ave (MD 97)	Boulevard	Olney	4	4D	150		M-60
Olney-Laytonsville Rd (MD 108)	Approx. 250' south of Maple Knoll Dr (Laytonsville south bounda	Approx. 250' north of Olney Mill Rd	Boulevard	Olney	2	4D	150		M-60
Olney-Laytonsville Rd (MD 108)	740' west of Georgia Ave	Georgia Ave (MD 97)	Town Center Boulevard	Olney	4	4D	150		M-60
Olney-Sandy Spring Rd (MD 108)	Prince Philip Dr	Doctor Bird Rd	Boulevard	Olney	4	4D	150		M-60
Olney-Sandy Spring Rd (MD 108)	Doctor Bird Rd	100' east of Norwood Rd	Country Connector	Olney / Sandy Spring-Ashton	2	2	80		A-92
Olney-Sandy Spring Rd (MD 108)	Georgia Ave	Prince Phillip Dr	Town Center Boulevard	Countywide Transit Corridors	4	4D	150		M-60
Olney-Sandy Spring Rd (MD 108)	500' east of Bentley Rd	Ashton Rd/New Hampshire Ave	Country Connector	Olney / Sandy Spring-Ashton	2	2	80		A-92
Olney-Sandy Spring Rd (MD 108)	100' east of Norwood Rd	500' east of Bentley Rd	Country Connector	Olney / Sandy Spring-Ashton	2	2	80		A-92
Olney-Sandy Spring Rd (MD 108)	Spartan Rd	Prince Phillip Dr	Boulevard	Countywide Transit Corridors	4	4D	150		M-60
Omega Dr	Fields Rd	Key West Ave	Downtown Boulevard	Great Seneca Science Corridor	2	4	100	30	A-261a
Orebaugh Ave	Arcola Ave	Wheaton RP	Neighborhood Connector	Kensington-Wheaton	2	2	70		P-36
Owens Rd	Georgia Ave	Old Baltimore Rd	Neighborhood Connector	Olney	2	2	70		P-18
Oxbridge Dr	Frederick Rd	Cider Barrel Rd	Neighborhood Connector	Germantown Employment Area Sector Plan (2009)	N/A	2	70		P-3

Appendix B

Public Participation Materials

Montgomery County Department of Transportation
DIVISION OF TRANSPORTATION ENGINEERING
100 Edison Park Drive, 4th Floor
Gaithersburg, Maryland 20878

VIRTUAL

PUBLIC MEETING

OLD COLUMBIA PIKE / PROSPERITY DRIVE IMPROVEMENTS

THURSDAY, MAR. 16, 2023| 6:30 P.M. TO 8:30 P.M.

Montgomery County Department of Transportation
DIVISION OF TRANSPORTATION ENGINEERING
100 Edison Park Drive, 4th Floor
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OLD COLUMBIA PIKE / PROSPERITY DRIVE IMPROVEMENTS

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MCDOT
Montgomery County Department of Transportation

Marc Elrich
Montgomery County Executive

Chris Conklin
Director, Department of Transportation

OLD COLUMBIA PIKE / PROSPERITY DRIVE IMPROVEMENTS

VIRTUAL

PUBLIC MEETING
Thursday, Mar. 16, 2023
6:30 P.M. To 8:30 P.M.

The Montgomery County Department of Transportation is holding a virtual public meeting to hear resident comments regarding the latest progress for the **Old Columbia Pike / Prosperity Drive Improvements Project**. The meeting will be held from **6:30 p.m. to 8:30 p.m. on Thursday, Mar. 16, 2023.**

PROJECT BACKGROUND: This project will improve the existing traffic patterns, operations and geometric deficiencies to resolve intersection safety and capacity issues. This project also proposes a shared use path on Old Columbia Pike / Prosperity Drive which will increase pedestrian and bicycle safety as well as connectivity. Drainage issues within the project limits will also be addressed. The project limits are from Stewart Lane to Cherry Hill Road.

PLEASE REGISTER TO ATTEND THE MEETING.
For more information, meeting materials, and to register, please visit:
https://www.montgomerycountymd.gov/dot-dte/projects/OldColumbiaPike/index.html

Join the hearing, learn and comment about:
- Project progress and schedule
- Proposed bicycle & pedestrian improvements as well as traffic patterns at the intersections

If you require special accommodations to view materials or participate, please contact Yasamin Esmaili at 240-777-7226 or Yasamin.Esmaili@montgomerycountymd.gov

Project Manager: Yasamin Esmaili | Yasamin.Esmaili@MontgomeryCountyMD.gov | 240-777-7226
Project Website: https://www.montgomerycountymd.gov/dot-dte/projects/OldColumbiaPike/index.html

MCDOT
Montgomery County Department of Transportation

Marc Elrich
Montgomery County Executive

Chris Conklin
Director, Department of Transportation

OLD COLUMBIA PIKE / PROSPERITY DRIVE IMPROVEMENTS

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Old Columbia Pike / Prosperity Drive Improvements Project

Public Meeting – March 16, 2023

MCDOT
Montgomery County
Department of Transportation

WRA

Virtual Public Meeting

- We are going to go over some basic controls to help you use the Zoom meeting format before we start the presentation
- Pleased note that this meeting is being recorded.
  - The video will be posted on the project website after the meeting
  - If you do not wish to have your voice or likeness recorded, please keep your camera off, and refrain from asking questions using the audio option. Instead, you can send your questions via the chat option.

Using Zoom

Muting

- Everyone is on mute. You cannot unmute yourself. We can unmute you during the Q&A time.
- To request to speak, you will need to use the **raise hand** feature. Once we unmute you, you may still need to click a pop-up menu to unmute yourself.
- If you have called in by phone, you can unmute yourself by dialing *6 once we unmute you.

Video

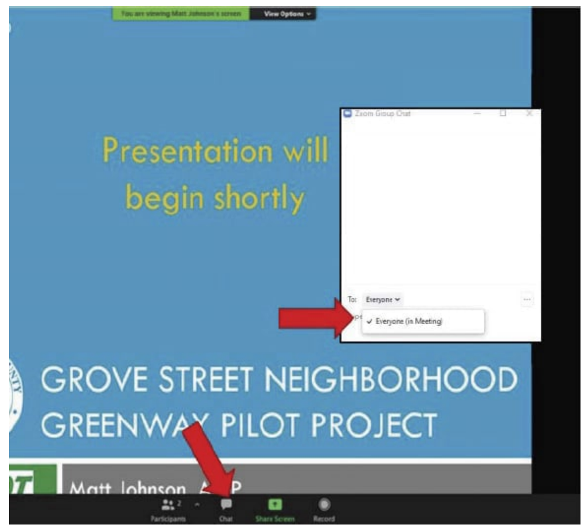
- Your camera is off by default. To ensure adequate bandwith for this meeting, we request that you please keep your camera off during the meeting.

Using Zoom Continued

Ask a question (text)

- Everyone is on mute. You cannot unmute yourself. We can unmute you during the Q&A time.

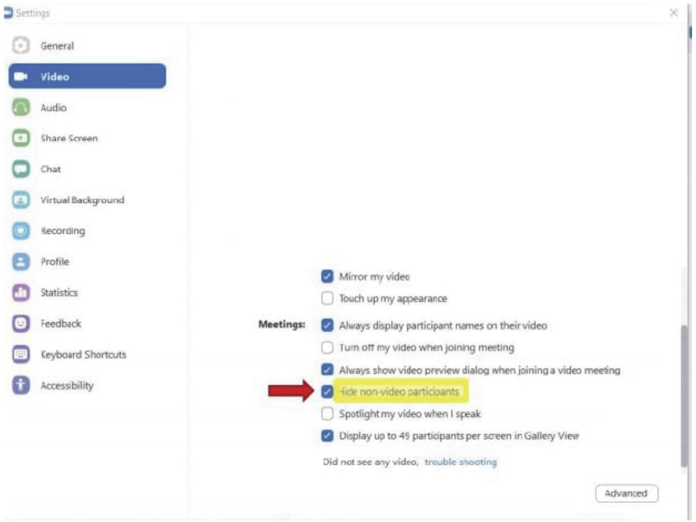
To raise your hand:
- Click “participants” at the bottom menu
- Click the blue “raise hand” button
- If you’ve dialed in by phone, dial *9

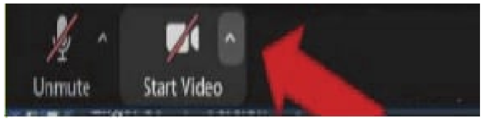


Using Zoom Continued

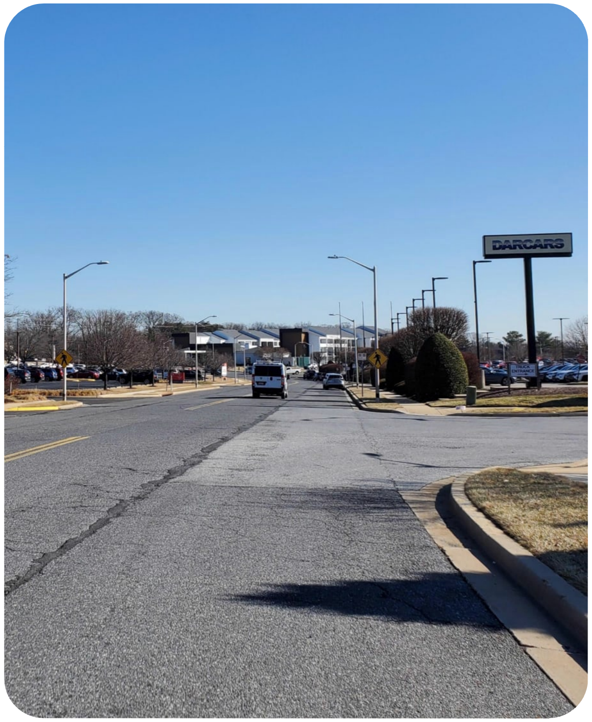
View

To change your view so that you can only see people with cameras on:
- Click the up arrow next to "start video"
- Select "video settings"
- Make sure "Hide non-video participants" is checked





Outline



- Project Limits/Background
- Project Purpose
- Project Overview
- Conceptual Design
  - Alternative 1 – No build
  - Alternative 2 – Improve intersections and add sidewalk/sidepath
  - Alternative 3 – Alternative 2 + Bridge open to traffic
- Project Schedule
- Questions

MCDOT Montgomery County Department of Transportation

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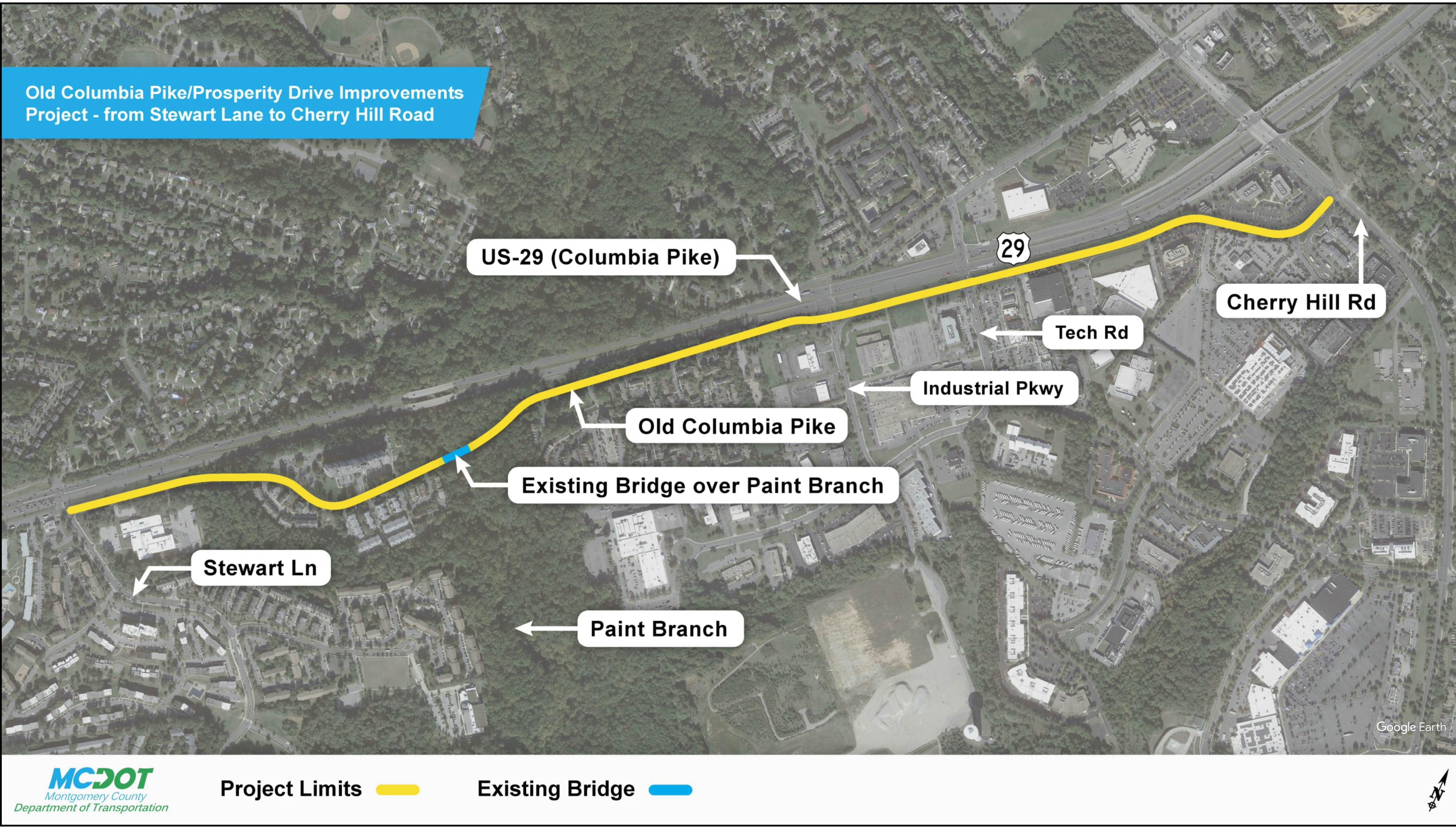
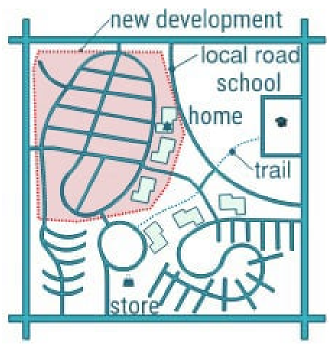


Old Columbia Pike/Prosperity Drive Improvements
Project - from Stewart Lane to Cherry Hill Road
US-29 (Columbia Pike)
29
Cherry Hill Rd
Tech Rd
Industrial Pkwy
Old Columbia Pike
Existing Bridge over Paint Branch
Stewart Ln
Paint Branch
Google Earth
MCDOT
Montgomery County
Department of Transportation
Project Limits
Existing Bridge
N

Project Purpose

- Address **connectivity** and **safety** needs along Old Columbia Pike/Prosperity Drive
- Improve the existing traffic patterns, operations and geometric deficiencies to resolve intersection safety and capacity
- Install a sidepath along Old Columbia Pike/Prosperity Drive
- Address drainage issues within the project limits
- Enhance safety for pedestrians and bicyclists, in keeping with Montgomery County Vision Zero Action Plan
- Promote equity and accessibility by providing continuous pedestrian facilities to promote a safe environment for pedestrians and bicyclists



Example of network connectivity

Life of a Transportation Project

We Are Here

1 FACILITY PLANNING
PHASE I

- Collect Data
- Obtain Public Input
- Develop Concept Plans
- Evaluate and Select Preferred Alignment/Typical Section
- Obtain Approvals From:
  - *Director*
  - *County Council T&E Committee*

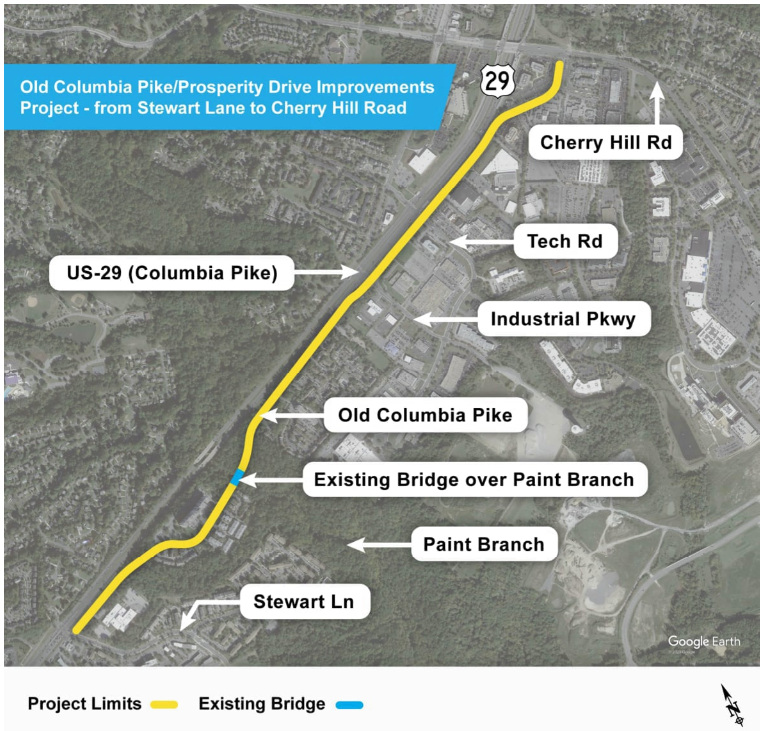
2 FACILITY PLANNING
PHASE II

- Develop Preliminary Contract Doucments (35% Level of Completion)
  - *Design Plans*
  - *Cost Estimates*
  - *Project Schedule*
- Submit to County Executive and County Council for:
  - *Final Design Decisions*
  - *Construction Funding in Capital Improvement Program (CIP)*

3 FINAL DESIGN & CONSTRUCTION

If approved for full funding and included in CIP, final design will be completed and project will be constructed.

Project Overview



- Project length is approx. 1.82 miles
- Existing bridge – Bridge over Paint Branch
- Six intersections
  - Stewart Lane
  - Industrial Parkway
  - Tech Road
  - Whitethorn Court
  - Prosperity Terrace
  - Cherry Hill Road
- US 29 at Stewart Lane Intersection Improvements in preliminary design
- Master Plan References:
  - Fairland Master Plan (1997, updated version is underway)
  - White Oak Science Gateway (2014)

Bridge over Paint Branch

Existing Condition

- Bridge is approx. 200 feet long, 27 feet wide
- Original structure built in 1912, widened in 1930
- Rehabilitated in 1973
- Registered with Maryland Historical Trust (MHT)
- Eligible for listing in the National Register of Historic Places (NRHP)
- Currently is closed to vehicular traffic but is open to pedestrians and bicyclists
- County is analyzing the condition of the existing structure

Potential Improvement Alternatives

- Rehabilitate for pedestrian/bicycle use only
- Rehabilitate for reopening to vehicular traffic
- Replace bridge
- Widen bridge

Conceptual Design

Alternative 1 – No Build

- No improvements to Old Columbia Pike/Prosperity Drive
- Safety and maintenance work on bridge
- Bridge remains closed to traffic and remains open to only pedestrians/bicyclists

Conceptual Design

Alternative 2 - Improve intersections and add sidewalk/sidepath

- Maintain one lane in each direction
- Improve intersections for safety and operations
- Install pedestrian and bicyclist improvements
- Bridge remains closed to traffic and remains open to only pedestrians/bicyclists

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Pedestrian and Bicyclist Improvements

Example of ADA compliant intersection crosswalks

Example of Typical Section with Buffered Sidepath and Sidewalk

Sidewalk Improvements

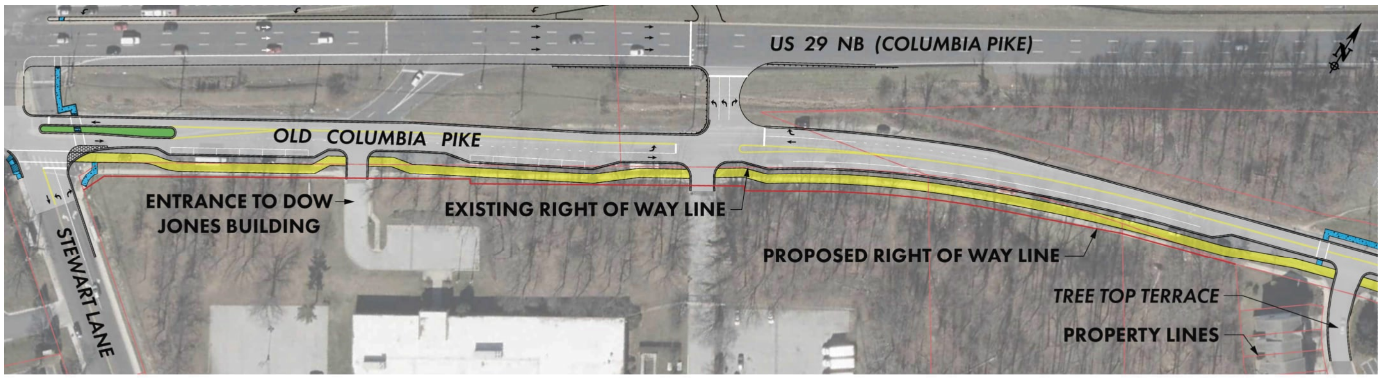
- Minimum 6' wide concrete sidewalk
- 5' to 6' wide grass buffer

Sidepath Improvements

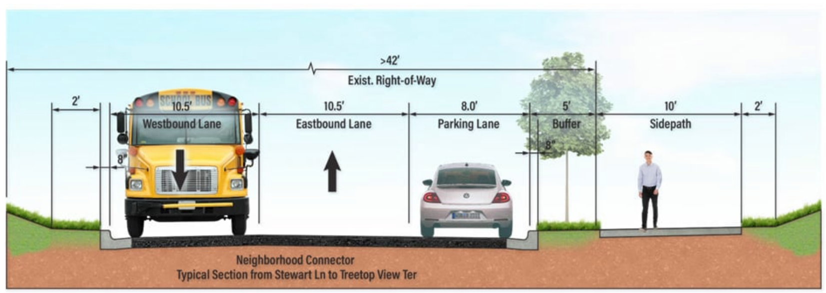
- 10' wide sidepath
- 5' to 6' wide grass buffer
- Shared between bicyclists, pedestrians, and personal electric vehicles (PEV)
- Continuous from Stewart Lane to Cherry Hill Road

Intersection Improvements

- ADA compliant pedestrian crosswalks and curb ramps at all driveways and intersections
- Geometric improvements to address existing safety concerns and improve traffic operation



Sidewalk | Sidepath | Roadway Pavement | Channelizing Island | Property Line / R.O.W.



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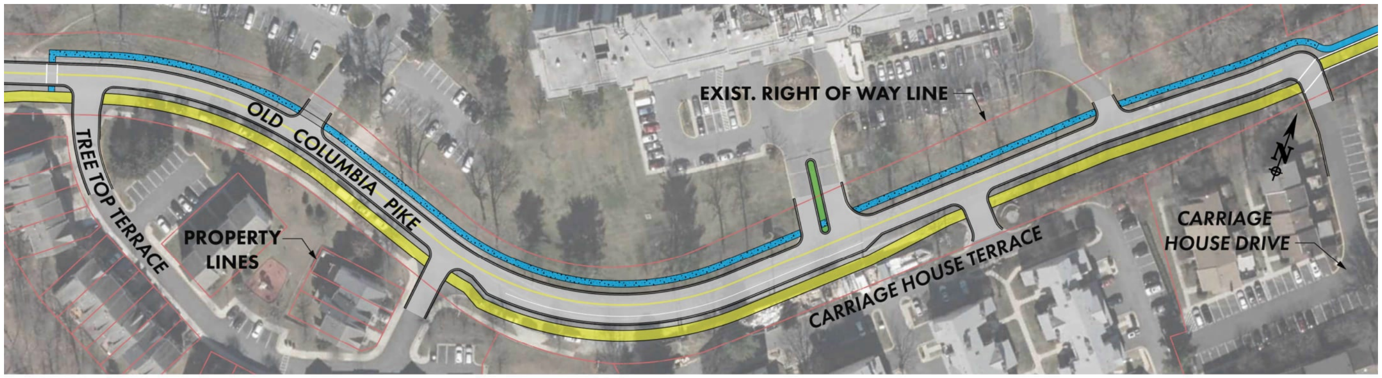
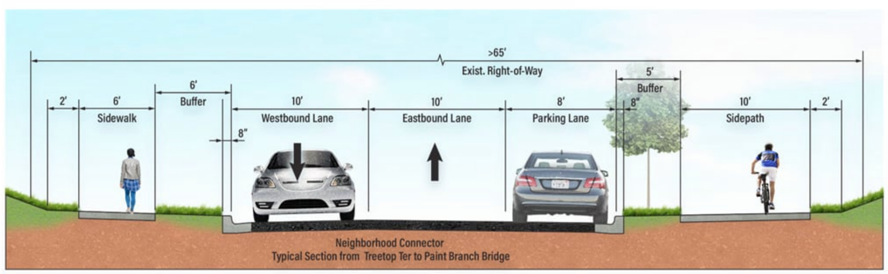
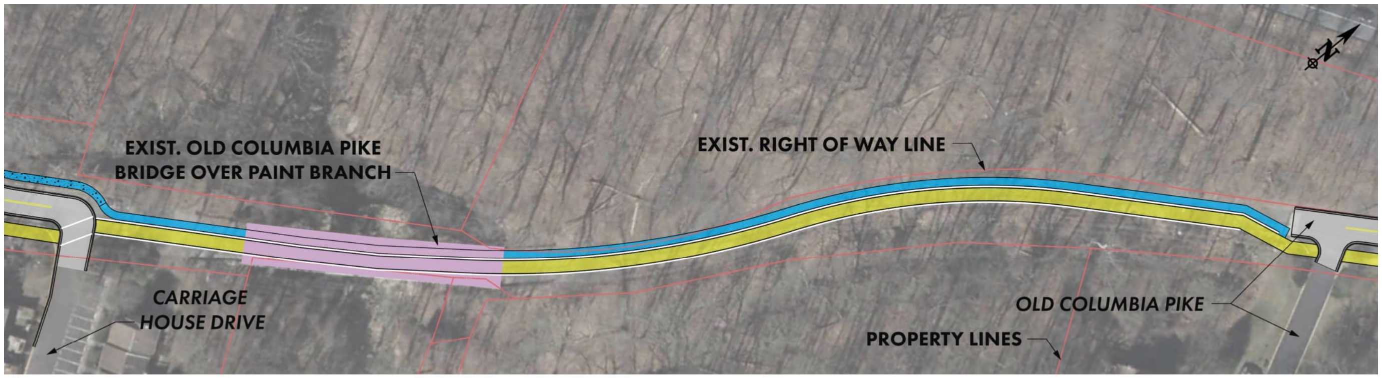
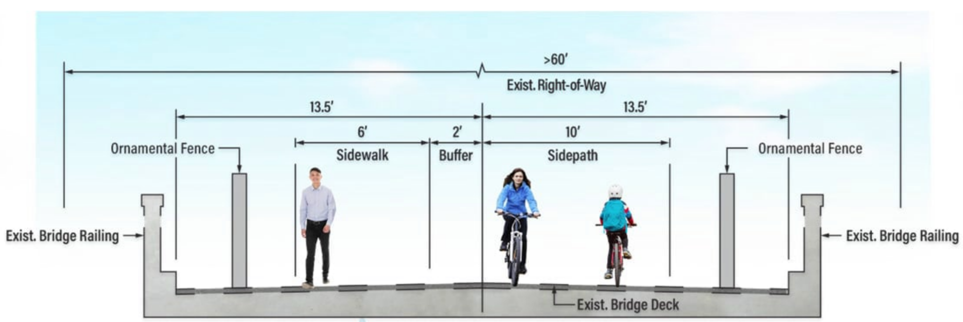


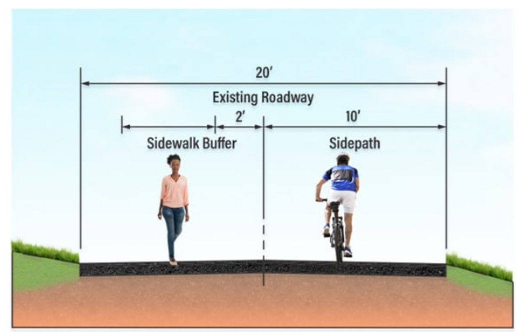
Sidewalk | Sidepath | Roadway Pavement | Property Line / R.O.W.





Sidewalk | Sidepath | Roadway Pavement | Existing Bridge | Property Line / R.O.W.





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Department of Transportation

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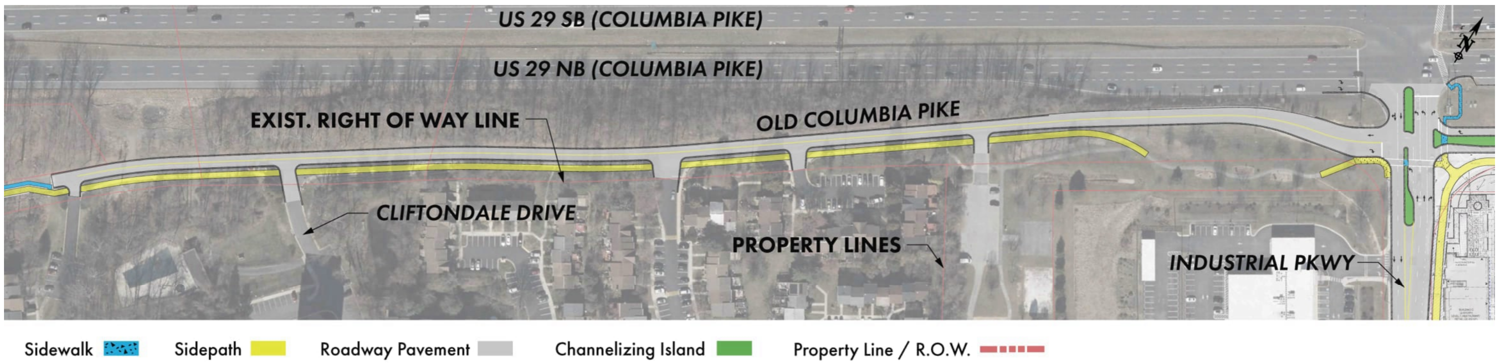
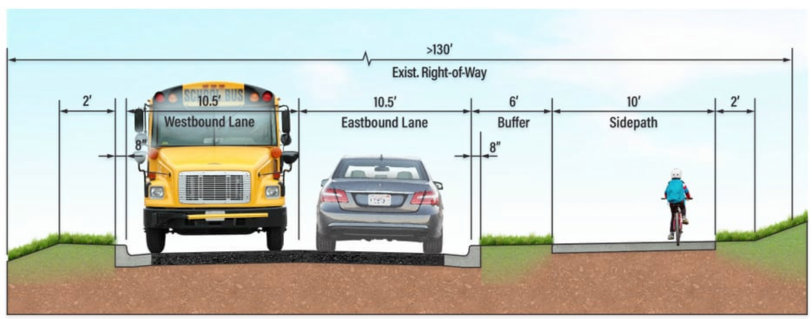
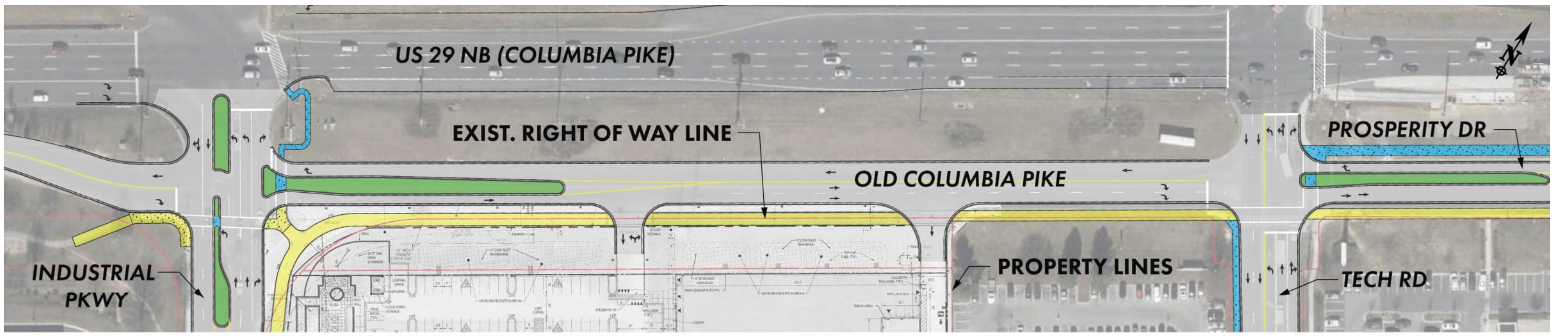
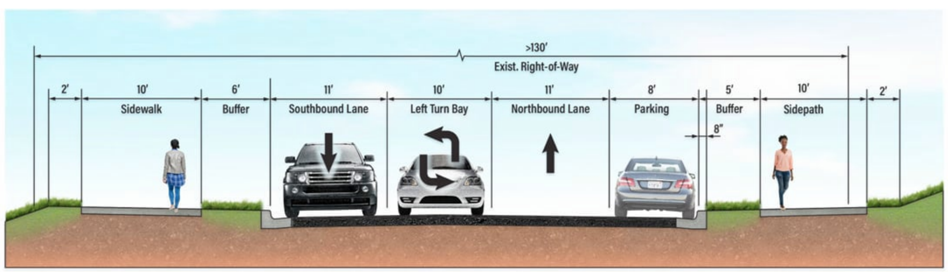
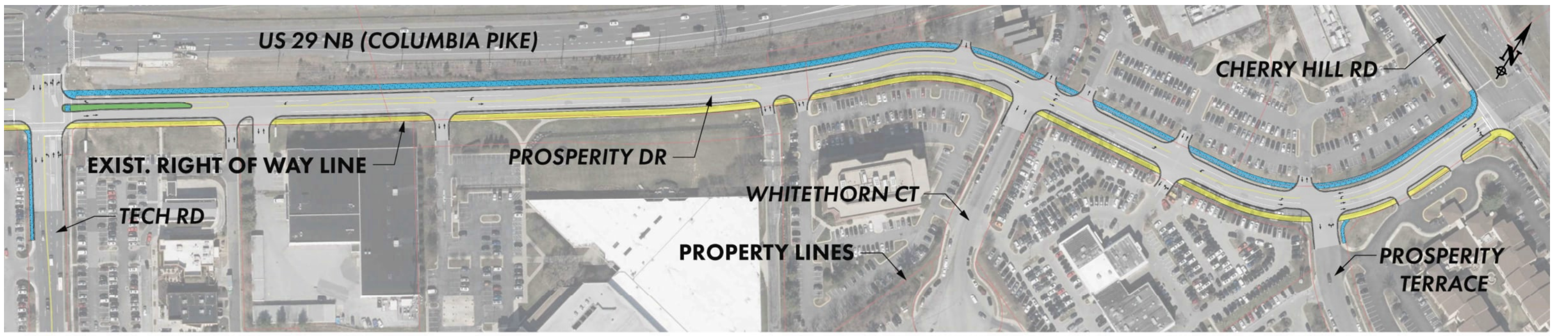

US 29 SB (COLUMBIA PIKE)
US 29 NB (COLUMBIA PIKE)
EXIST. RIGHT OF WAY LINE
OLD COLUMBIA PIKE
CLIFTONDALE DRIVE
PROPERTY LINES
INDUSTRIAL PKWY
N
Sidewalk
Sidepath
Roadway Pavement
Channelizing Island
Property Line / R.O.W.


>130'
Exist. Right-of-Way
2'
10.5'
Westbound Lane
8"
10.5'
Eastbound Lane
6'
Buffer
8"
10'
Sidepath
2'
SCHOOL BUS

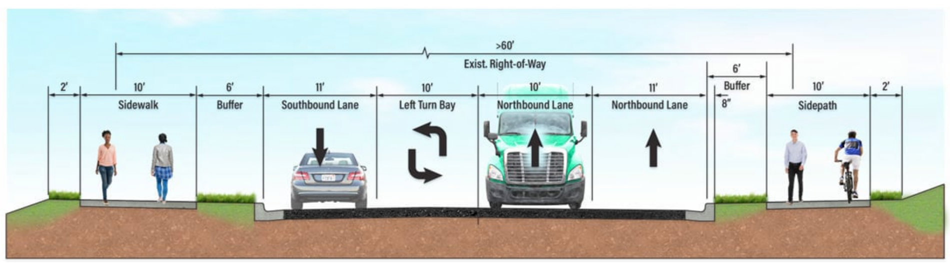


Sidewalk | Sidepath | Roadway Pavement | Channelizing Island | Property Line / R.O.W.





Sidewalk Sidepath Roadway Pavement Channelizing Island Property Line / R.O.W.



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Conceptual Design

Alternative 3: Alternative 2 + bridge open to traffic

- Maintain one lane in each direction
- Improve intersections for safety and operations
- Install pedestrian and bicyclist Improvements
- Bridge opens to one lane in each direction

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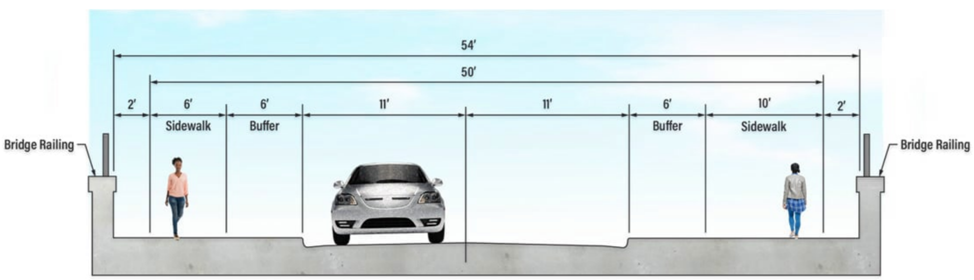
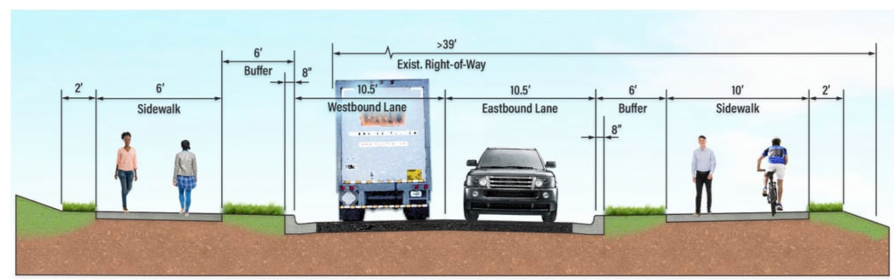
Sidewalk
Sidepath
Roadway Pavement
New Bridge





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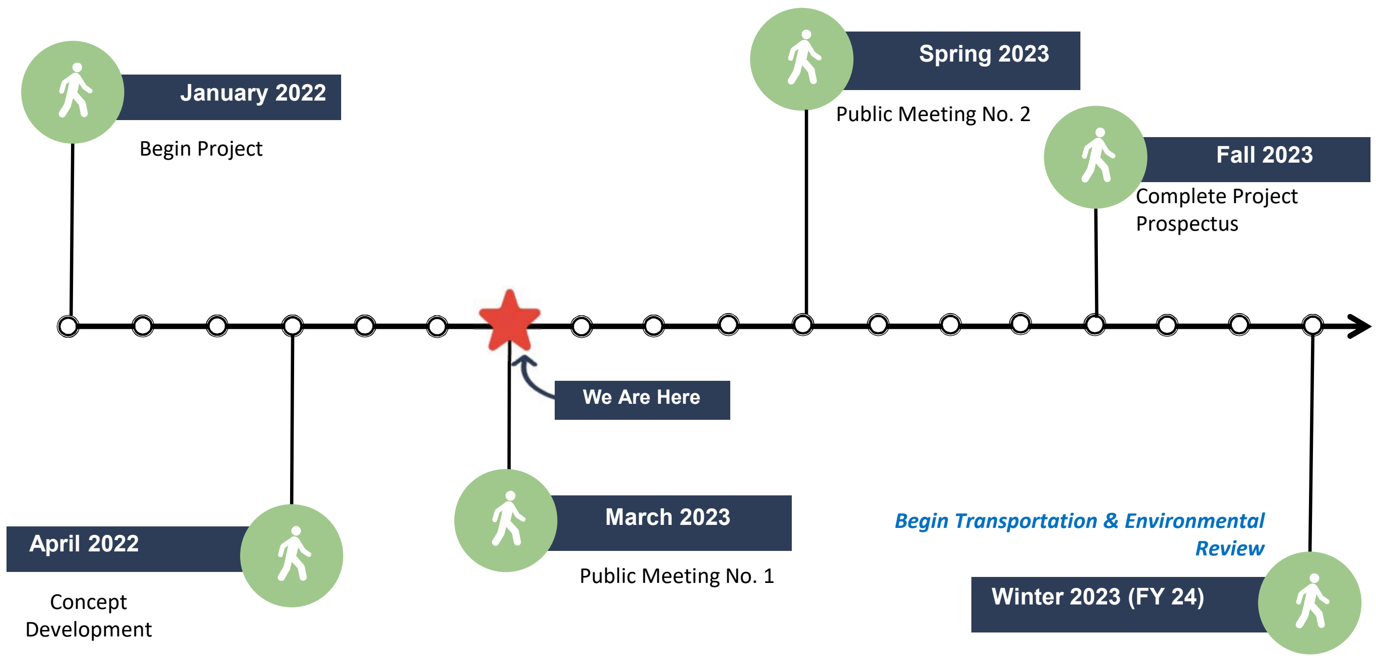
Project Schedule



Contact

Yasamin Esmaili, CPM

Project Manager

240-777-7226

yasamin.esmaili@montgomerycountymd.gov

https://www.montgomerycountymd.gov/dotdte/projects/OldColumbiaPike/index.html

Questions?

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Marc Elrich
County Executive

MCDOT
Montgomery County
Department of Transportation

October 2023

Invitation to Public Information Meeting

Old Columbia Pike/Propsperity Drive Improvements Project in White Oak

Hybrid Meeting

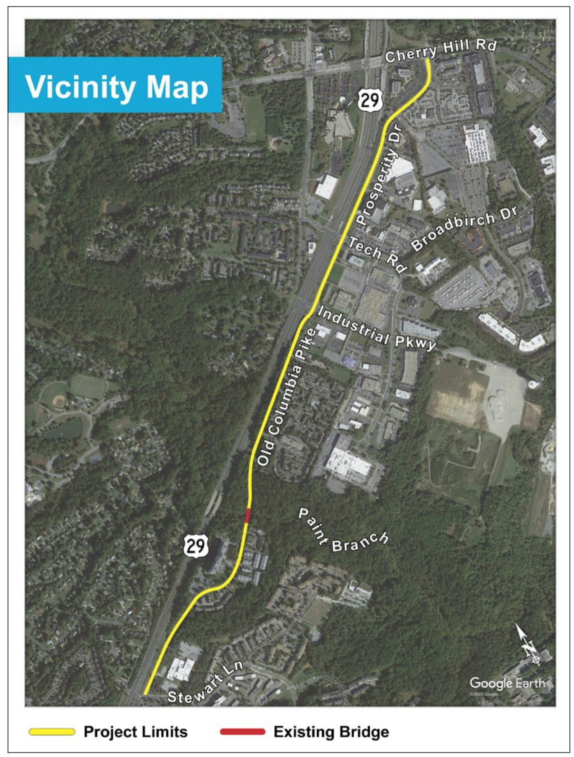
Montgomery County Department of Transportation (MCDOT) invites you to attend an on-site or online public meeting to learn more about the **Old Columbia Pike / Prosperity Drive Improvements Project in White Oak.** *A hybrid (online & on-site)* meeting will be held on ***Tuesday, November 14, 2023, at 6:30 p.m.*** The on-site meeting will be held in the **Community Lounge** of the **White Oak Community Recreation Center** located at **1700 April Lane, Silver Spring, Maryland** 20904.

PLEASE REGISTER TO ATTEND VIRTUALLY

Registration prior to the meeting is required to receive the link and instructions for signing into the meeting and using the internet-based virtual platform.

To register for the meeting, please visit the "Participate" tab of the project webpage via the below QR code, where you will find a link to the online registration form.

If you require special accommodations to participate in the meeting or to view materials, please contact MCDOT's Planning Specialist, Lori Main, by email at **Lori.Main@montgomerycountymd.gov.**



PROJECT BACKGROUND

The Old Columbia Pike / Prosperity Drive Improvements project provides for a facility planning study to improve intersection safety and capacity issues as well as enhance safety for pedestrians, bicyclists and people with disabilities as they travel to nearby schools and facilities. Drainage issues within the project limits will also be addressed. The project limits are from Stewart Lane to Cherry Hill Road. Public input is encouraged and may influence the design of this project.

PROJECT WEBPAGE

For more information, please visit the below MCDOT's project webpage:

https://www.montgomerycountymd.gov/dot-dte/projects/OldColumbiaPike/index.html

After the public meeting, the recording of the public meeting and a copy of the presentation slides in PDF format will be made available online under the "Project Documents" tab.

PUBLIC FEEDBACK

Public input is the key to the success of a public infrastructure project, as it allows the County to understand the concerns of the community. Please provide us with your valuable comments by **Tuesday, November 28, 2023,** via the following:

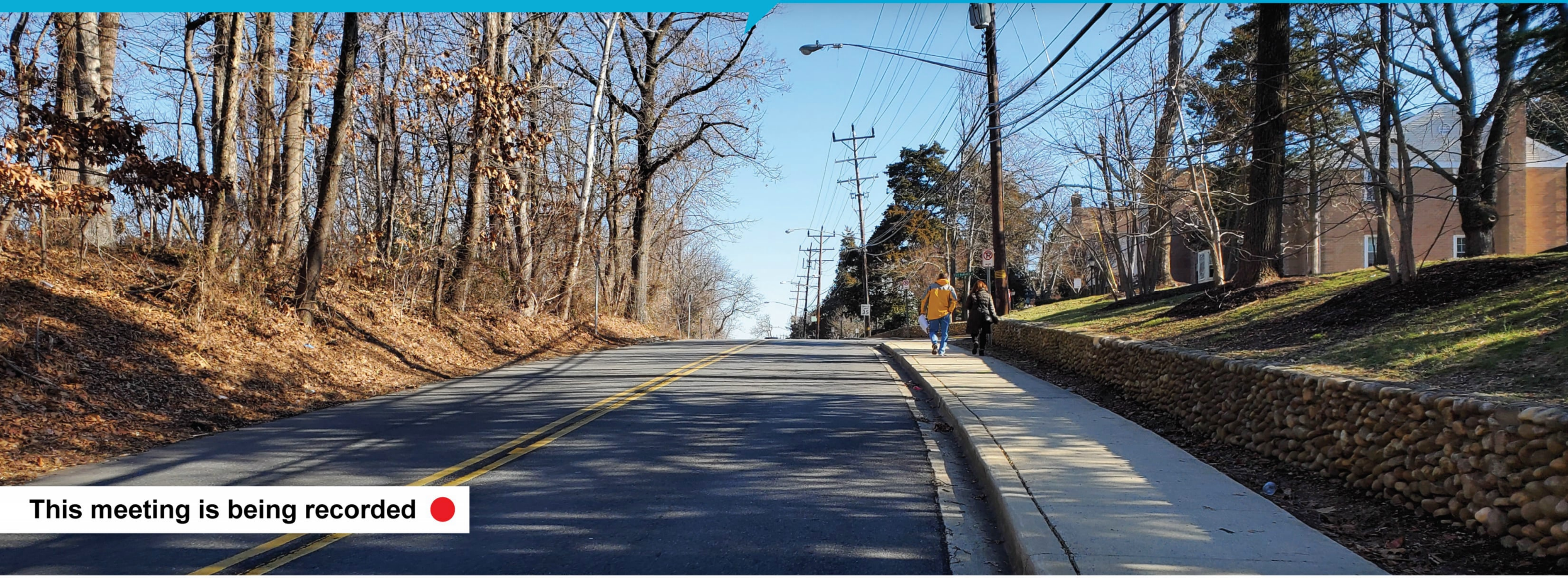
- Use the online comment form which is also available on the MCDOT's project webpage under the "Participate" tab, link and QR code above, or
- Email the MCDOT's Project Manager at **Yasamin.Esmaili@montgomerycountymd.gov.**

HOMEOWNER/CIVIC ASSOCIATION OR CHAMBER OF COMMERCE THAT RECEIVES THIS NEWSLETTER IS REQUESTED TO CONVEY THE NEWSLETTER AND PUBLIC MEETING INFORMATION TO THEIR MEMBERS.

Old Columbia Pike / Prosperity Drive Improvements Project

Public Meeting 2 – November 14, 2023

6:30 – 6:35 Welcome to the meeting   **6:35 – Meeting begins (recording starts)**



This meeting is being recorded

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Hybrid Virtual Public Meeting

- We are going to go over some basic controls to help you use the Zoom meeting format before we start the presentation
- Pleased note that this meeting is being recorded.
  - The video will be posted on the project website after the meeting
  - If you do not wish to have your voice or likeness recorded, please keep your camera off, and refrain from asking questions using the audio option. Instead, you can send your questions via the chat option.

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Using Zoom

Muting

- Everyone is on mute. You cannot unmute yourself. We can unmute you during the meeting by phone, you can unmute yourself by dialing *6 once we unmute you.

Video

- Your camera is off by default. To ensure adequate bandwidth for this meeting, we request that you please keep your camera off during the meeting.

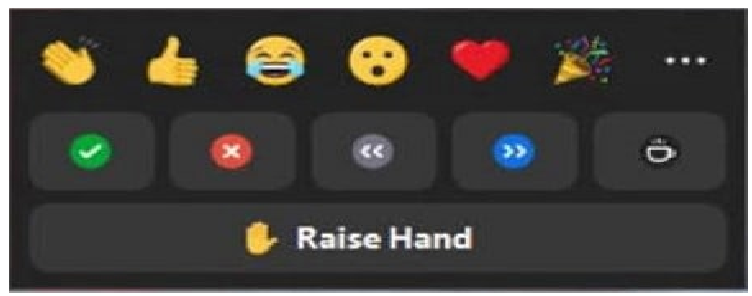
Using Zoom Continued

Ask a question (text)

- Following tonight's presentation, there will be a Question-and-Answer session if time allows. Please wait until the presentation ends to raise your hand to provide comments or ask a question. Alternatively, you may type your question into the Chat Box throughout tonight's presentation. **Please direct all Chat messages to our Zoom Host, Lori Main**.

To raise your hand:

- Click "Reactions" icon at the bottom your screen then click the "Raise Hand" button
- If you've called in by phone, press *9 to raise your hand and *6 to unmute yourself



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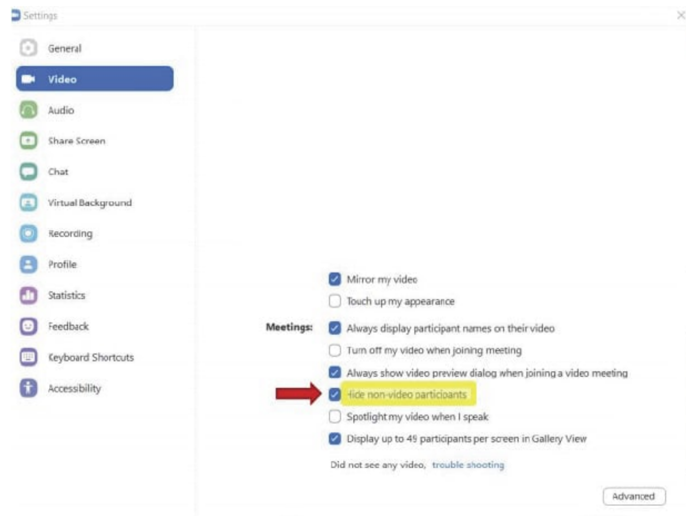
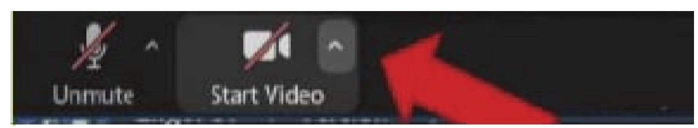
Using Zoom Continued

View

To change your view so that you can only see people with cameras on:

- Click the up arrow next to “start video”
- Select “video settings”
- Make sure “Hide non-video participants” is checked





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Introduction

- **Montgomery County DOT**
  - Daniel Sheridan, PE
  - Yasamin Esmaili, CPM
- **Whitman, Requardt and Associates, LLP**
  - Mark Roberts, PE, DBIA
  - S. Ching Tee, PE

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Life of a Transportation Project

We Are Here

1 FACILITY PLANNING
PHASE I

- Collect Data
- Obtain Public Input
- Develop Concept Plans
- Evaluate and Select Preferred Alignment/Typical Section
- Obtain Approvals From:
  - *Director*
  - *County Council T&E Committee*

2 FACILITY PLANNING
PHASE II

- Develop Preliminary Contract Doucments (35% Level of Completion)
  - *Design Plans*
  - *Cost Estimates*
  - *Project Schedule*
- Submit to County Executive and County Council for:
  - *Final Design Decisions*
  - *Construction Funding in Capital Improvement Program (CIP)*

3 FINAL DESIGN & CONSTRUCTION

If approved for full funding and included in CIP, final design will be completed and project will be constructed.

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Outline

- Project limits
- Project overview
- Project purpose
- Conceptual design
  - Alternative 1 – No build
  - Alternative 2 – Improve intersections, add sidewalk and sidepath
  - Alternative 3 – Alternative 2 with bridge open to traffic
  - Alternative 4 – 4 lanes with bridge open to traffic
  - Intersection alternatives
    - Industrial Parkway at Old Columbia Pike
    - Tech Road at Old Columbia Pike / Prosperity Drive
- Project schedule
- Questions

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Project Overview

- Project length is approx. 1.82 miles
- Existing bridge over Paint Branch
- Four intersections
  - Stewart Lane
  - Industrial Parkway
  - Tech Road
  - Cherry Hill Road
- US 29 at Stewart Lane intersection improvements is in design with MDOT SHA
- Master plan references:
  - Fairland and Briggs Chaney Master Plan (2023) succeeded Fairland Master Plan (1997)
  - White Oak Science Gateway (2014)

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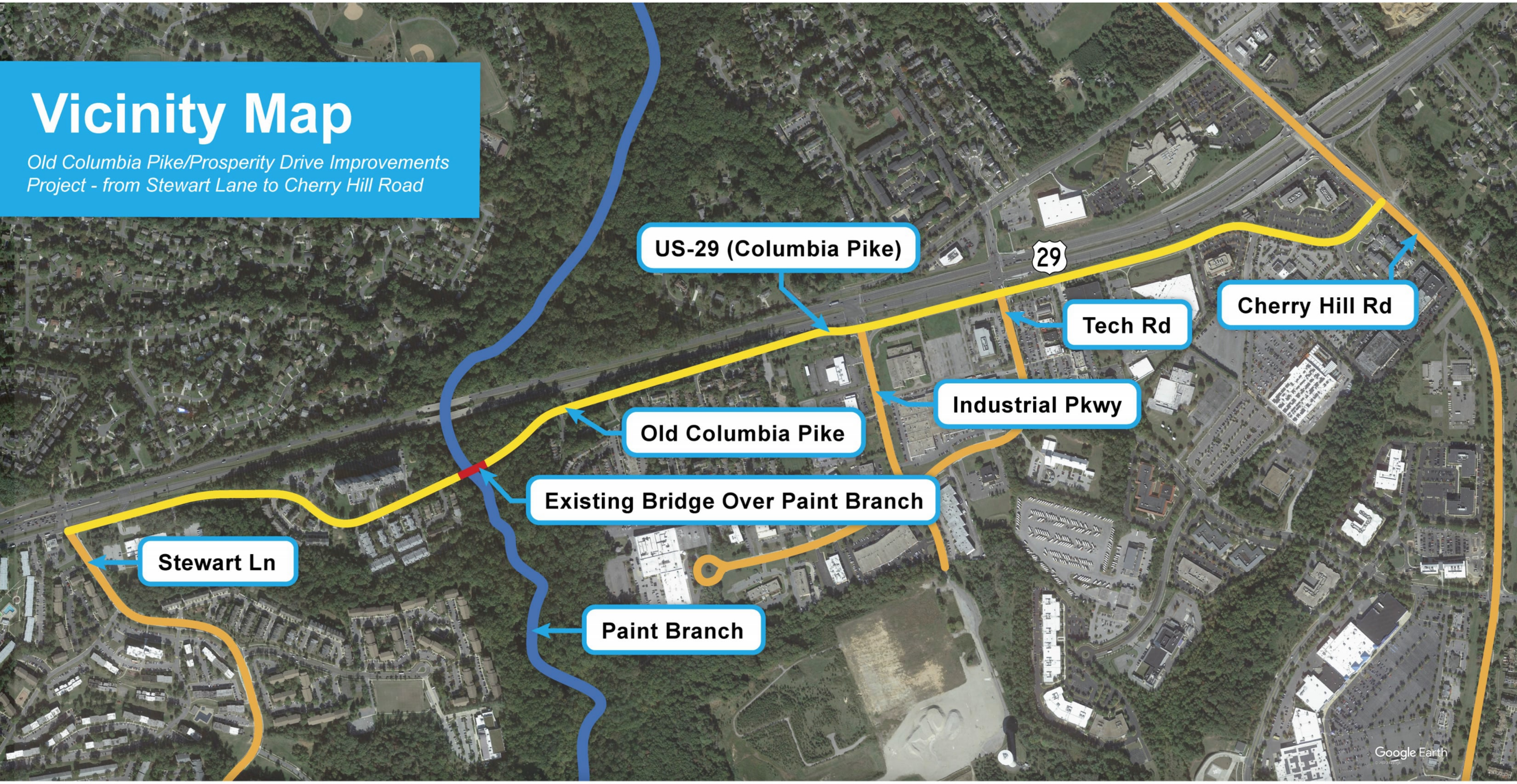
Vicinity Map

Old Columbia Pike/Prosperity Drive Improvements Project - from Stewart Lane to Cherry Hill Road



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Project Limits | Side Street | Existing Bridge | Paint Branch

Project Purpose

Address **connectivity** and **safety** needs along Old Columbia Pike/Prosperity Drive by:

- Improving the existing traffic patterns, operations and geometric deficiencies to resolve intersection safety and capacity
- Installing a sidepath along Old Columbia Pike/Prosperity Drive
- Addressing drainage issues within the project limits
- Enhancing safety for pedestrians and bicyclists, in keeping with Montgomery County Vision Zero Action Plan
- Promoting equity and accessibility

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Bridge over Paint Branch

- Bridge is approx. 200 feet long, 27 feet wide
- Original structure built in 1912, widened in 1930
- Rehabilitated in 1973
- Registered with Maryland Historical Trust (MHT)
- Eligible for listing in the National Register of Historic Places (NRHP)
- Currently closed to vehicular traffic but is open to pedestrians and bicyclists

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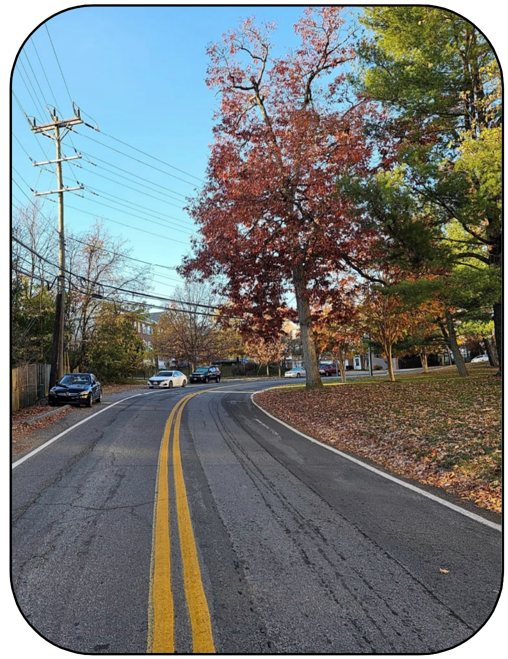
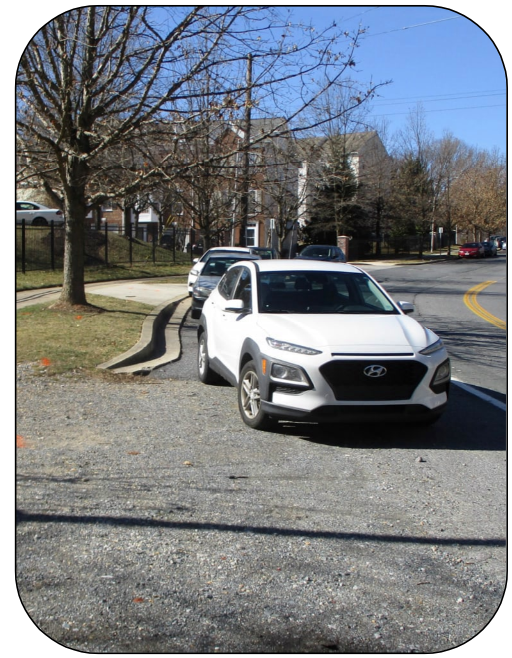
Existing Conditions





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Existing Conditions

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Pedestrian and Bicyclist Improvements

Example of an ADA Compliant intersection crosswalks

Example of Typical Section with Buffered Sidepath and Sidewalk

Sidewalk Improvements

- Minimum 6’ wide concrete sidewalk
- 5’ to 6’ wide grass buffer

Sidepath Improvements

- 10’ wide sidepath
- 5’ to 6’ wide grass buffer
- Shared between bicyclists, pedestrians, and personal electric vehicles (PEV)
- Continuous from Stewart Lane to Cherry Hill Road

Intersection Improvements

- ADA compliant pedestrian crosswalks and curb ramps at all driveways and intersections
- Geometric improvements to address existing safety concerns and improve traffic operation

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How does this project make it safer for pedestrians?

Example of a protected intersection

Example of pedestrian refuge island

Example of raised crosswalk at intersection

Protected Intersection Design

- Physical separation of vehicles and pedestrians
- Clear signage and pavement markings
- Pedestrian signal with push button

Pedestrian Refuge Island

- Shortened crossing distance
- Improved visibility

Traffic Calming Devices

- Raised crosswalks / speed tables
- Curb extensions
- Lane narrowing

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Roadway Characteristics

Montgomery County Complete Streets

- Old Columbia Pike / Prosperity Drive includes:
  - Neighborhood Connector
  - Town Center Street
  - Town Center Boulevard

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Neighborhood Connector

- From Stewart Lane to Industrial Parkway
- 25 mph target speed
- 10’ to 10.5’ lanes
- 6’ sidewalk; 10’ sidepath

Example of Neighborhood Connector
Watkins Mill Road between Frederick Avenue and Blunt Road

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Town Center Street

- From Industrial Parkway to Cherry Hill Road
- 25 mph target speed
- 10’ to 11’ lanes
- 10’ sidewalk
- 10’ sidepath

Example of Town Center Street
Tuckerman Lane near Grosvenor Metro Station

Town Center Boulevard

- From Stewart Lane to Cherry Hill Road
- 30 mph target speed
- 10’ to 11’ lanes
- 10’ sidewalk
- 10’ sidepath

Example of Town Center Boulevard
Veirs Mill Road (MD 586) between Havard Street and Connecticut Avenue

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Conceptual Design

Alternative 1 – No build

- No improvements to Old Columbia Pike / Prosperity Drive
- Bridge remains closed to vehicular traffic and open to pedestrians/bicyclist

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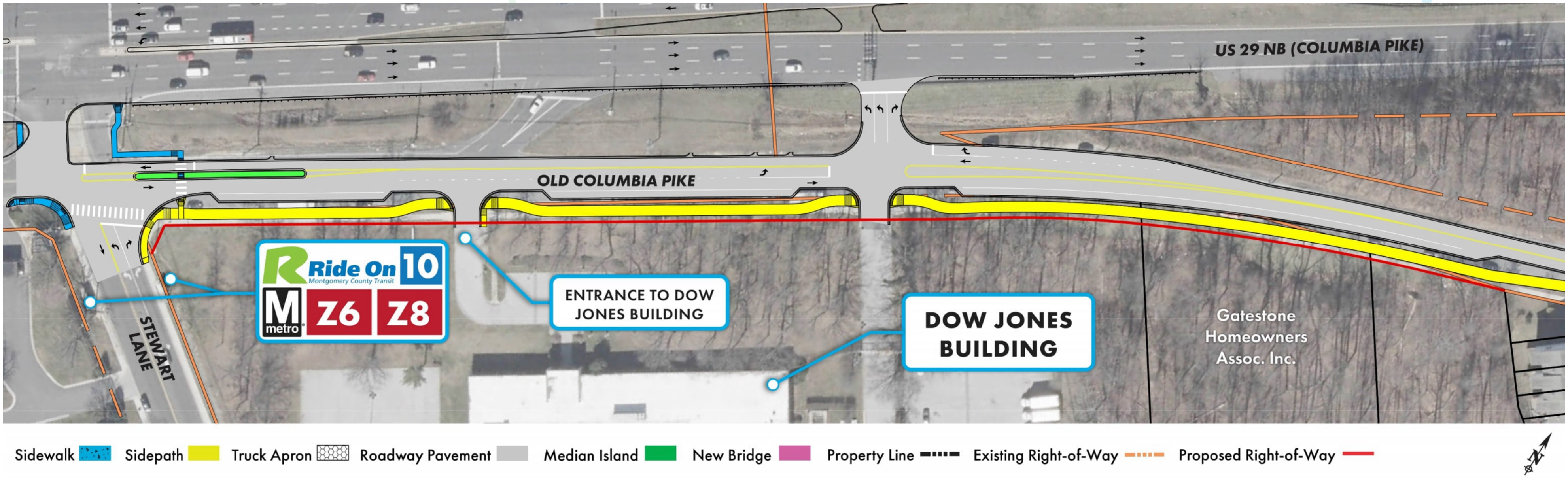
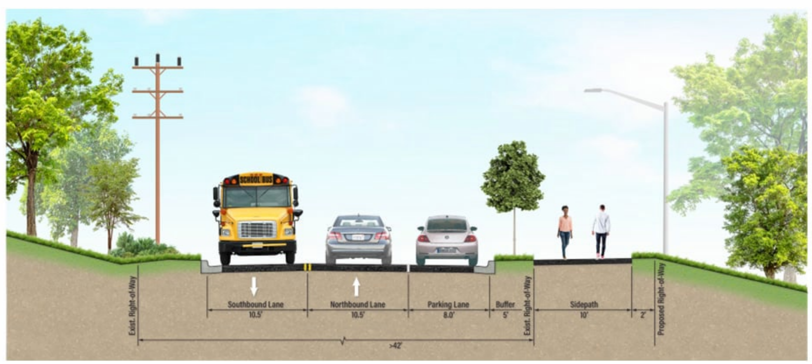
Alternative 2 - Improve intersections, add sidewalk and sidepath

- Maintain one lane in each direction
- Improve intersections for safety and operations
- Install pedestrian and bicyclist improvements
- Install lighting
- Bridge remains closed to vehicular traffic and open to pedestrians/bicyclists

Alternative 2 Improve intersections, add sidewalk and sidepath





Neighborhood Connector Typical Section

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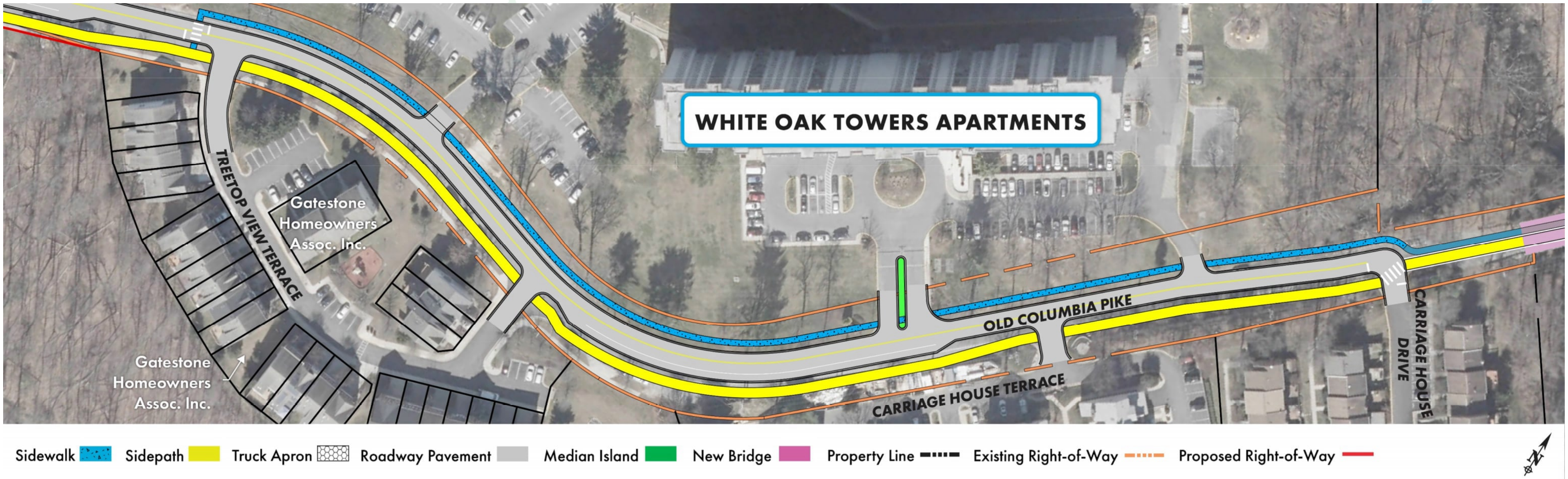
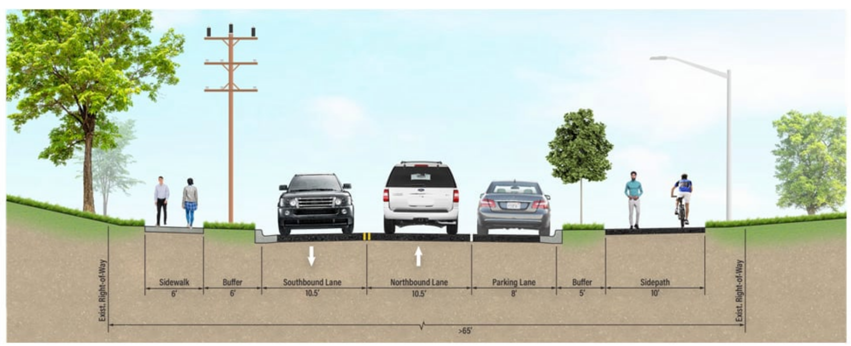
Alternative 2 Improve intersections, add sidewalk and sidepath





Neighborhood Connector Typical Section

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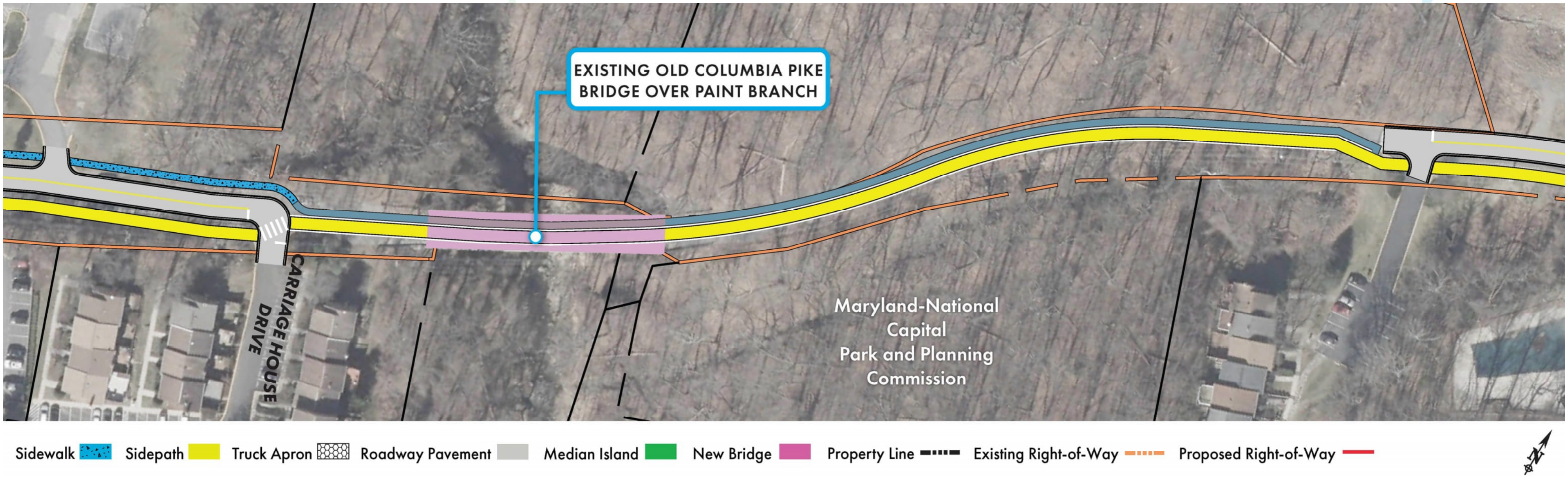
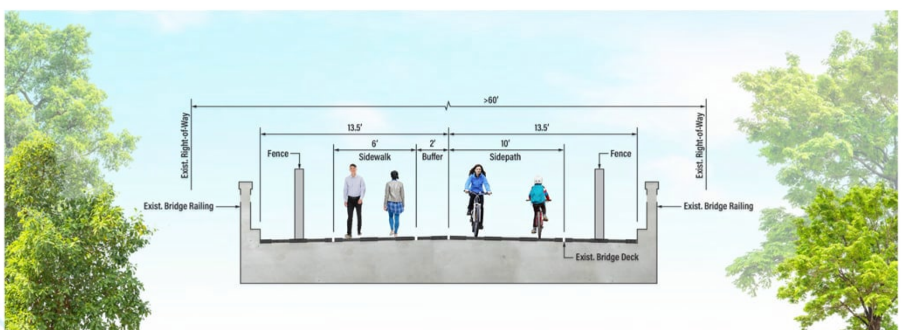
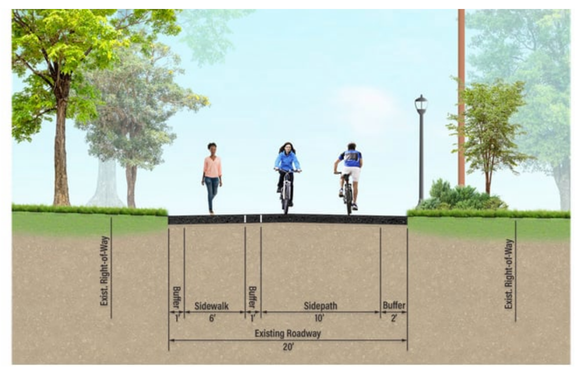
Alternative 2 Improve intersections, add sidewalk and sidepath





Typical Section Bridge over Paint Branch (Closed to Vehicular Traffic Open to Pedestrian and Bicyclist)



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Alternative 2 Improve intersections, add sidewalk and sidepath

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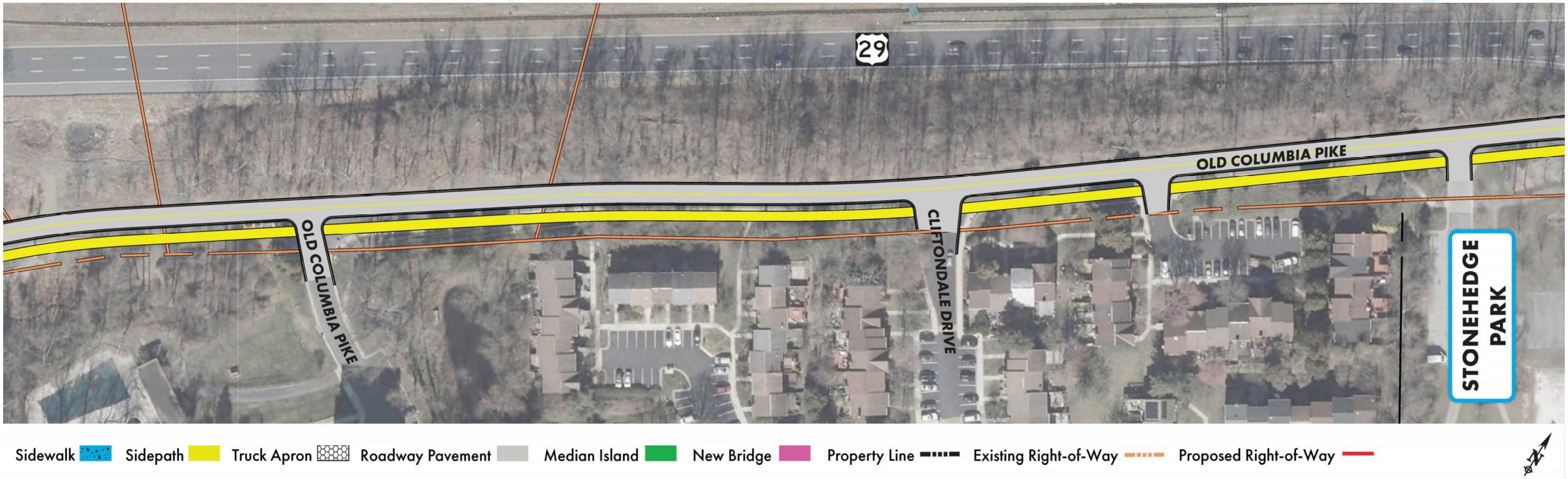
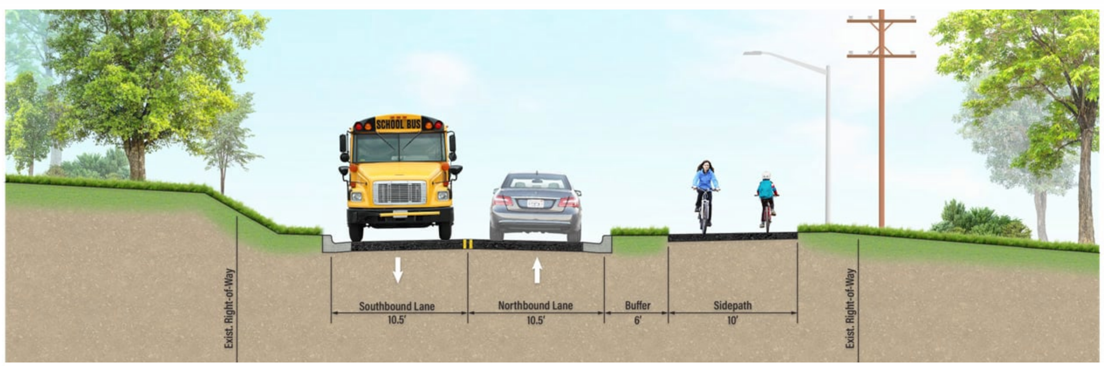
Alternative 2 Improve intersections, add sidewalk and sidepath





Neighborhood Connector Typical Section

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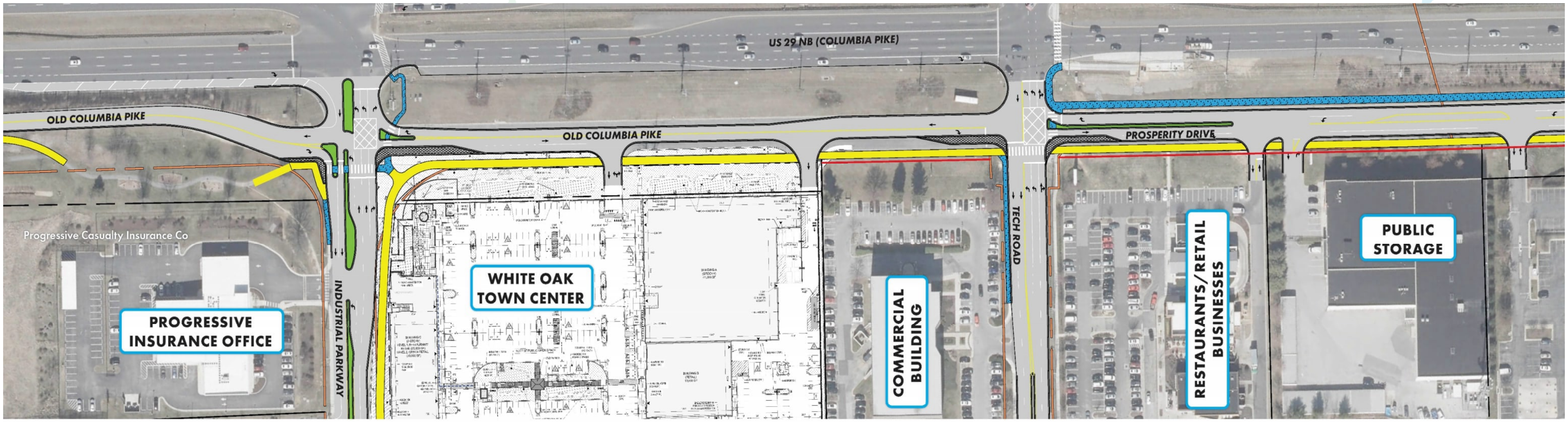
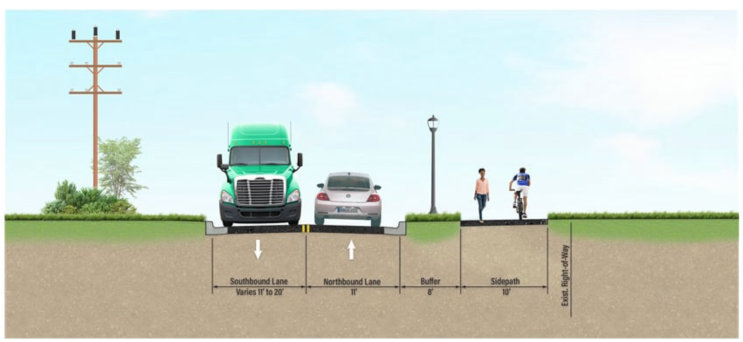
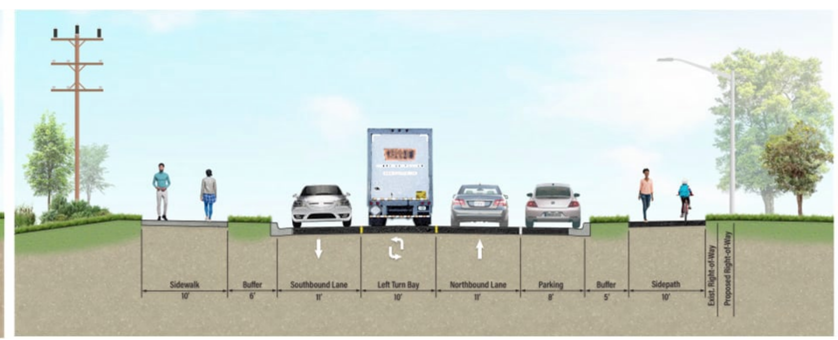
Alternative 2 Improve intersections, add sidewalk and sidepath



Sidewalk | Sidepath | Truck Apron | Roadway Pavement | Median Island | New Bridge | Property Line | Existing Right-of-Way | Proposed Right-of-Way





Town Center Street Typical Section

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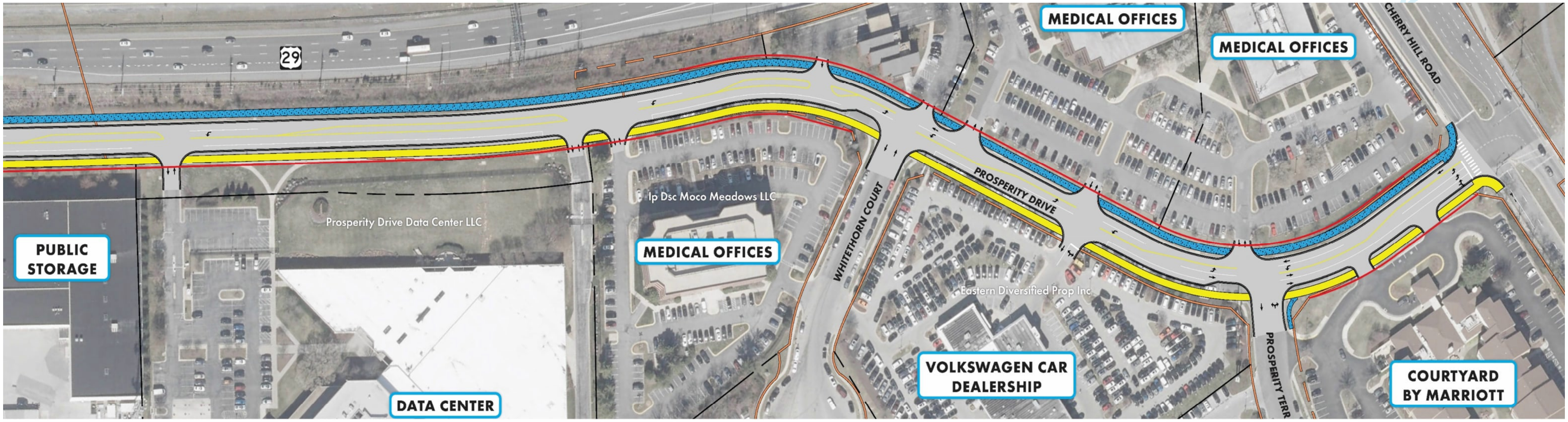
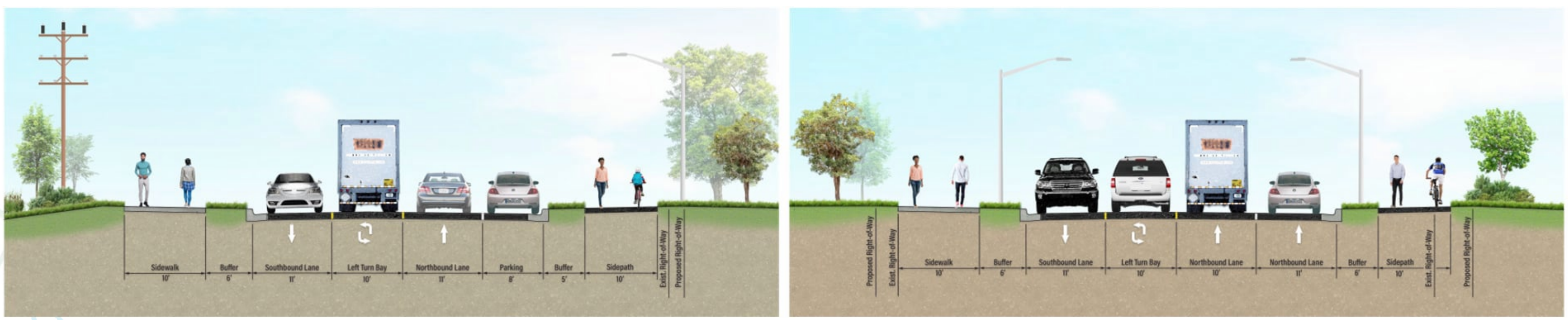
Alternative 2 Improve intersections, add sidewalk and sidepath



Sidewalk | Sidepath | Truck Apron | Roadway Pavement | Median Island | New Bridge | Property Line | Existing Right-of-Way | Proposed Right-of-Way



Town Center Street Typical Section

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Alternative 3: Alternative 2 with bridge open to traffic

- Maintain one lane in each direction
- Improve intersections for safety and operations
- Install pedestrian and bicyclist improvements
- Install lighting
- Replace bridge to allow 2 lanes of traffic

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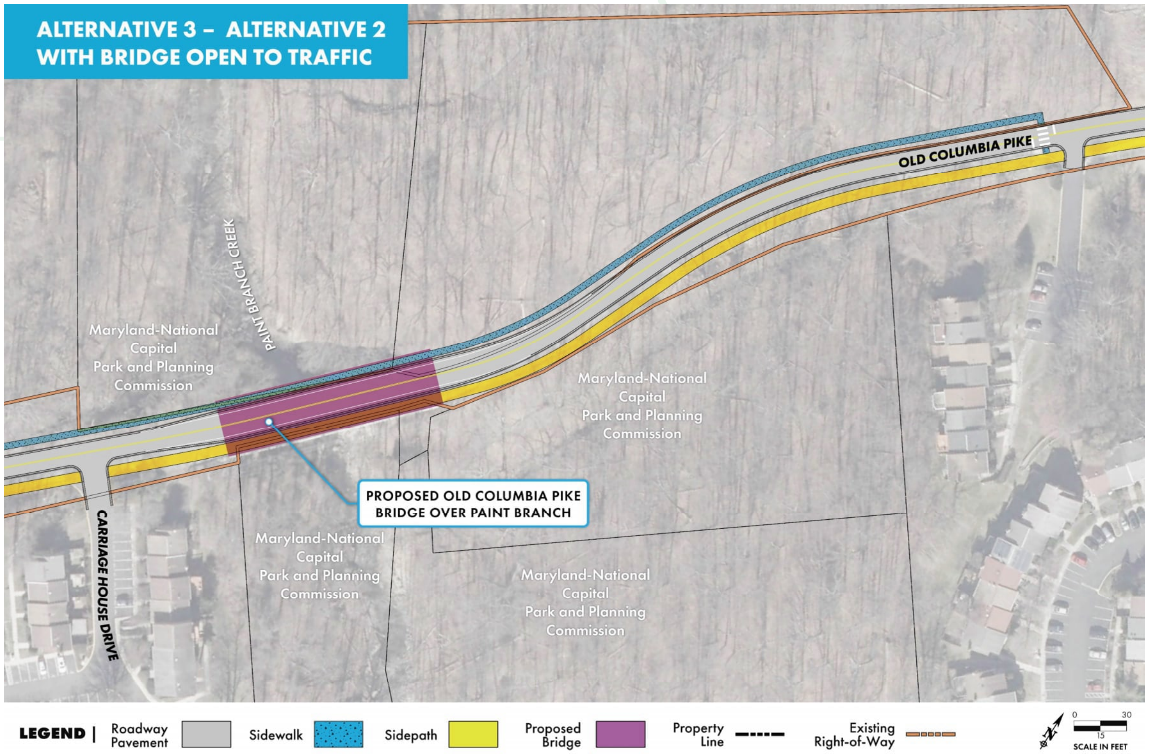
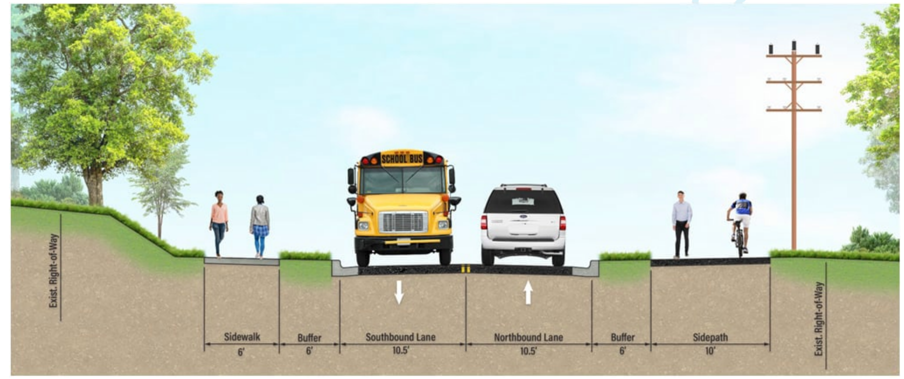
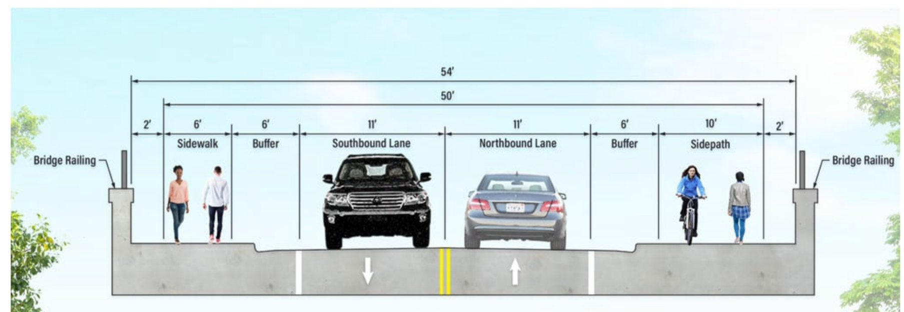




Neighborhood Connector Typical Section



Typical Section Bridge over Paint Branch
2-Lanes/2-Way Traffic with Sidewalk and Sidepath

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Alternative 3

Alternative 2 with bridge open to traffic

Rendering of Alternative 3, standing at south side of bridge looking north

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Alternative 4: 4 lanes with bridge open to traffic

- Two lanes in each direction
- Improve intersections for safety and operations
- Install pedestrian and bicyclist improvements
- Install lighting
- Replace bridge to allow 4 lanes of traffic

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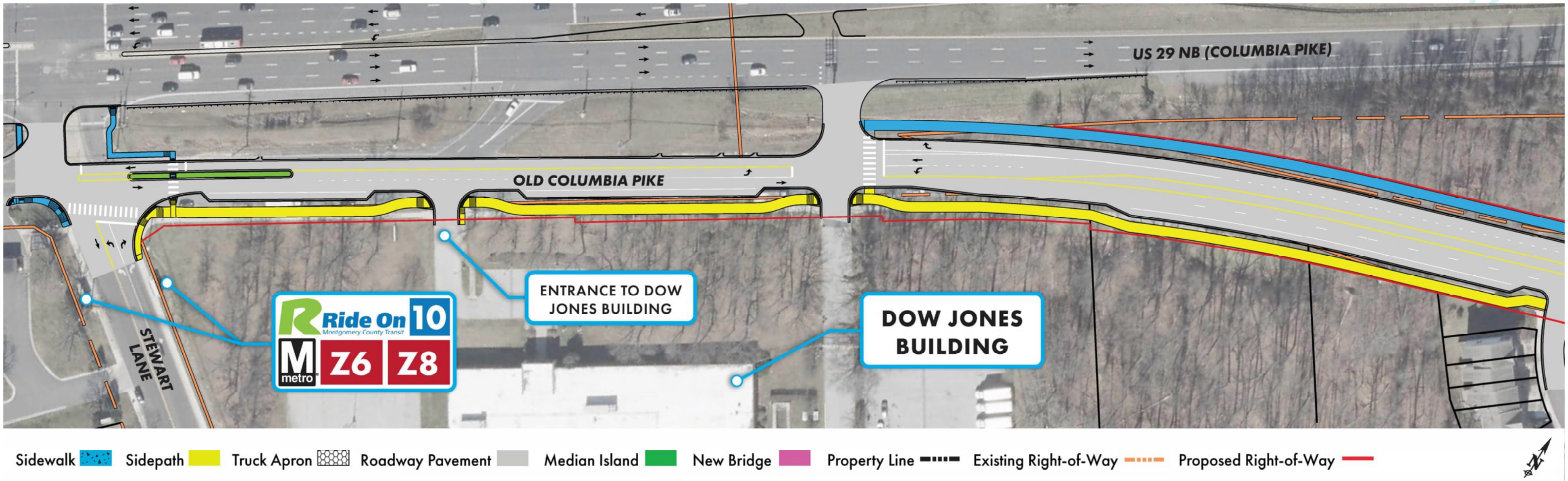
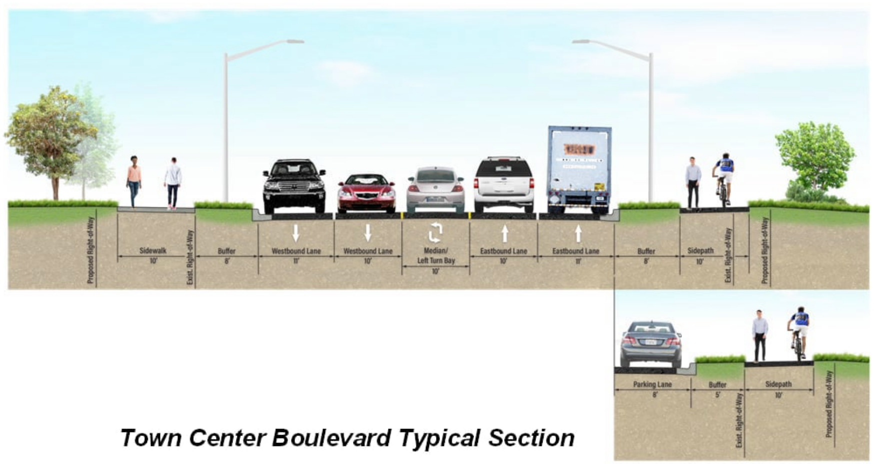
Alternative 4

4 lanes with bridge open to traffic





Town Center Boulevard Typical Section

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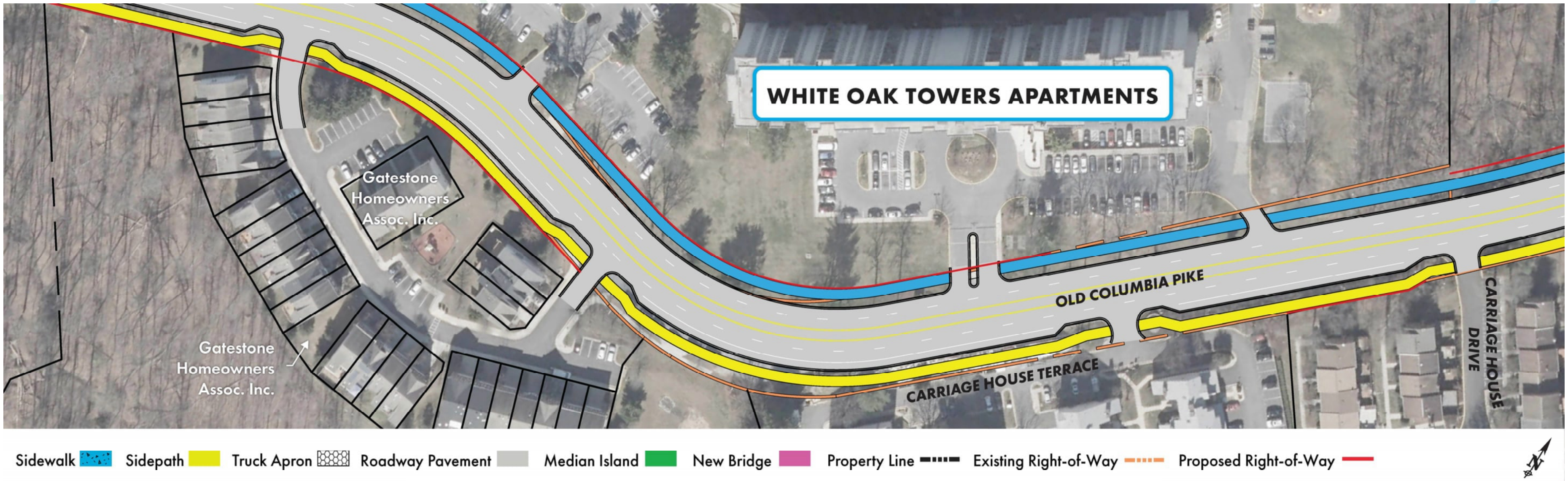
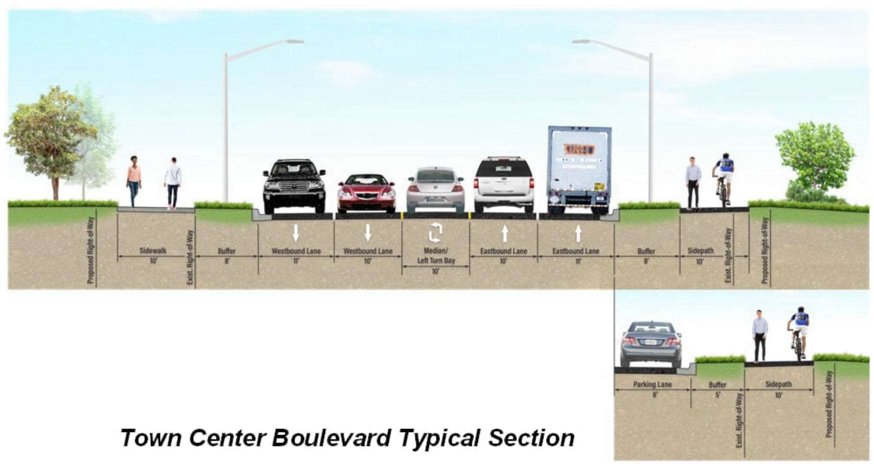
Alternative 4

4 lanes with bridge open to traffic





Town Center Boulevard Typical Section

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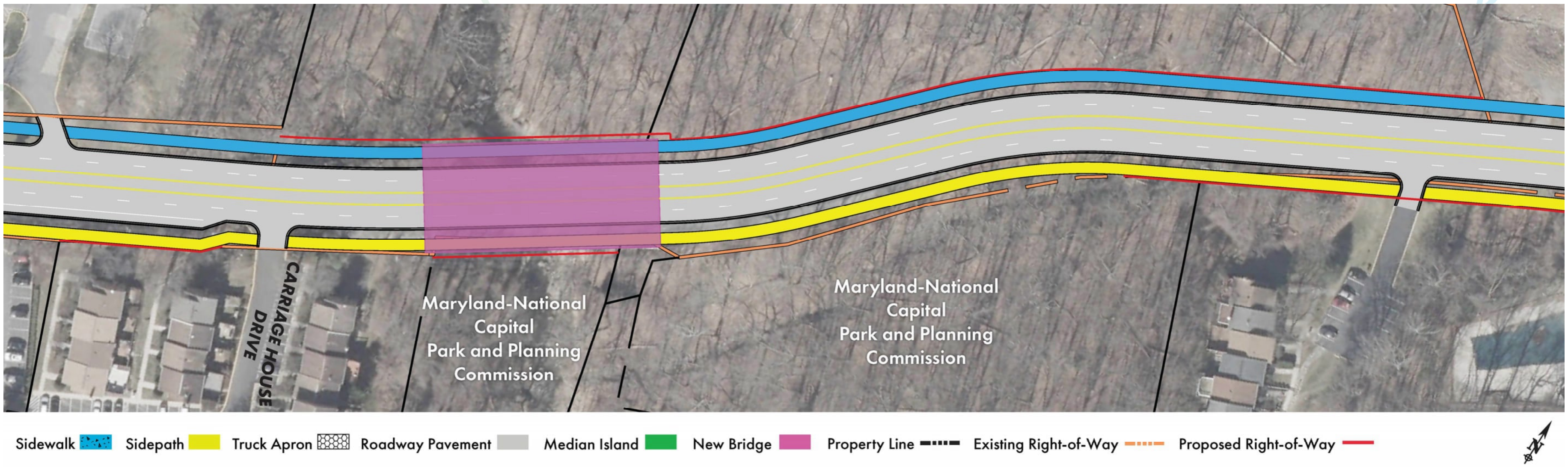
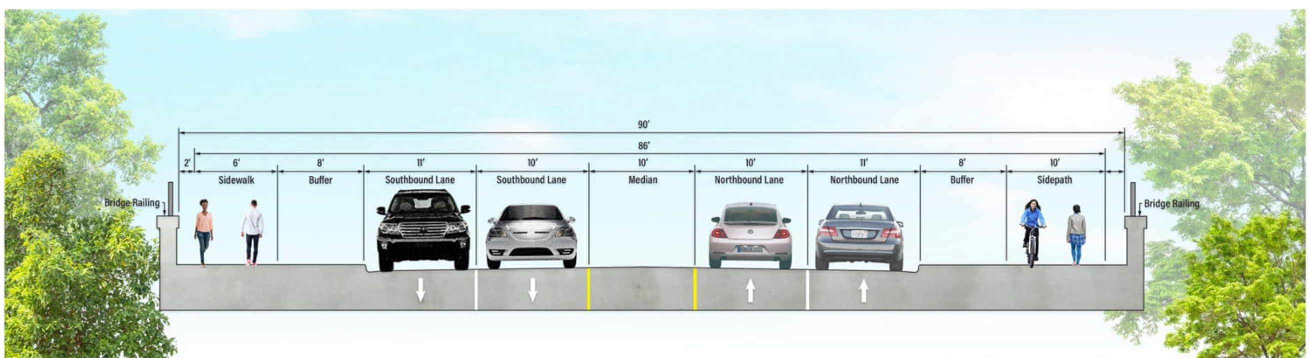
Alternative 4

4 lanes with bridge open to traffic





Typical Section Bridge over Paint Branch

4 lanes, 2-way with center median, sidewalk and sidepath

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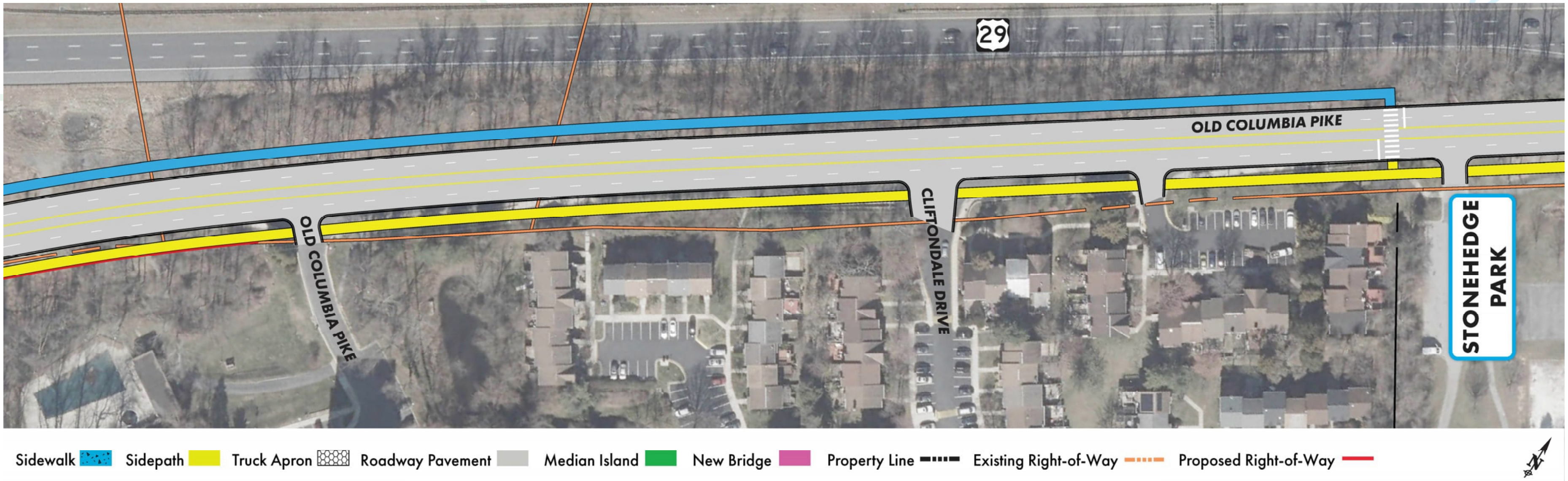
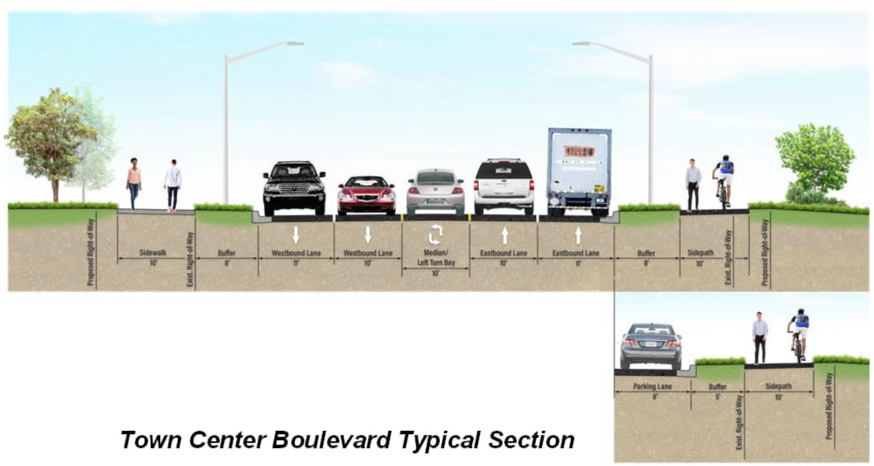
Alternative 4

4 lanes with bridge open to traffic





Town Center Boulevard Typical Section

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Montgomery County Department of Transportation

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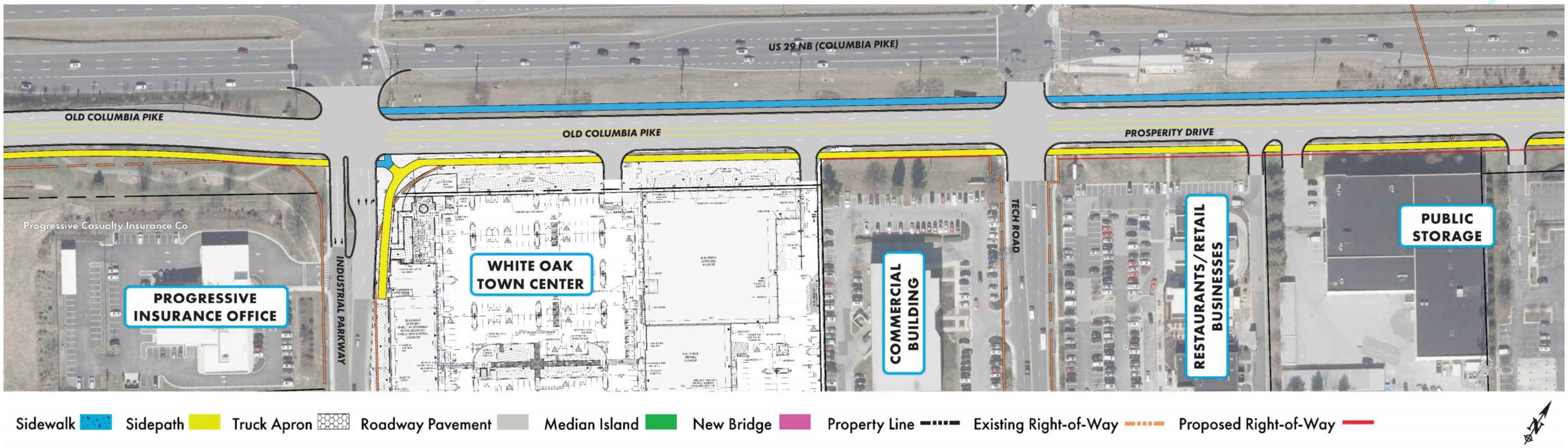
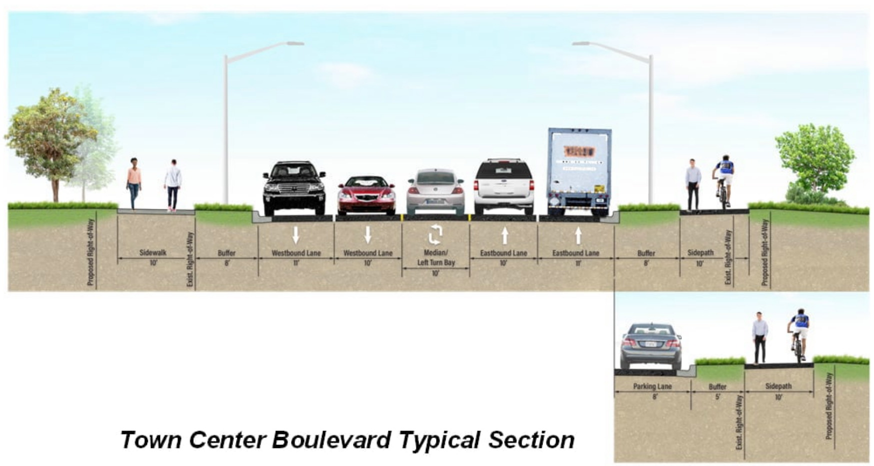
Alternative 4

4 lanes with bridge open to traffic





Town Center Boulevard Typical Section

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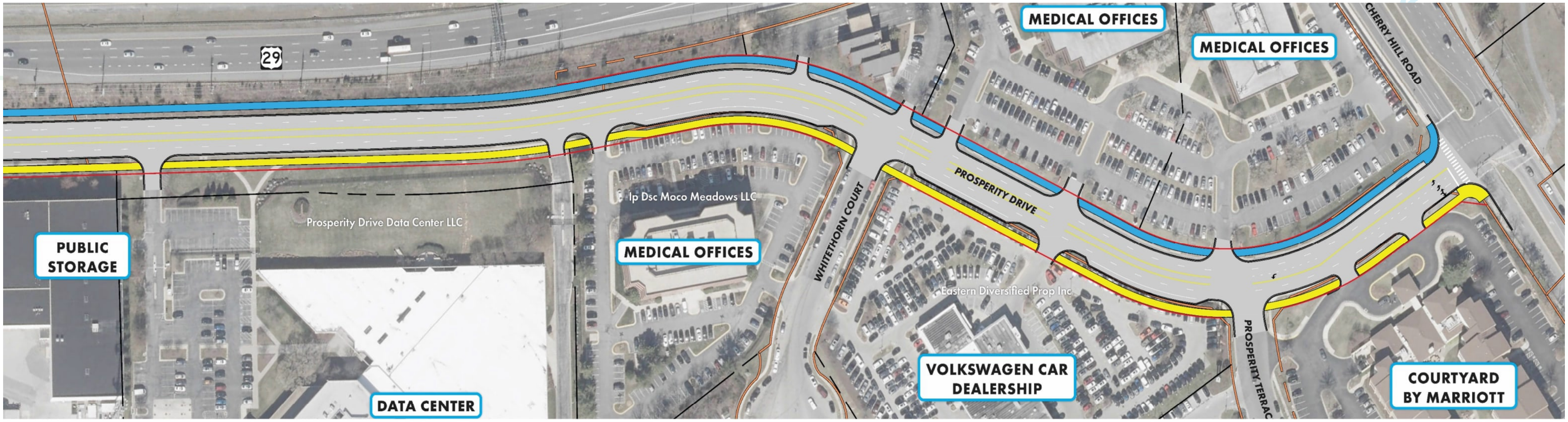
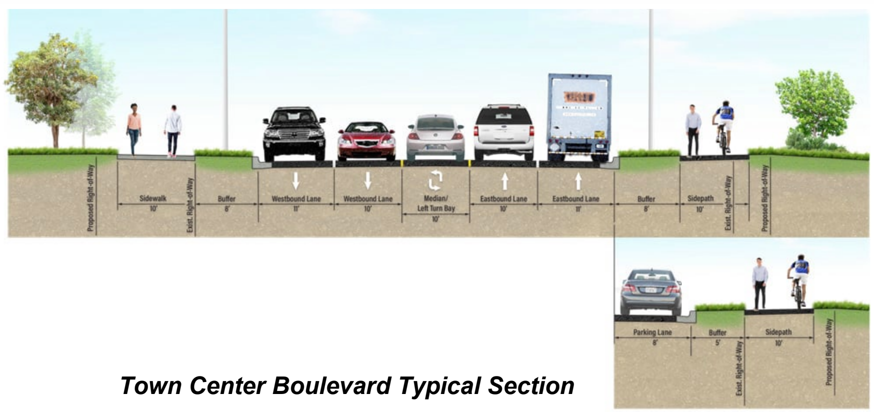
Alternative 4

4 lanes with bridge open to traffic



Sidewalk Sidepath Truck Apron Roadway Pavement Median Island New Bridge Property Line Existing Right-of-Way Proposed Right-of-Way



Town Center Boulevard Typical Section

MCDOT
Montgomery County
Department of Transportation

WRA

Industrial Parkway and Old Columbia Pike

Existing conditions:

- Westbound traffic queue blocks intersection
- Unsafe U-turn

MCDOT
Montgomery County
Department of Transportation

WRA

Industrial Parkway and Old Columbia Pike

Existing conditions:

- Lacks ADA pedestrian crossing
- Wide pavement area without clear pavement markings

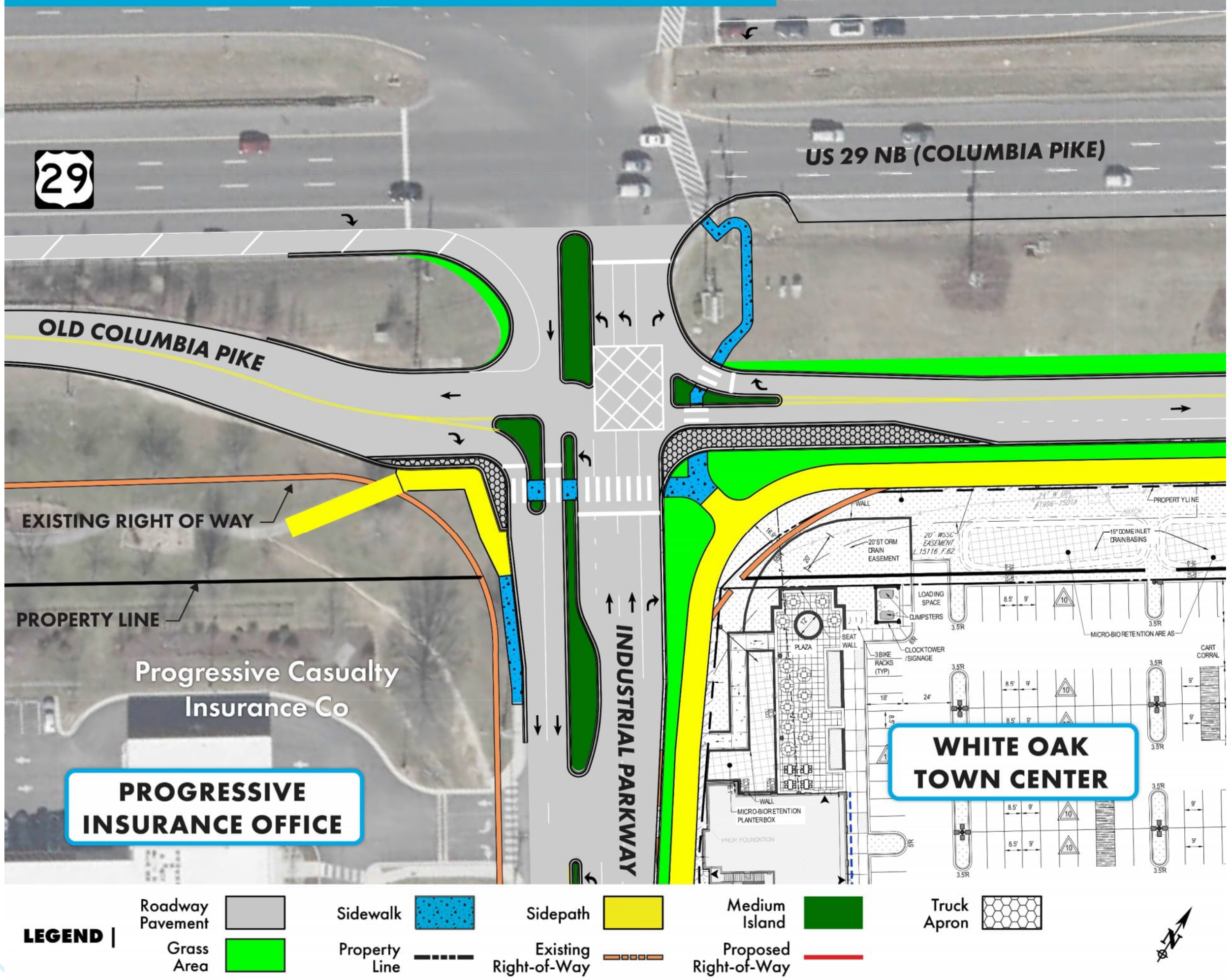
MCDOT
Montgomery County
Department of Transportation

WRA

Intersection Alternative A – Industrial Parkway

- Install DO-NOT-BLOCK intersection marking and signage
- Remove one right turn lane from US 29 NB to Industrial Pkwy
- Clear signage and pavement marking
- Protected intersection design
- Pedestrian refuge islands

INTERSECTION ALTERNATIVE A – INDUSTRIAL PARKWAY
(GEOMETRIC IMPROVEMENTS WITH UNSIGNALIZED CROSSING OF INDUSTRIAL PARKWAY)



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Montgomery County
Department of Transportation

WRA

Intersection Alternative B – Industrial Parkway

- Relocate westbound Industrial Parkway signal from US 29 to Old Columbia Pike
- Remove one right turn lane from US 29 NB to Industrial Pkwy
- Channelizing islands
- Signalized pedestrian crossings
- Clear signage and pavement markings
- Protected intersection design
- Pedestrian refuge islands

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Montgomery County
Department of Transportation

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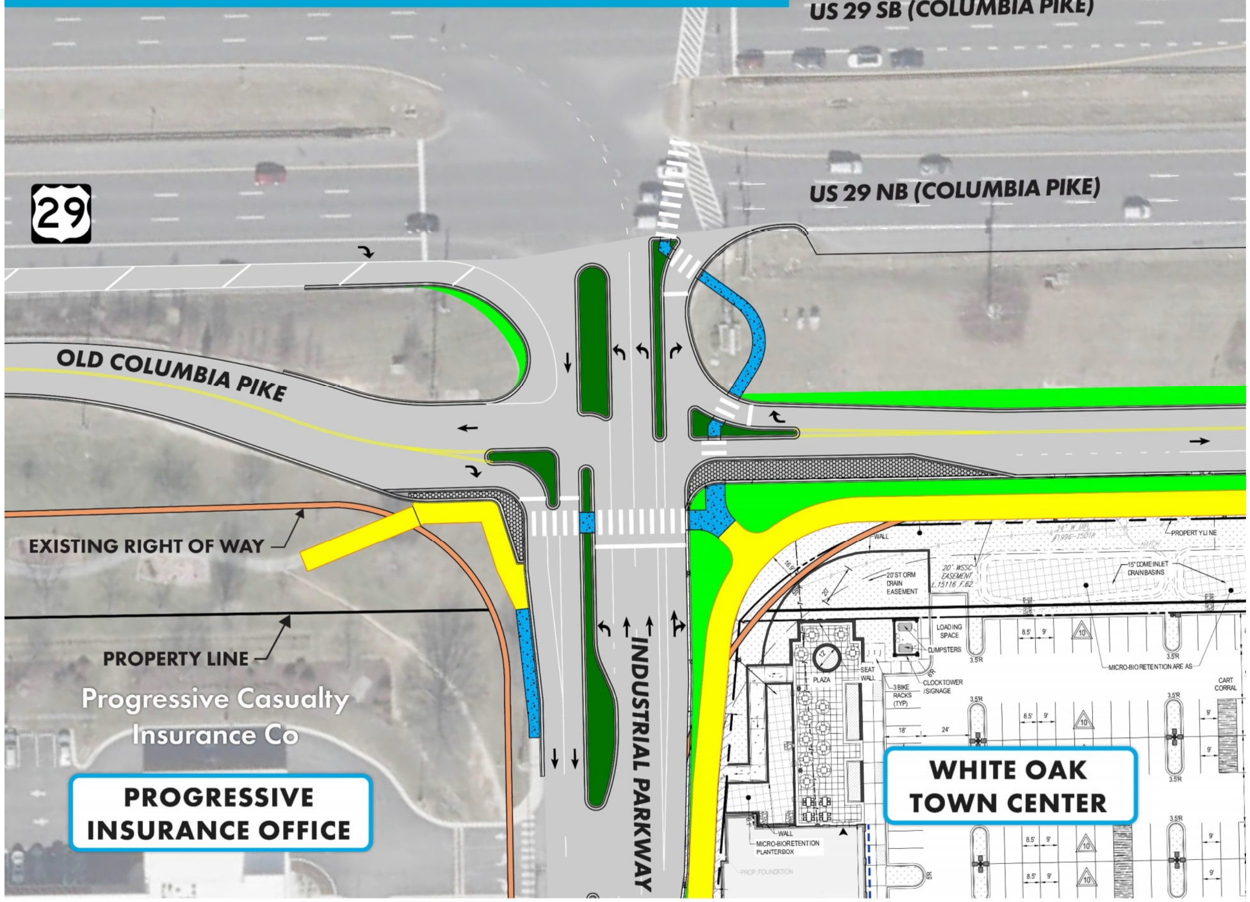
INTERSECTION ALTERNATIVE B – INDUSTRIAL PARKWAY

(RELOCATING WESTBOUND INDUSTRIAL PARKWAY SIGNAL TO OLD COLUMBIA PIKE)



LEGEND |

Roadway Pavement · Grass Area · Sidewalk · Property Line · Sidepath · Existing Right-of-Way · Medium Island · Proposed Right-of-Way · Truck Apron

MCDOT Montgomery County Department of Transportation

WRA

Tech Road and Old Columbia Pike / Prosperity Drive

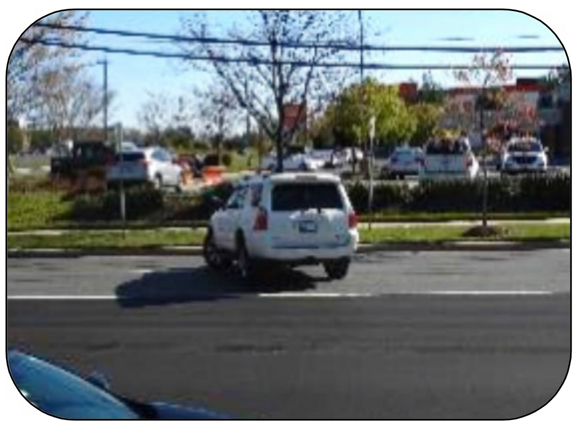
Existing conditions:

- Westbound traffic queue blocks intersection
- Westbound traffic backs up to block entrances

MCDOT
Montgomery County
Department of Transportation

WRA

Tech Road and Old Columbia Pike / Prosperity Drive



Existing conditions:

- Unsafe U-turn
- Lacks ADA pedestrian crossings
- Unclear pavement markings

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WRA

Intersection Alternative C – Tech Road

- Install DO-NOT-BLOCK intersection marking and signage
- Clear signage and pavement marking
- Protected intersection design
- Pedestrian refuge islands

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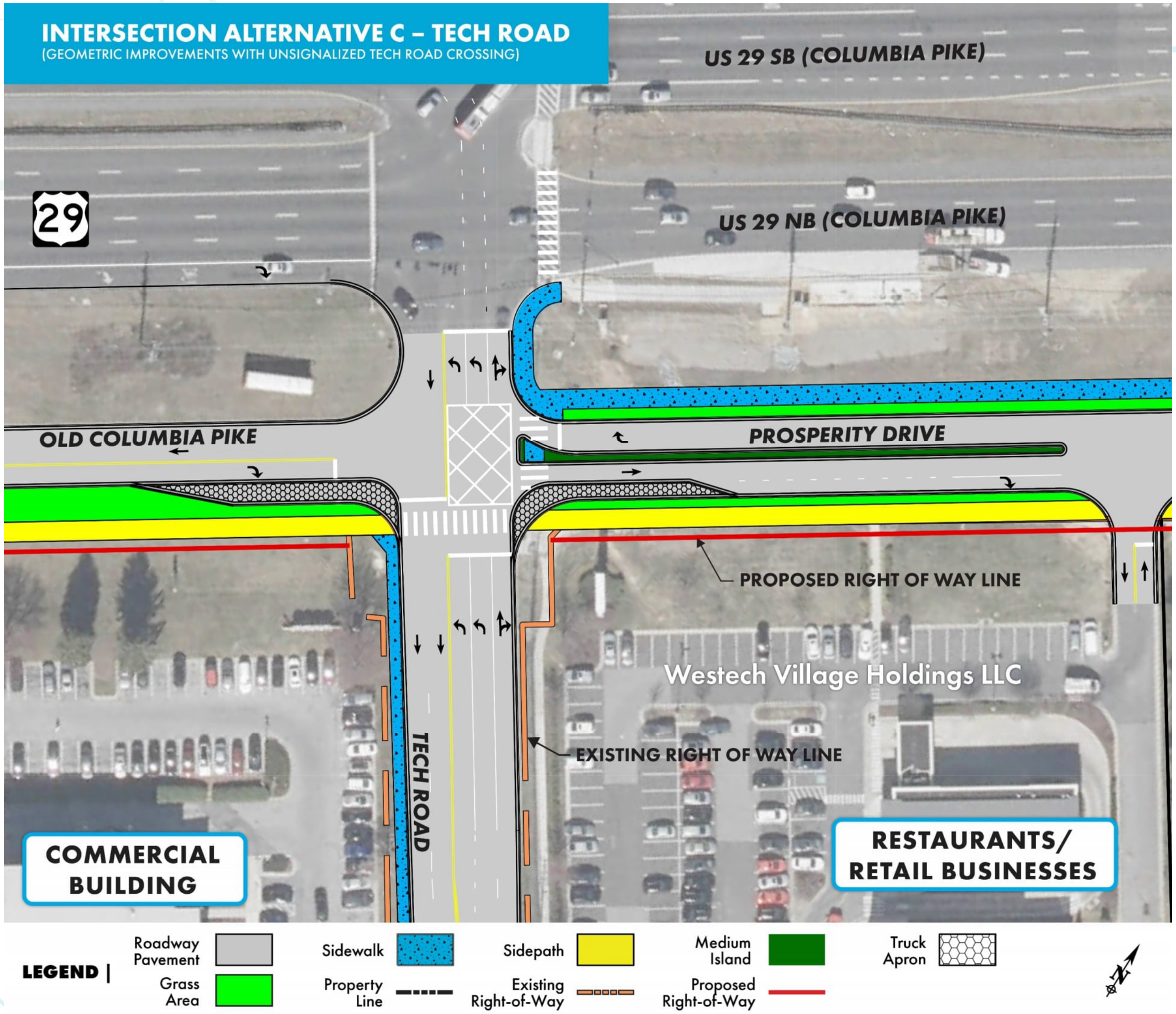
INTERSECTION ALTERNATIVE C – TECH ROAD
(GEOMETRIC IMPROVEMENTS WITH UNSIGNALIZED TECH ROAD CROSSING)
US 29 SB (COLUMBIA PIKE)
US 29 NB (COLUMBIA PIKE)
29
OLD COLUMBIA PIKE
PROSPERITY DRIVE
PROPOSED RIGHT OF WAY LINE
Westech Village Holdings LLC
EXISTING RIGHT OF WAY LINE
TECH ROAD
COMMERCIAL BUILDING
RESTAURANTS/ RETAIL BUSINESSES
LEGEND |
Roadway Pavement
Grass Area
Sidewalk
Property Line
Sidepath
Existing Right-of-Way
Medium Island
Proposed Right-of-Way
Truck Apron
N

Intersection Alternative D – Tech Road

- Relocate westbound Tech Road signal from US 29 to Old Columbia Pike
- Install channelizing islands
- Install signalized pedestrian crossings
- Add signage and pavement marking
- Apply protected intersection design
- Install pedestrian refuge islands

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Department of Transportation

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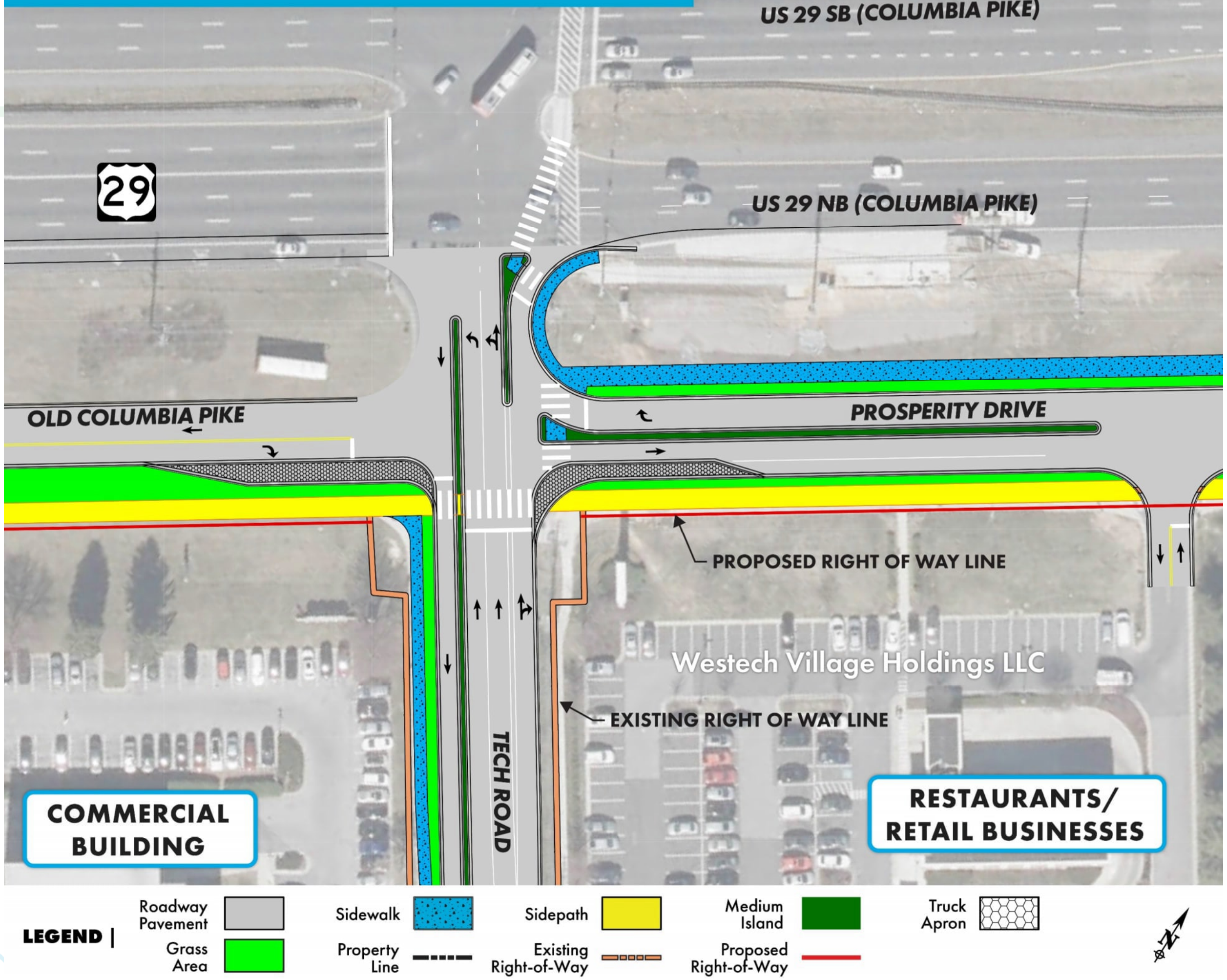
INTERSECTION ALTERNATIVE D – TECH ROAD

(RELOCATING WESTBOUND TECH ROAD SIGNAL TO OLD COLUMBIA PIKE / PROSPERITY DRIVE)



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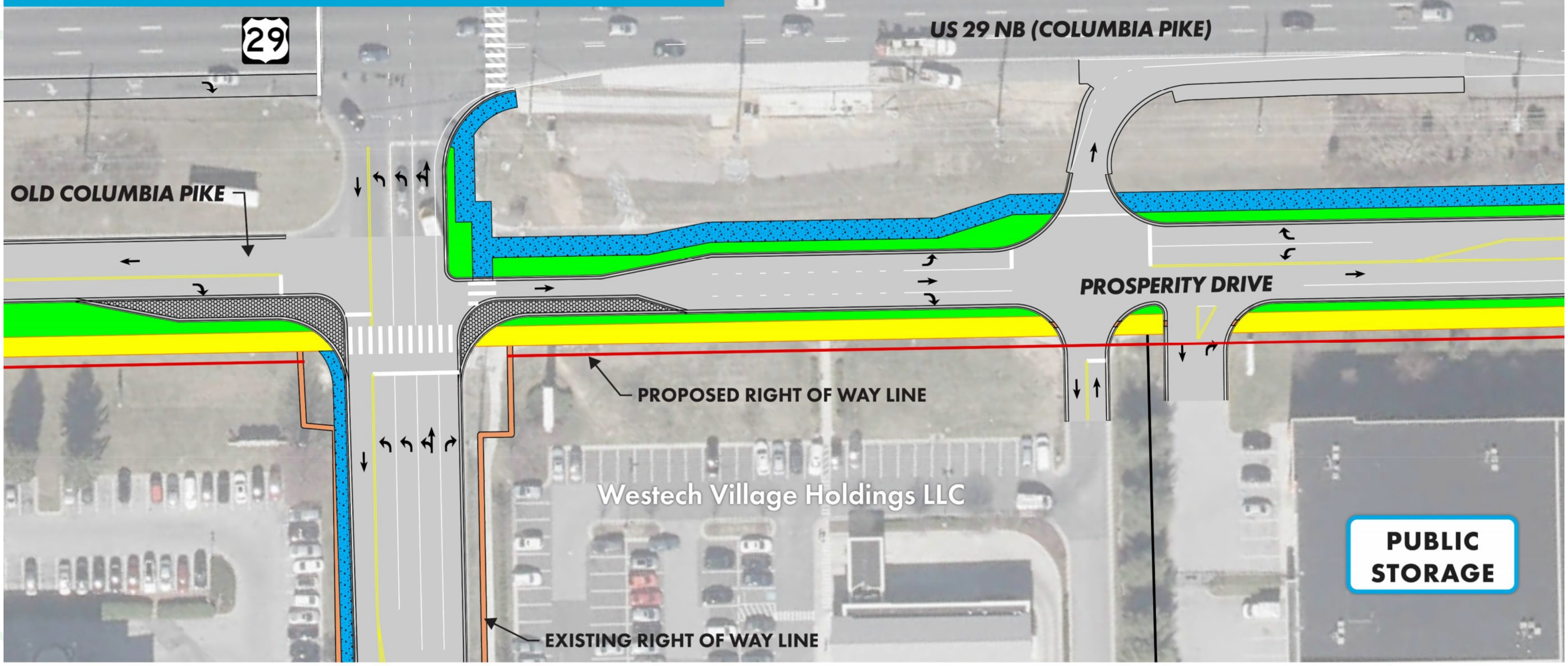
Intersection Alternative E – Tech Road

- On ramp from Prosperity Drive to northbound US 29
- Relocate westbound Tech Road signal from US 29 to Old Columbia Pike/Prosperity Drive
- Signalized pedestrian crossings
- Clear signage and pavement markings
- Protected intersection design
- Pedestrian refuge islands

INTERSECTION ALTERNATIVE E – TECH ROAD

(PROSPERITY DRIVE ON RAMP TO US 29 NORTHBOUND WITH SIGNALIZED CROSSING OF TECH ROAD)



LEGEND | Roadway Pavement · Sidewalk · Sidepath · Medium Island · Truck Apron · Grass Area · Property Line · Existing Right-of-Way · Proposed Right-of-Way

MCDOT Montgomery County Department of Transportation

WRA

Summary of Alternatives

	1 – No build	2 – Improves intersections, add sidewalk and sidepath	3 – Alternative 2 with bridge open to traffic	4 – 4 lanes with bridge open to traffic
Key features	Remains as is; only minimum safety improvements to bridge surface	Upgrade intersections to be ADA compliant; improve pedestrian/bicyclist connectivity	New bridge with 2 lanes of traffic	New bridge with 4 lanes of traffic
Forest impact (acres)	None	0.5	2.0	5.5
Right of way impact (acres)	None	1	1	4
Estimated cost*	N/A	$ 25 million	$ 40 million	$ 60 million

* Includes right of way and construction cost

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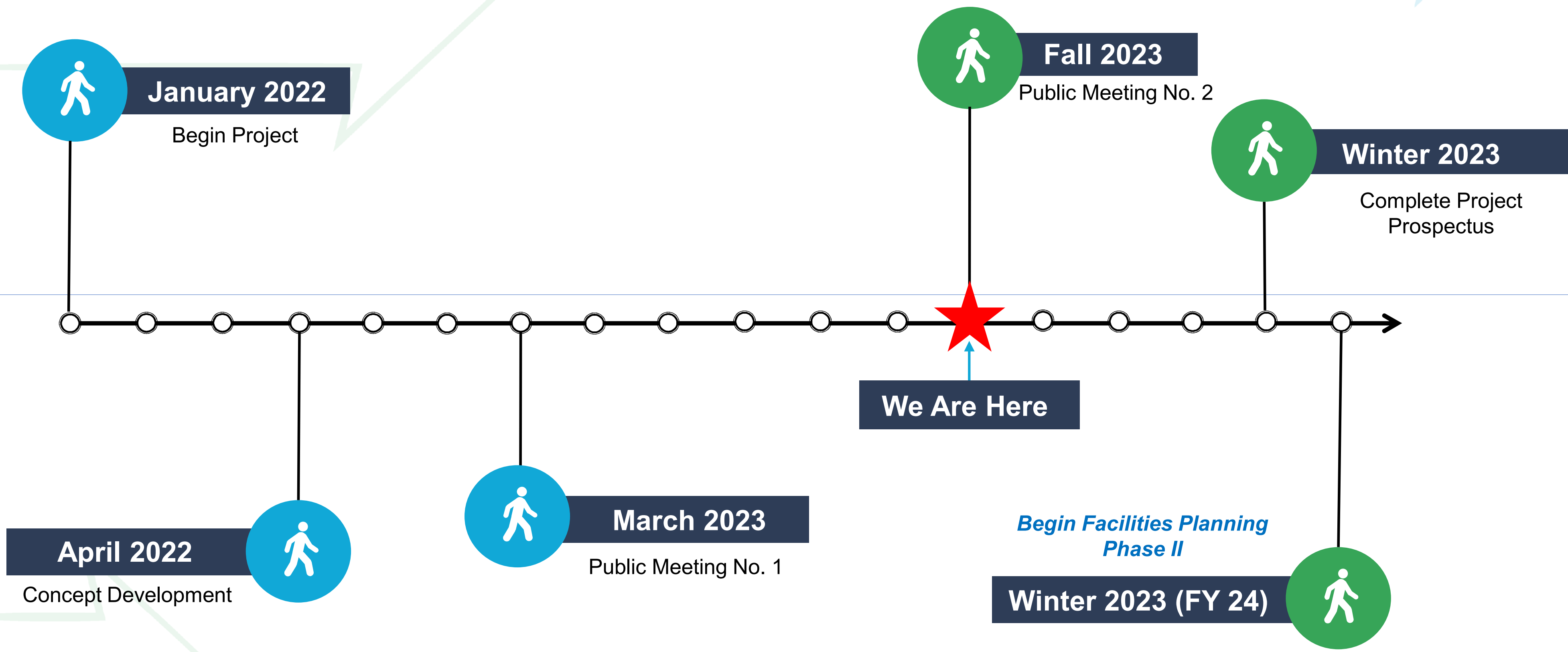
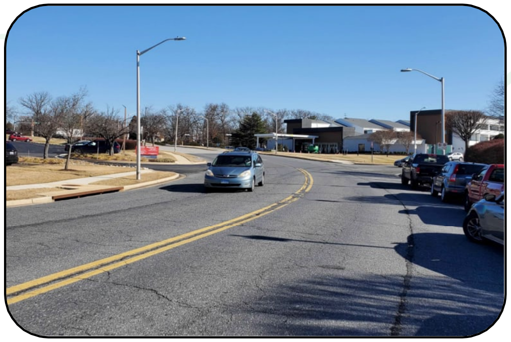
WRA

Project Schedule



Contact



Yasamin Esmaili, CPM
Project Manager

240-777-7226

yasamin.esmaili@montgomerycountymd.gov

https://www.montgomerycountymd.gov/dot-dte/projects/OldColumbiaPike/index.html

MCDOT
Montgomery County
Department of Transportation

WRA

Questions?

MCDOT
Montgomery County
Department of Transportation

WRA

References

- Project Website - https://www.montgomerycountymd.gov/dot-dte/projects/OldColumbiaPike/index.html
- MC Vision Zero Plan - https://www.montgomerycountymd.gov/visionzero/
- MC Complete Streets Guide - https://montgomeryplanning.org/planning/transportation/complete-streets/
- Road diet - https://highways.dot.gov/safety/proven-safety-countermeasures/road-diets-roadway-configuration

MCDOT Montgomery County Department of Transportation

WRA

Appendix C

Public Comments

18:22:33 From Lori Main to Everyone:
        Project Website:
https://protect-us.mimecast.com/s/Gkw7C687gKIrDYAoCmWW5n?domain=montgomerycountymd.gov
18:55:21 From mroberts to Everyone:
        Montgomery County Vision Zero Action Plan:
https://protect-us.mimecast.com/s/6pWoC737jVhAq1xmINKs8u?domain=montgomerycountymd.gov
18:56:40 From mroberts to Everyone:
        Montgomery County Complete Streets:
https://protect-us.mimecast.com/s/4n_yC827kKc6rpZjCohWYL?domain=montgomeryplanning.org
19:03:20 From Jeff Cessna to Lori Main(Direct Message):
        It looks like the Side path will involve removing the existing stone wall in front of the Stonehedge Neighborhood, removing the neighborhood sign, and building quite far into the neighbor hood side and front yards. Will the new front of Stonehedge be paid for by the county or the Neighborhood association?
19:03:36 From karen to Lori Main(Direct Message):
        Please, no additional traffic on Old Columbia Road.
19:03:50 From Beth H (she/her) to Lori Main(Direct Message):
        If we want to send a comment via chat, who should it be sent to? (Who should we select)
19:04:37 From karen to Lori Main(Direct Message):
        Pike
19:04:43 From Lori Main to Beth H (she/her)(Direct Message):
        Hi Beth, you can send it to the host or to me, Lori Main.
19:05:35 From Lori Main to Beth H (she/her)(Direct Message):
        Or everyone is good too. Thanks!
19:07:30 From Beth H (she/her) to Lori Main(Direct Message):
        Could someone provide an overview of the initial impetus for this project? Why is it underway, what are the overall goals or considerations?
19:07:44 From E Finnegan to Lori Main(Direct Message):
        Has DOT looked at the traffic modeling done for the WOSG Master Plan? Are there changes to the traffic expectations to 2045 in the COG Round 10?
        Are you expecting to make this a stand alone CIP for the next biennial CIP?
19:08:38 From mroberts to Everyone:
        -Project Website:
https://protect-us.mimecast.com/s/Gkw7C687gKIrDYAoCmWW5n?domain=montgomerycountymd.gov
19:09:21 From Beth H (she/her) to Lori Main(Direct Message):
        I have seen the website. I don't think enough is being explained.
19:09:53 From Jeff Cessna to Lori Main(Direct Message):
        Will plans still support an easy way to turn left onto Industrial from northbound old Columbia to access northbound 29?
19:12:36 From karen to Lori Main(Direct Message):
        What is the crime percentage of the bridge area? How will this impact Stonehenge community?
19:14:02 From karen to Lori Main(Direct Message):
        How will this impact school bus pick up and drop off?
19:16:55 From E Finnegan to Lori Main(Direct Message):

Will DOT be resurfacing the section of Old Columbia from Stewart to the White Oak Shopping Center soon? It is in terrible shape.
19:25:31 From Jeff Cessna to Lori Main(Direct Message):
When (if) Viva White Oak opens, there will be a massive increase in traffic on Industrial as it is one of only 2 northern access point to that neighborhood (the other being from Cherry Hill Road). Will this traffic also be taken into account?
19:27:14 From karen to Lori Main(Direct Message):
It will be unfair to make residence drive all around to access RT 29.
19:28:31 From Jeff Cessna to Lori Main(Direct Message):
I am a Stonehedge resident and oppose opening bridge to traffic. It would become a cut-through.
19:47:27 From Jeff Cessna to Lori Main(Direct Message):
Stonehedge was shown in the opening picture, with the stone wall. The existing side walk does not allow the space to install a side path without moving the road closer to 29.
19:57:53 From Jewru Bandeh to Lori Main(Direct Message):
FYI....Announcement from the East County Regional Services Office...The regional CIP Community Forum on April 12th, 2023, 7:00 - 8:30 pm at the White Oak Community Recreation Center.
20:01:00 From Solomon Debe to Lori Main(Direct Message):
is there a place to see the there options?
20:02:10 From Lori Main to Solomon Debe(Direct Message):
The displays will be posted on the project website tomorrow. Thanks!
20:03:01 From Solomon Debe to Lori Main(Direct Message):
Reacted to "The displays will be..." with 👍

First Name:	Last Name:	Property Address:	Email Address:	Your Questions and/or Comments on this project:
George	Shafer	1605 Regent Manor Ct	george.shafer@gmail.com	I would love to see what the county is planning on doing with this area.
Steve	Ashurst	14401 hollyhock way, burtonsville, md, 20866	steve@makeitbikeable.com	Please, whatever you do, make space for people riding bikes and walking along Old Columbia Pike/Prosperity Dr over the entire length of this project. This section should really be considered park-like and it should be that pleasant to bike and walk from both ends of this project. That may mean providing protected bike lanes separate from wide sidewalks to the bridge crossing, and removing some on-street parking. Any widening should only be for the benefit of vulnerable road users. We should not continue to spend tax dollars on road infrastructure that only brings more cars/trucks. As for myself, this is really the only direct route I can take to get to silver spring safely via bicycle. This has to exist and it needs to be a first-class facility for commuters and recreational users alike. Car/Truck traffic should be slowed (think speed bumps) and the lanes need to be as narrow as possible, not widened for cars. This is not a high-speed road, it shouldn't be, as it is mostly residential on both sides of the bridge. It needs to have lighting, safety features for crossing intersections that are convenient and prioritize people on foot and riding bicycles over car/truck traffic. Regards, Steve Ashurst
Eileen	Finnegan	10404 Sweetbriar Parkway	finnegan20903@yahoo.com	1. How does this project interact with the White Oak Science Gateway Master Plan transportation improvement to rebuild the bridge and make a 4-lane arterial from White Oak north to Industrial? 2. Maintenance is needed on the road section from Stewart to the White Oak Shopping Center. Will DOT be resurfacing or filling pot holes in this short section? 3. How does this project inter-face with possible 29 interchanges/access/egress improvements at Tech and Industrial?
Jordan	Day	1220 East West highway apt 1017, silver spring, md, 20910	jordan.albert.day@gmail.com	I strongly support alternative 2, which will drastically improve walkability and traffic safety along Columbia Pike. It seems unnecessary to re-open the bridge to automobile traffic--there are already 6 lanes of car capacity on Columbia Pike and the likely expense to re-open the bridge for only two lanes of traffic seems extraneous in that context. Old Columbia Pike and Prosperity Drive are overly wide as is and narrowing those roads would be enormously helpful to slow cars and begin to turn White Oak into the town center envisioned in the county's long range plans

904 Cannon Rd
Colesville, MD 20904
March 28, 2023

Department of Transportation
Attn: Old Columbia Pike Prosperity Dr. Improvements Team
Yasamin Esmaili, Project Manager
Rockville, MD 20850

Dear Ms Esmaili:

My name is Dan Wilhelm and I am with two groups that have a strong interest in this road improvement project and the entire area. I am President of the Greater Colesville Citizens Assn and a director with LABQUEST. I was an active member of the 2014 White Oak Science Gateway (WOSG) Master Plan (MP) and master plans before that, in 1997 and 1981.

I am going to confine my comments to the two intersections on US 29/Old Columbia Pike at Tech Rd and Industrial Pkwy. Your team stated at the March 16, 2023 public meeting that developing a safe and effective design at these two intersections would be difficult because Old Columbia Pike is so close to US29 – only several car lengths.

Today, through traffic on Old Columbia Pike is not allowed because of the large number of accidents that had previously occurred when US29 northbound vehicles turned left, colliding with Old Columbia Pike through traffic. As you surely know, the council wanted Old Columbia Pike to be a through road from Cherry Hill Rd to Stewart Ln, with two lanes initially and four lanes eventually. The question is: what should be the configuration at these two intersections? The two proposed configurations below apply for all alternatives, including the no-build (south of Industrial Pkwy).

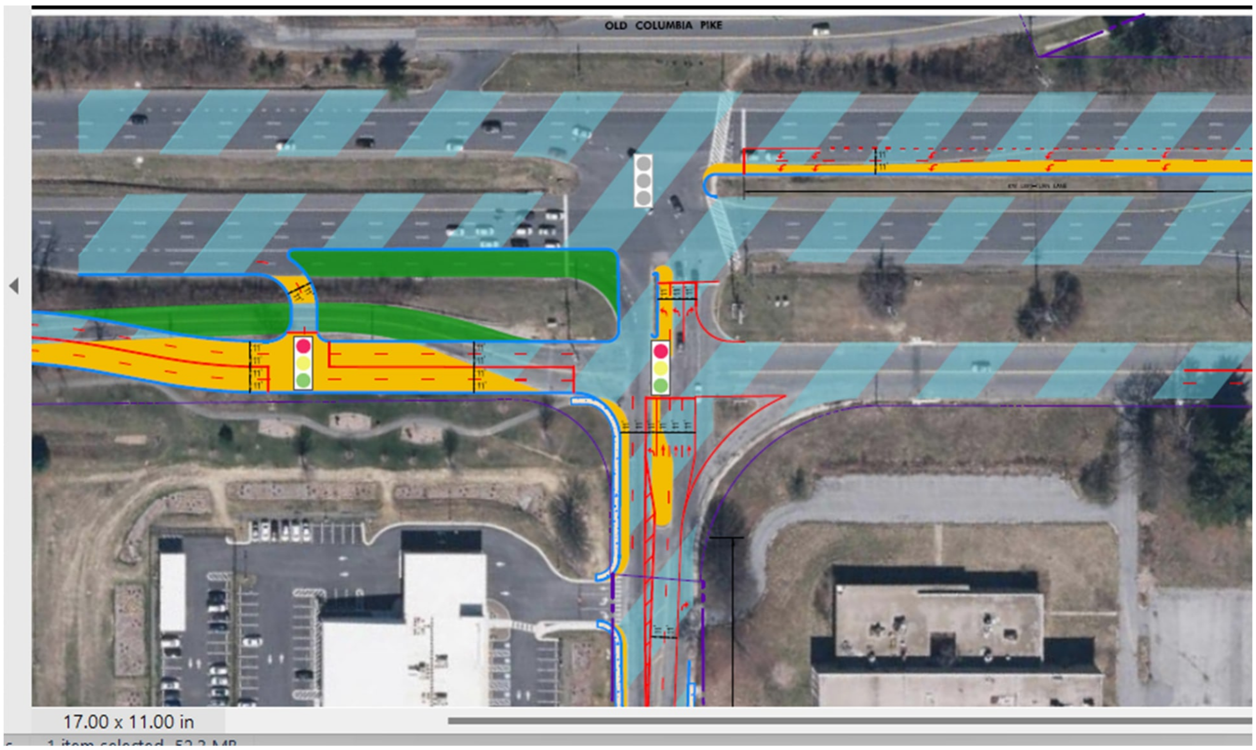
The starting place for answering the configuration question should be the White Oak Local Area Transportation Improvement Program that was approved in 2017. That program was based in part on a DOT study of the entire WOSG MP area to identify where transportation improvements are needed and to develop an initial configuration design for road improvements. These two intersections were included in that design and were included in the final list of projects that would be covered by the LATIP fee. The updated report can be found at [MCDOT - Unified Mobility Proram (montgomerycountymd.gov)].

Industrial Pkwy

Appendix A to the DOT LATIP study report contained all the traffic data and configuration data. (Appendix A is not on the above web site.) The concept for the Industrial Pkwy intersection can be found on page 665 – copied below. It shows that northbound US 29 traffic would exit onto Old Columbia Pike a short distance south of Industrial Pkwy. From there drivers could travel south, into the residential area, or north. At the Old Columbia Pike/industrial Pkwy intersection, they could turn right or proceed through the intersection. Note that northbound traffic on US29 can no longer turn right into Industrial Pkwy. I think this configuration would provide a safe and effective design.

With that configuration, traffic from the residential area could also turn left on Industrial Pkwy to access US29. It would thus address the problem the residents expressed on March 16 about their present difficulty accessing US29.

Also notice in the figure below that a second left-turn lane has been added for southbound US29 traffic. That extra lane is needed to support not only the White Oak Town Center development currently under construction but also the 12M sq ft Viva White Oak development that will be built along with an extension of Industrial Pkwy.



Tech Rd

The LATIP configuration on page 666 of Appendix A would continue the existing configuration, including the prohibition of through traffic on Old Columbia/Prosperity Dr. at Tech Rd. I don't think that configuration is safe since vehicles turning from US29 northbound could still collide with traffic on Old Columbia Pike /Prosperity Dr. I think the configuration at Industrial Pkwy should also be applied at Tech Rd.

Like Industrial Pkwy, a second southbound left-turn needs to be added to US29 to support Viva White Oak, White Oak Medical Center and Montgomery College.

- I expect most of the traffic that uses Tech Rd that is bound for Viva White Oak will turn left from Tech Rd onto Industrial Pkwy. Some traffic will use Broadbirch Dr, Plum Orchard Dr and Healing Way to access FDA Blvd.
- The White Oak Medical Center is at the intersection with Plum Orchard Dr and Healing Way. The WOMC plans to add more beds and a second doctor's pavilion, which will result in increased traffic, some of it coming from Tech Rd.
- The Montgomery College is planning to open a Workforce Development and Continuing Education center this fall at 2221 Broadbirch Dr. In addition, the College is currently looking for its planned east county campus site, which could be collocated with the education center or

somewhere else in the area. I think it will likely be accessed by this same road network from US29 and/or Cherry Hill Rd.

To support the above future traffic, two southbound left-turn lanes are needed from US29 at both Tech Rd and Industrial Pkwy. One might think that the intersection with Cherry Hill would be better. It would be but the left-turn is already at capacity and Cherry Hill Road is nearly at capacity. Therefore, the traffic southbound needs all three exist points.

Thanks for considering my recommendations, which GCCA and LABQUEST support.

Sincerely

Daniel L. Wilhelm

From: Eileen Finnegan <finnegan20903@yahoo.com>
Sent: Saturday, March 18, 2023 3:57 PM
To: Esmaili, Yasamin <Yasamin.Esmaili@montgomerycountymd.gov>; Sheridan, Daniel <Daniel.Sheridan@montgomerycountymd.gov>
Cc: Pitts, Corey <Corey.Pitts@montgomerycountymd.gov>; Bossi, Andrew <Andrew.Bossi@montgomerycountymd.gov>; eric.graye <eric.graye@montgomeryplanning.org>; Conklin, Christopher <Christopher.Conklin@montgomerycountymd.gov>; Salles, Cicero <Cicero.Salles@montgomerycountymd.gov>; Hondowicz, David <David.Hondowicz@montgomerycountymd.gov>; Darden, Wesley <Wesley.Darden@montgomerycountymd.gov>
Subject: Old Columbia/Prosperity Improvement Project: Comments & Questions

[EXTERNAL EMAIL]
Hello Yasamin and Daniel,

Thank you for holding the public Zoom meeting on the Old Columbia/Prosperity Drive Project. As part of the White Oak Science Gateway (WOSG) Master Plan area, the final configuration of this road will impact the transportation network/capacity for the area going forward for possibly decades.

In reviewing your "slide deck" presentation (link below) and other County documents I have a few questions/comments. I'd appreciate clarity on these particular issues.

1. The WOSG Master Plan clearly calls for this road segment to be a 4-lane arterial with the Paint Branch Bridge to be reopened to vehicles. This was not included in your presentation. **Is this current project an intermediate step, or is this project intended to fulfill the WOSG Master Plan?** Here is a link to the Plan's web site at Park and Planning (click on the menu on the right for the approved plan and the transportation appendix): https://montgomeryplanning.org/planning/communities/midcounty/white-oak-science-gateway/

2. As presented, it appears that you are using different classifications and number of travel lanes from those listed in Master Plan of Highways and Transitways Functional Classification. The roadway details shown in this master plan reflect the results of the WOSG decisions AND Complete Streets. Here is a listing of the roadway segments, classification, number of travel lanes and speeds listed:

Old Columbia Pike: Approx. 1000' west of Stewart Ln to Industrial Pkwy, **Town Center Boulevard** 4 lanes, 25MPH

Old Columbia Pike: 1140' west of Clifftondale to Industrial Pkwy, **Downtown Boulevard**, 4 lanes, 25 MPH

Prosperity Dr: Industrial Pkwy to Cherry Hill Rd, **Downtown Boulevard**, 4 lanes, 25 MPH

Link: https://montgomeryplanning.org/wp-content/uploads/2022/11/created_2_1_23.pdf

3. The White Oak area is governed by a rather unique pay-and-go development policy, known as the White Oak Local Transportation Improvement Plan (LATIP). The LATIP is an accumulation of individual projects which will be (eventually) funded by area development fees. **If interim, are these**

improvements intended to be in addition to the LATIP? Or if permanent, and not increasing traffic capacity, will only the sidepath be part of any future LATIP calculation? Here's the LATIP link: https://montgomerycountymd.gov/dot-dir/Resources/Files/LATR-WhitePaper(1).pdf

4. **What are the most current SHA plans for the Industrial/Tech and Rt29 intersections?** The Draft of the Briggs Chaney plan (posted 3/17) calls for a change as follows "The recommendation for a grade-separated interchange at Tech Road/Industrial Parkway as recommended by the 2018 [sic 2014] White Oak Science Gateway Plan should be amended to be placed only at Industrial Parkway." It is not clear what traffic modeling was done to support this recommendation. Does this footprint work for your project? Does it adversely impact the visibility/access to the now-under-construction White Oak Town Center project?

5. During the Zoom Q&A, 2045 traffic modeling for this project seemed to be pending, and was going to be done using most current projections. The WOSG traffic appendix has the TAZ map for the area. Attached is an Excel file of the various TAZ numbers used in area traffic projections over the past decade fyi. Notice that there were some errors in FDA numbers which were corrected in Round 9.2. Since the Round 10 numbers have not been published by COG to date, I do not have Round 10 listed.
https://www.montgomerycountymd.gov/dot-dte/Resources/Files/OldColumbiaPk/Public%20Meeting%20Displays.pdf
What is/was the scope of any modeling? What projections will be/were used?

6. As you heard, **the intersections of Prosperity at Industrial and Tech are currently problematic for traffic circulation in the area, and it appears that this plan is using the same lane configurations?** For example, the only way to get to the White Oak Town Center grocery is to be on 29 and enter on to Tech and make a right on Prosperity. If you are on Industrial going west, you can make a right onto Prosperity. But there is no easy access from Old Columbia. If you are Prosperity east of Tech you are relegated to cutting through the WesTech Village parking lot?

7. Obviously the Paint Branch Bridge (a Luten bridge) does have history. Remarkably, 2 students from UMD did papers documenting the history and widening in the 30s. These papers, at College Park, have been digitized.
See: https://archives.lib.umd.edu/repositories/2/digital_objects/1469
https://archives.lib.umd.edu/repositories/2/digital_objects/1617

Attached is a photo from the book, "Reinforced Concrete Bridges" by Daniel B Luten 1917 fyi. Amazingly, this photo also shows the piers of the much earlier bridge across the Paint Branch.

To wrap up, I can well understand and appreciate that residents living along Old Columbia do not want the roadway widened or the bridge opened, but **how does this project "square" with the various approved County master plans and public promises that the White Oak Science Gateway development will be accomplished with a some-what adequate transportation infrastructure?** Or, if this is a more temporary/intermediate/short lived improvement, residents should be informed.

Thank you again, and I look forward to receiving your reply and answers.

Regards,
Eileen Finnegan

Referenced links:
MoCo DOT slide deck: https://www.montgomerycountymd.gov/dot-dte/Resources/Files/OldColumbiaPk/Public%20Meeting%20Displays.pdf
Fairland-Briggs Chaney Draft: https://montgomeryplanningboard.org/wp-content/uploads/2023/03/Fairland-and-Briggs-Chaney-Master-Plan-Working-Draft.pdf

Old Columbia Pike / Prosperity Drive
Improvements Project

Public Meeting
Tuesday, November 14, 2023
Chat Log

From Marc Suddleson to Lori Main(Direct Message) : What accommodations for pedestrians to get across 29 at Tech Road. So dangerous!

From Marc Suddleson to Lori Main(Direct Message) : Need a ped bridge at Tech Road...in plan?

From Marc Suddleson to Lori Main(Direct Message) : Tech and Old Columbia needs a traffic light..metro park ride, county bus stops, school buses, new houses, apts, and through traffic doesn't stop! Very dangerous!

From Carolina Paladines to Lori Main(Direct Message) : As a homeowner at Gatestone off Old Columbia Pike (Townhomes before white oak towers) I do not think alternatives 3 and 4 (opening the bridge to traffic) is a good option. I do like improvements for pedestrians such as improving our sidewalks and having a bike trail.

From Marc Suddleson to Lori Main(Direct Message) : https://www.nbcwashington.com/news/local/School-Bus-Strikes-Critically-Injures-Pedestrian-in-Maryland-247311781.html

From Carolina Paladines to Lori Main(Direct Message) : Coming out of our homes to get on Old Columbia Pike is already difficult especially in the morning hours and opening vehicular traffic would make it more worse.

From Marc Suddleson to Lori Main(Direct Message) : https://wjla.com/news/crime/pedestrian-struck-by-hit-and-run-driver-in-silver-spring

From Marc Suddleson to Lori Main(Direct Message) : Lori...thanks for recognizing my comments. Can you please share the links highlighting the danger for pedestrians in crossing US29.

From Lori Main to Marc Suddleson(Direct Message) : Hi Marc, the chat including all links will be shared with the project manager and consultants after the meeting. Thanks for providing them!

From Marc Suddleson to Lori Main(Direct Message) : While the new town center is a welcome addition to our area. But US 29 creates a major barrier to access for those who live in nearby communities.

From Marc Suddleson to Lori Main(Direct Message) : Reacted to Hi Marc, the chat in... with "👍"

From Marc Suddleson to Lori Main(Direct Message) : Agree with all three previous comments to not open old bridge to cars. And prioritize pedestrian safety in the area!

From Marc Suddleson to Lori Main(Direct Message) : Agree with comment on need for active traffic controls.

From Marc Suddleson to Lori Main(Direct Message) : Can some chat here or say during meeting the SHA project reference number that includes a flyover or grade separate roadway at Tech 29

From Lori Main to Marc Suddleson(Direct Message) : I'm not understanding your meaning. what would you like me to say during the meeting?

From Cathy’s Phone to Lori Main(Direct Message) : I live off of Tech Rd and Featherwood St. I would not make additional lanes for cars. Cars will use that road as a cut through to Rt 29 as they do Tech Rd and Old Columbia pike. I cannot even make a right into Tech Rd going south on Rt 29 in the mornings because traffic blocks the lane

From Marc Suddleson to Lori Main(Direct Message) : How can I refer to the SHa plan?

From: Beth Hilkemeyer <bhilke1@yahoo.com>
Sent: Sunday, November 26, 2023 10:12 PM
To: Esmaili, Yasamin <Yasamin.Esmaili@montgomerycountymd.gov>
Cc: Sheridan, Daniel <Daniel.Sheridan@montgomerycountymd.gov>
Subject: Old Columbia Pike/Prosperity: questions and comments

[EXTERNAL EMAIL]

Greetings!

My name is Beth Hilkemeyer and I reside at 12116 Cliftondale Drive in the Stonehedge Community.

Thank you for your efforts to improve our community. I appreciate that you hosted a second meeting on November 14, and the additional detail now provided on intersection options. As I was unable to attend the meeting, I watched the recording and reviewed the other project materials. Like attendants at your two public meetings, I am not in favor of opening the bridge to motor vehicles.

Questions

I tentatively support Alternative 2, although I have a few questions.

Where specifically is "0.4 mile to 675' South of Industrial Pkwy Intersection?"

If this is the portion alongside the Stonehedge community, you are proposing a 37' width, whereas the current road width is 24', with approximately an additional 5 to 9' over to the telephone poles and the stone retaining wall. Will the stone wall be impacted? Will the poles be moved? To what extent does your plan rely on removing trees on the west side of Old Columbia Road?

I also have questions about the fence that will be added to the bridge. How high will it be (this is not clear from the rendering and the cross section)? Will people still be able to look down over the side of the bridge to see the stream below?

Are you continuing to coordinate with the Stonehedge park project? The most recent plans they presented showed MCDOT responsible for the continuation and location of the shared use path.

Comments on Intersections and Crosswalks

I can see that a lot of thought went into the different options you presented, both with respect to pedestrian and bicyclist safety and with respect to motor vehicle movements.

It is difficult for me to fully understand the pros and cons of the intersection options (Industrial Parkway A vs. B, Tech Road C vs. D) without having the opportunity to ask specific questions at your meeting. Perhaps options B and D would be safer for pedestrians and bicyclists, as they remove any uncertainty regarding whether vehicles will choose to roll forward while pedestrians and bicyclists are crossing with the light. The block box patterning used in options A and C still would help motorists to understand whether they could still roll forward, making crossing those intersections more predictable.

Comments:

- At the Industrial intersection, the sidewalk between Old Columbia and U.S. 29 jogs over. If this is to avoid a sign, that sign is no longer there.
- Consider whether to add a section of sidewalk from the Flash stop heading northeast to the proposed sidewalk, to shorten the walk from those coming from the north.
- If safe, crosswalks would be helpful at both ends of Spine Road, to cross over both Industrial and Tech Roads. I mention this area as your improvements include channelizing islands on these roads.
- Additional crosswalks may be needed eventually along the northern portion of Prosperity Drive.
- Currently drivers make a left out of Public Storage and into the service road adjacent to it. It is helpful to retain this movement if possible.

* Please add a symbol for traffic lights to future plans so that we can see their proposed location.

Would it be possible to make the following improvements soon, rather than waiting until this project is implemented? The first two suggestions were in place until recent work associated with the White Oak Town Center development.

- Arrow pointing south in cross-through allowing drivers to continue or turn south onto Old Columbia Pike from Industrial.
- Right turning arrow on pavement for the right turning movement as leave Old Columbia Pike at the Industrial Road intersection.
- Block box striping accompanied by establishing (if not there already) traffic light pavement sensors to the east of the striping.
- Change the arrow sign for the right-most turning lane from northbound 29 to indicate that the lane provides a right turn and also a U turn to the right.

<u>Getting Community Feedback</u>
Thank you for sending us a letter about the November 14 meeting. I do not believe we received anything for the White Oak Science Gateway Master Plan process, so this is an improvement.
The deadline for comments (with a two week turn-around over the Thanksgiving Holiday) may dissuade people from participating. In addition, the meeting recording's sound quality often makes it difficult to understand what is being said, including the explanation of the alternatives.
It was mentioned that comments and responses would be summarized. Could these be posted on your website in the near term? Could you also post when the Transportation and Environment Committee meeting will be, and include a link to the materials provided to Committee members?
This project would occur in a transforming area subject to policies and requirements from several documents. As part of your project documents, please consider summarizing them and how they impact your development of alternatives.
Also, if you are required to include these four alternatives, consider explaining how doing so fulfills requirements for how you analyze and present alternatives. If there are criteria that your department usually uses to evaluate options, that also would be helpful to explain.
Finally, under "Schedule" on your website, consider whether to provide a summary of milestones, including what the Transportation and Environment Committee, County Executive, and County Council will do, and how an approved project then needs to be added to the Capital Improvement Program (with its own timing). This summary could indicate when and how residents can continue to provide feedback, which milestones were complete, and the timing of the next milestone when known.
<u>One Final Comment</u>
Thank you for having areas where the bridge was tested repaired. There is one remaining core hole, right in the middle of the bridge's roadway.

Thank you for considering my feedback,

Beth Hilkemeyer

From: bonzelle7@gmail.com <bonzelle7@gmail.com>
Sent: Thursday, November 23, 2023 2:12 PM
To: Esmaili, Yasamin <Yasamin.Esmaili@montgomerycountymd.gov>
Cc: Santos Fritz, Frankie <Frankie.SantosFritz@montgomerycountymd.gov>
Subject: White Oak Project-Old Columbia Pike(Industrial Pkwy south over Paint Branch)

[EXTERNAL EMAIL]

Happy Thanksgiving Ms. Esmaili.
I would like to thank you and the other MoCo officials for the recent presentation.

Our neighborhood is experiencing quite a set back with the developing going on and I, along with many others, would prefer minimal updates and the road to remain closed to thru traffic.
I believe the main concern should be with the Stewart Lane interchange, Industrial Parkway and Tech Rd.
More lighting and safe crosswalks as I witnessed recently(after 5p) people jay walking across Industrial Pkwy, barely seen!!
It makes me think of the new MoCo program reducing traffic deaths that is happening now.

I know this is going to take awhile but in the meantime, quick measures can be taken- more lighting, police presence, speed reduction and cross walks.

MoCo put a moratorium on development in this area for many years; beginning in the 80's. Now, things are opening up too quickly.
Yes, it is an industrial area but citizens live here and we would like to respected.

Thank you for your time.
Bonnie Davis-Isom
12001 Old Columbia Pike
Silver Spring
301-325-7654

Sent from my iPhone

From: David Bickell <bickelld@gmail.com>
Sent: Wednesday, November 15, 2023 4:17 PM
To: Esmaili, Yasamin <Yasamin.Esmaili@montgomerycountymd.gov>
Subject: Old Columbia Pike

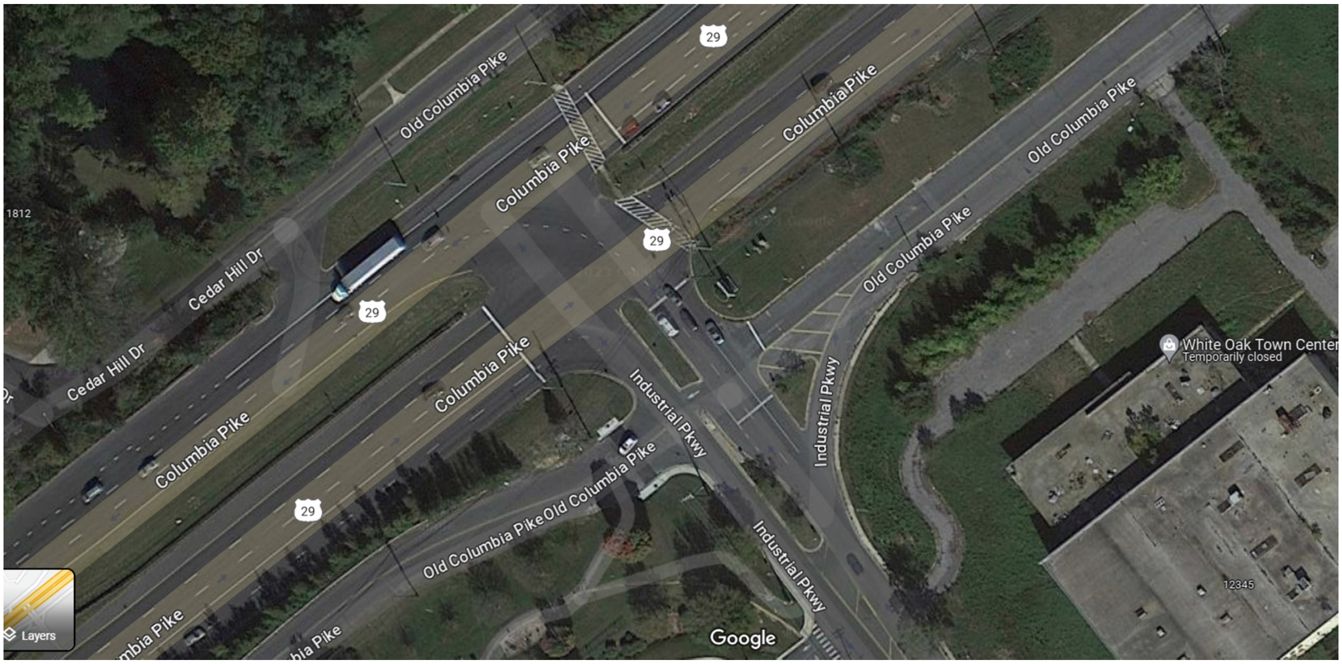
[EXTERNAL EMAIL]
Mrs. Esmaili,

Thank you for sharing the work that you and your team has done for future improvements to our community and the opportunity to share our thoughts last night. I live at the end of Old Columbia pike as it merges onto highway 29 next to the intersection of Industrial Parkway. As we discussed last night I think we should do away with the options to open the bridge to traffic and focus more on the intersections at Tech Road and Industrial Parkway.

I also agree that the traffic lights should be moved back away from Highway 29 on both Tech Road and Industrial parkway entrances to 29 and bring back the cameras to enforce so people will not block the intersections and will be able to see pedestrians and cyclists easier with the push button pedestrian crossing with flashing lights to let the motorists know a pedestrian is in the intersection. There are a lot of people that wear all black clothing in this area and it makes it hard for them to be seen at night.

I would first reach out to the Maryland state highway and coordinate your efforts with any plans they might have for these intersections. The West side of 29 on old Columbia Pike also needs a lot of work as well. It currently has a crosswalk to nowhere that crosses 29 from Industrial parkway to old columbia parkway, but yet no crosswalk or anything once it gets you to the west of 29. The onramp to 29 is also dangerous as old Columbia Park west of 29 is nearly 10ft lower than the highway. The on ramp from Old Columbia Pike to 29 South bound is dangerous with buses scraping the ramp trying to get up to the highway. Also there are many drivers that are not aware that they have a on ramp and just sit at the top of the hill looking for an entrance onto the highway. Please see the pictures. I would love to show you and your engineers some of these and other issues that need to be addressed such as water run off from 29 that flows through our neighborhood exc.

V/R
David Bickell
(931)201-9834


Old Columbia Pike
Columbia Pike
Cedar Hill Dr
Industrial Pkwy
White Oak Town Center
Temporarily closed
29
Layers
Google

First Name:	Last Name:	Property Address:	Email Address:	Please check one of the following that describes you best:	On-Street Parking	Access to Bus Stops	Crosswalks	Sidewalk	Sidepath*	On-Street Bike Lanes**	Grass Area & Landscaping	Lighting	Capital Bikeshare availability	Please check all applicable concerns you have on Old Columbia Pike / Prosperity Drive.	Please rank the following design options for the segment between Stewart Lane and Cherry Hill Road. To view the displays of the design alternatives, please visit links provided on the project website.	To what degree to you support this project?	Your Questions and/or Comments on this project:
Margaret	Goergen-Rood	10508 Royal Road Silver Spring, MD 20903	mgoe64@hotmail.com														I believe that for the success of all the future development in the White Oak area, including Viva White Oak, White Oak Town Center, Montgomery College and the new White Oak apartments, all will need maximum access points at the Route 29 and Old Columbia Pike. Today there are not enough access points to support the increase in cars and traffic that will be trying to get into the development. I support opening the bridge and providing all residents of the White Oak area access to the public road and the ability to more easily get to the new development.
Meredith	Elrod	1631 Carriage House Terr	kepera@gmail.com	I live/work on Old Columbia Pike / Prosperity Drive	Important	Important	Extremely Important	Extremely Important	Important	Important	Neutral	Important	Neutral	Insufficient pedestrian facilities (e.g., sidewalk);Insufficient crosswalks;Speeding of motor vehicles;Sight distance / blind spots;On-street parking;	Improve intersections, add sidewalk and sidepath;No build;Alternative 2 with bridge open to traffic;Alternative 3 with 4-lanes;	3	Plan is not clear
Michael	Schwartz	12030 Bronzegate Pl, Silver Spring MD 20904	michaelps@duck.com	I live/work on Old Columbia Pike / Prosperity Drive	Important	Extremely Important	Extremely Important	Extremely Important	Important	Important	Neutral	Extremely Important	Neutral	Insufficient pedestrian facilities (e.g., sidewalk);Insufficient crosswalks;Speeding of motor vehicles;Drainage / stormwater management;Insufficient bicycle facilities (e.g., bike lane, sidepath, etc.);On-street parking;Lighting on sidewalks/sidepaths/greenways. "No Through Route" signage.;	Improve intersections, add sidewalk and sidepath;Alternative 2 with bridge open to traffic;Alternative 3 with 4-lanes;No build;	5	I disapprove of any reopening of the bridge to motor vehicle traffic. It will only lead to Old Columbia Pike becoming a high-speed alternate to Rt 29 during traffic slowdowns. I approve of a sidewalk or sidepath from the park entrance to Industrial Parkway. I approve of marking and routing OCP as the safe alternative to walkers and bikes as a bypass to unsafe travel on Rt 29.
Stephen	Ashurst	14401 Hollyhock Way	steve@makeitbikeable.com	I do not live/work near Old Columbia Pike / Prosperity Drive, but I pass by this area often (at least once a week)	Not Important At all	Important	Extremely Important	Important	Extremely Important	Not Important	Important	Important	Important	Insufficient bicycle facilities (e.g., bike lane, sidepath, etc.);On-street parking;	Improve intersections, add sidewalk and sidepath;No build;Alternative 2 with bridge open to traffic;Alternative 3 with 4-lanes;	4	As others have noted via other meetings, having the bike and pedestrian facilities along Prosperity and Old Columbia Pike is paramount, these must happen. The one part I do love today is having no thru motor vehicle traffic across the bridge. When I ride my bike, I can take the lane and enjoy the climb from the bridge without too much interaction with motor vehicles except those who live in the neighborhood. Having quiet, safe streets is important to people walking and bicycling and we should keep what is good. I would like road smoothed out with new pavement, but adding vehicles is a show-stopper, do not add vehicles across the bridge, they should be on US-29. Adding lighting to the area will help commuters (peds/bikes) get through safely, as I know it is dark when I've had to travel late or early morning. The intersections are a huge problem due to the closeness of the parallel road. I agree we need to put the money into the intersections. Looking at Industrial and Tech together would allow you to create a flow of traffic that would prevent unnecessary interaction, allowing only left turns exiting at Industrial, and only right turns at Tech onto US-29. Make use of blocks and one way streets to prevent people from going the wrong way and also the ROW could be smaller then too. Queuing would happen in a lane where people were all going the same direction and reduce chaos. I could also see a possibility of creating a pedestrian/bike bridge over US-29 somewhere between Tech and Industrial and over to Featherwood on the other side. The intersection at Stewart needs to be revamped for sure. Unfortunately, that's going to be work from SHA, it really needs to have US-29-grade separated from Stewart Ln. There's no need to have U-Turning vehicles who want to go south on US-29 blocking Old Colubmia Pike, etc. This intersection is the one of the worst on US-29 North of Silver Spring. The SHA needs to step in a offer their solutions so that this update on Prosperity/Old Columbia is completed right the first time. Regards, Steve Ashurst
Steve	Ashurst	14401 hollyhock way	Steve@makeitbikeable.com	I do not live/work near Old Columbia Pike / Prosperity Drive, but I pass by this area often (at least once a week)	Not Important At all	Neutral	Important	Important	Extremely Important	Neutral	Important	Important	Important	Need to keep the bridge area clear of motor vehicles. ;	Alternative 2 with bridge open to traffic;No build;Improve intersections, add sidewalk and sidepath;Alternative 3 with 4-lanes;	4	I wanted to add another comment about the trail that passes under the bridge. There should be a connection to this trail if one doesn't already exist. And honestly, any money consideration for a new bridge should instead be used to improve the trail to make it bike friendly too. Also let's get creative on more bike facilities that have more than alt 2 to select. I don't like having only one viable option that truly meets the needs of the area. Nobody wants cars and trucks so come up with alt 5 and 6 without cars too.
Jordan	Day	1401 Blair Mill Road	jordandayaia@gmail.com	I do not live/work near Old Columbia Pike / Prosperity Drive, and I do not go to this area often; I am just interested in this project.	Not Important	Extremely Important	Extremely Important	Extremely Important	Extremely Important	Important	Important	Important	Important	Insufficient pedestrian facilities (e.g., sidewalk);Insufficient crosswalks;Insufficient bicycle facilities (e.g., bike lane, sidepath, etc.);Speeding of motor vehicles;Sight distance / blind spots;	Improve intersections, add sidewalk and sidepath;Alternative 2 with bridge open to traffic;Alternative 3 with 4-lanes;No build;	5	I support Alternative 2 but both Industrial Parkway and Tech Road are too wide at their intersections with Prosperity Drive--at Industrial Parkway at least the left turn lane onto Old Columbia Pike could be eliminated/consolidated (how many people are making that turn per day?) and the right turn onto Old Columbia Pike could be eliminated/consolidated as well. At Tech Road, the cross section of five lanes is far too wide for pedestrian/bike safety.
Adrianne	Bell	1928 Bronzegate Blvd	alb536@hotmail.com	I live/work near Old Columbia Pike / Prosperity Drive (within 5 minutes walking)	Important	Extremely Important	Neutral	Important	Important	Neutral	Important	Extremely Important	Not Important	Sight distance / blind spots;On-street parking;Speeding of motor vehicles;	Improve intersections, add sidewalk and sidepath;No build;Alternative 2 with bridge open to traffic;Alternative 3 with 4-lanes;	4	Do not want to see bridge opened up to automobiles as it would affect us tremendously getting out of our neighborhood. Dangerous now with cars speeding up hill from apartment bldg. below us.

Roberts, Mark

From: djwilhelm@verizon.net
Sent: Wednesday, November 15, 2023 10:37 AM
To: 'Main, Lori J.'; 'Esmaili, Yasamin'
Cc: 'Sheridan, Daniel'; Tee, Suid; Roberts, Mark; Chris Conklin; Corey Pitts; Cicero Salles; Rob Richardson; Peter Myo Khin
Subject: Old Columbia Pike / Prosperity Drive Improvements Project
Attachments: Industrial Pkwy.docx

See attached comments about the design of the intersections at US29/Old Columbia Pike/Properity Dr with Industrail Pkwy and Tech Road. As the audience stated last night, DOT needs to focus on these two intersections and not the bridge over Paint Branch. These intersections are a priority for the Viva White Oak developer would will surely be moving forward with the development within the next month.

The following three diagrams are taken from pages 569-571 of Appendix A to the MC DOT December 2016 (updated in Jan 2019) White Oak Science Gateway LATR/LATIP White Paper. The last I looked, this was on the DOT web site. The three diagrams show improvements at industrial Pkwy intersections with US29 and Old Columbia Pike. They show the existing conditions, proposed 2040 design and proposed 2040 Improved design. The improved design is what should be build and includes the following

- Second left turn from US29 southbound (needed to accommodate Viva White Oak, Montgomery College, and other developments in that area.
- Spur from northbound US29 onto Old Columbia Pike, with two lanes.
- Signal at Spur and Old Columbia Pike
- Signal at Old Columbia Pike and Industrial Pkwy
- Two northbound left-turn lanes from Old Columbia Pike onto Industrial Pkwy. I would modify this to allow the left lane to go thru and left onto US29 so that residents along Old Columbia Pike can get out and go those two ways.
- The Appendix A proposal is for two lanes southbound on Old Columbia Pike at Industrial Pkwy. I would have only one since I would also not improve the bridge over Paint Branch for vehicle traffic.
- Provide a dedicated right lane onto US29 from Industrial Pkwy

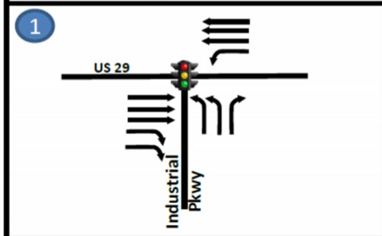
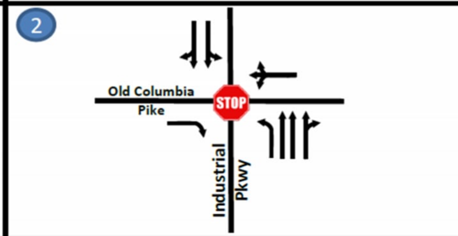
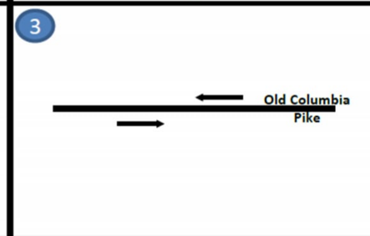
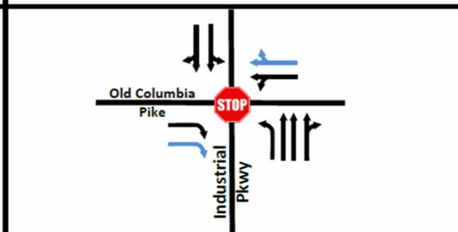
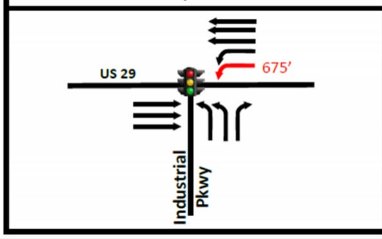
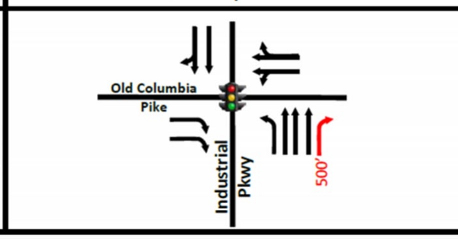
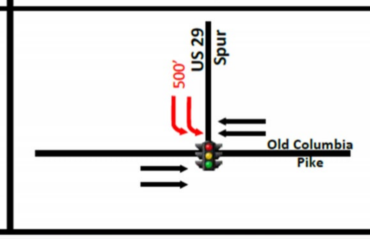
I suggest the same design be used at Tech Road and US29/Old Columbia/Prosperity Dt. Two southbound lanes from Old Columbia Pike/Prosperity Dr would be justified here because there is a good number of businesses in that direction. At that intersection, provision needs to be made for BRT to be running along Tech Rd from Old Columbia Pike on the west side of US29 to Broadbirch Rd on the east side. As a minimum, one BRT platform would likely be needed on each side of US29 to permit transfers to the Blue US29 BRT route. It may be best to have two platforms on each side of US29 for those people who want to go to the residences and businesses there.

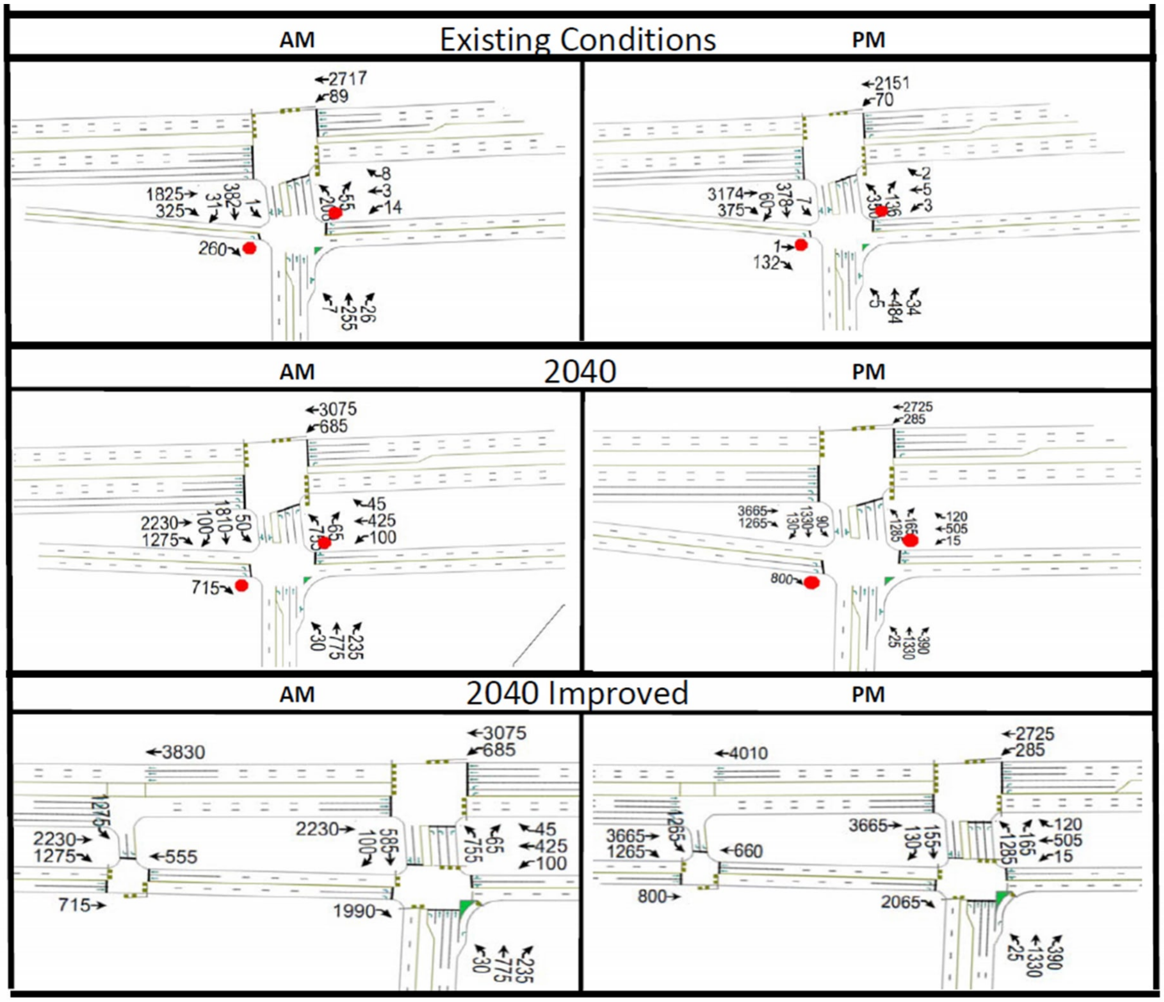
Sidewalks and side-paths need to be included into the design along all these roads.

I encourage you to make other improvements to the LATIP design that have not occurred to me.

I also encourage a group meeting to sort through the design with all the kay people. Other than DOT, that includes the Viva White Oak developer, Planning, LABQUEST, and White Oak Service Manager. That meeting should probably occur in December. Once the group decides on the design, another community meeting should be held so other community members can comment on it. I would then take this to the Council T&E committee once the design is finalized.

US 29/ Old Columbia Pike and Industrial Parkway

US 29 and Industrial Pkwy	Old Columbia Pike and Industrial Pkwy	Old Columbia Pike and US 29 Spur
Existing Conditions	**Existing Conditions**	**Existing Conditions**
		
2040	**2040**	**2040**
No Change		
2040 Improved	**2040 Improved**	**2040 Improved**
		



AM
Existing Conditions
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484
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Appendix D

Project Team Meeting Minutes

MEMORANDUM of MEETING

Date: June 3, 2022

Date of Meeting: June 3, 2022
Time of Meeting: 10am – 11am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC:

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA		stee@wrallp.com
Frederick Ophardt	WRA		fophardt@wrallp.com
Mark Roberts	WRA		mroberts@wrallp.com
Brenden Little	WRA		blittle@wrallp.com
Samantha Suero	WRA		ssuero@wrallp.com
Timothy Hess	WRA		thess@wrallp.com
Zhang Wengang	RJM		wengang.zhang@rjmengineering.com
Mayra Mendeleev	MRA		mmendeleev@MAHANRYKIEL.COM
Daniel Sheridan	Montgomery County		Daniel.Sheridan@montgomerycountymd.gov
Yasamin Esmaili	Montgomery County		Yasamin.Esmaili@montgomerycountymd.gov
Barry Fuss	Montgomery County		barry.fuss@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status, progress, and next steps.

A. Project Status Update
Ching provided a brief project status update and summarized the work that has been performed to date.

B. Previous Master Plan Recommendations

a. White Oak Science Gateway Master Plan (July 2014) is the most recent master plan associated with this project.
b. Some of the recommendations from this master plan include:
    a. Connect OCP to Martin Luther King Recreation Park
    b. Shared use path and bike lanes along OCP
    c. Interchanges at US 29 and Stewart Ln and Industrial Pkwy/Tech Rd
    d. Development of a Bus Rapid Transit (BRT) system

C. Structure Investigation

a. Fred presented his cursory field investigation of the OCP bridge over Paint Branch.

b. The existing bridge was constructed in 1912 and widened in 1930.
c. If the existing bridge is to be considered for rehab, an extensive concrete testing program would need to be established. Extensive repairs would also be required.
d. Some repairs would be required if the bridge is maintained for pedestrians.
e. Due to the type of existing structure and surrounding topography, demolition of the bridge would be more expensive than a traditional bridge demolition.

D. Traffic Investigation

Wengang presented a summary of field traffic investigation, measurement and observation, and traffic analysis and evaluation of existing condition

E. Environmental Investigation

Brendan presented a summary of the environmental investigation memo. Mayra provided an update on the scope of work related to natural resources inventory and forest stand delineation work performed to date.

Action Items

- Ching: Create monthly meetings to provide updates on the status of the project
- Fred: Prepare a ballpark cost estimate for different bridge alternatives to provide decision makers with an order of magnitude of cost as well as pros and cons of each alternative. A comparison matrix to compare all alternatives will be provided in the final report.
- Ching: Reach out to MDOT SHA project manager for a timeline for construction of the US 29 (Columbia Pike) at Stewart Lane project
- Ching: Reach out to Steve Aldridge from Park and Planning to confirm roadway classification
- RJM: Continue working on the 2045 no-build traffic volumes

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: August 19, 2022

Date of Meeting: August 19, 2022
Time of Meeting: 10am – 11am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC:

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Frederick Ophardt	WRA	443-224-1806	fophardt@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Timothy Hess	WRA	443-224-1601	thess@wrallp.com
Zhang Wengang	RJM	443-319-3451	wengang.zhang@rjmengineering.com
Mayra Mendeleev	MRA	410-900-1642	mmendeleev@ mahanrykiel.com
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status, progress, and next steps.

A. Project Status Update
Ching provided a brief project status update and summarized the roadway work that has been performed to date.
- Working on draft of Purpose and Need Statement (will submit 9/1/2022)
- Preparing draft of Concept Plan (will submit 9/5/2022)

B. Structures Team Update
Fred provided an update on the four options for the Paint Branch bridge, all of which would require concrete testing. He reached out to several firms that can perform some of the required concrete testing.
- One firm gave a ballpark of $ 67,000 estimate for concrete testing

C. Traffic Team Update
Wengang provided an update on work completed to date.
- Completed the existing traffic volume analysis
- Awaiting concept design to further analysis for potential proposed conditions

D. Environmental Team Update
Mayra provided an update on work completed to date.
- Field work has been completed

- Currently working on the report and should have a draft of the report by the end of the August 2022

Action Items

- Ching: Provide Montgomery County with a summary of questions/concerns about the vision and intent of the Old Columbia Pike project so that the County can give guidance on how to proceed with the Concept Plan
- Ching: Email out boundary map for MCDOT to develop a project mailing list
- Fred: Provide MCDOT with a summary of information received from various firms about the cost of concrete testing

Upcoming Important Dates

- Next progress meeting – 9/9/2022
- Public Meeting – 11/12/2022

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

Ching Tee, PE

MEMORANDUM of MEETING

Date: September 8, 2023

Date of Meeting: September 7, 2023
Time of Meeting: 2pm – 3pm
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@ montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Purpose

To update MCDOT on the Old Columbia Pike (OCP) Planning Project progress with preparing for Public Meeting No. 2 and receive feedback on the materials prepared for the meeting.

A. Project Status Update
   - Preparing for public meeting no. 2

B. Topics for discussion
   - Public Meeting No. 2
     - Schedule and location
       September 27 (Wednesday). White Oak Community Center 1700 April Lane
     - Format
       Hybrid (In person and virtual conducted simultaneously)
     - Outline
     - Public meeting website
       - Refine questionnaire
       - Submitted GIS files to County IT
     - Artistic/graphic renderings
     - Alternatives to be presented
       - Alternative 1 – No Build
       - Alternative 2 – Improve intersections, and add sidewalk and sidepath
       - Alternative 3 – Alternative 2 + bridge open to traffic
       - Alternative 4 – Four lanes
       - Intersection options
         - Industrial Parkway at Old Columbia Pike
         - Tech Road at Old Columbia Pike / Prosperity Drive

- Yasamin contacted King Audio to initiate a meeting on September 18 to discuss needs for the public meeting. She will send Ching the contact information.
- WRA and MCDOT agreed on having 10-15 minutes at the start of the public meeting to allow people to settle in and look at displays. Those attending virtually can review materials that will be provided online.
- WRA and MCDOT agreed on having people write comments directly on roll maps during the public meeting or on sticky notes to leave their comments. Those attending virtually can leave comments in the chat box, fill out an online form, or comment verbally.
- MCDOT requested that
- Tentative date for a practice run of the public meeting presentation is September 20th.
- Ching suggested using PDFs for the online displays and MCDOT agreed.
- Dan commented that in the rendering for Alternative 2, the tree is obstructing the view on the bridge and requested that the trees be trimmed back a bit.

C. Outstanding Task
- Next public meeting – September 27, 2023
- Traffic study report
- Purpose and need
- Cost estimates
- Prepare project prospectus

Action Items
- Ching to send questionnaire to MCDOT for feedback. MCDOT will decide if it should be combined with the questionnaire already posted to the County website or make it a second questionnaire.
- Yasamin to send a meeting invite for the public meeting and ensure all the required people receive the invite.
- Ching to coordinate with graphics to see if the overhanging tree in Alternative 2 graphic rendering can be adjusted.

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: September 9, 2022

Date of Meeting: September 9, 2022
Time of Meeting: 10am – 11am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC:

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Timothy Hess	WRA	443-224-1601	thess@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Brendan Little	WRA	410-864-1044	blittle@wrallp.com
Wengang Zhang	RJM	443-319-3451	wengang.zhang@rjmengineering.com
Mayra Mendeleev	MRA	410-900-1642	mmendeleev@ mahanrykiel.com
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status, progress, and next steps.

A. Project Status Update

Ching provided a project status update and summarized the roadway work that has been performed to date.

- Submitted Purpose and Need Statement
- Submitted Concept Alternative No. 1
- Submitted summary list of questions

Ching gave a brief description of the of the current proposed alternatives and Dan suggested the following proposed concept alternatives:

1. Rehab the existing bridge, to be opened only for pedestrians/bicyclists. OCP will be maintained as 2-lanes, 2-way roadway with sidepath and sidewalk connections
2. Reconstruct new bridge for two lanes of vehicular traffic with sidepath and sidewalk. OCP will be maintained as 2-lanes, 2-way roadway
3. Reconstruct new bridge for four lanes of vehicular traffic with sidepath and sidewalk. OCP will be open to 4-lanes, 2-way roadway

Ching walked through the proposed concept alternative no. 1 and received the following comments from MCDOT:

- Tighten up radii for all the entrances in accordance with MCDOT Complete Streets guidelines
- Mid-block crossing south of Treetop View Terrace should be moved closer to the intersection for the safety of the pedestrians
- Verify that on-street parking is allowed for a Town Center Boulevard
- Remove right turn along WB Industrial Parkway to NB OCP; makes an unsafe pedestrian crossing due to high-speed turning vehicle
- Consider that the existing traffic pattern and mode of transportation observed may be different than MCDOT's vision for the future of this corridor
- Cost is a major component of the decision making process

B. Structures Team Update

Ching provided an update the structures work that has been performed to date.

- Continuing work on report from the cursory inspection
- Evaluating costs for concrete testing
- Evaluating considerations for concrete testing

C. Traffic Team Update

Wengang provided a description of proposed traffic improvements to Old Columbia Pike.

D. Environmental Team Update

Timothy and Mayra provided an update on work completed to date.

Action Items

- Ching: Provide Montgomery County with an updated concept plan with right-of-way information shown
- Wengang: Coordinate with MDOT SHA on proposed traffic and intersection improvements including but not limited to coordination with on-going project MO8445146 US-29 at Stewart Ln
- Wengang: Provide MCDOT with PDF of proposed concept alternative no. 1 to help facilitate MCDOT internal discussion
- Yasamin: Confirm the Complete Street type that is applicable for Old Columbia Pike north of Industrial Parkway

Upcoming Important Dates

- Next progress meeting – 10/14/2022
- Public Meeting – 11/12/2022

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

Ching Tee Digitally signed by Ching Tee
DN: C=US,
E=stee@wrallp.com,
CN=Ching Tee
Date: 2022.09.14
14:26:52-04'00'

Ching Tee, PE

MEMORANDUM of MEETING

Date: August 4, 2023

Date of Meeting: August 4, 2023
Time of Meeting: 10am – 10:30am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status, progress, and next steps

A. Project Status Update
- WRA submitted sub-alternatives memo and supplemental traffic analysis
- Cost estimates for overall project is under internal review

B. Structures Team Update
- Completed cost estimate for bridge. Cost listed below are for bridge work only.
  - Alternative 1 – No Build, resurface of bridge and erect safety pedestrian fence - $ 160,000
  - Alternative 2 – Rehabilitate bridge open to pedestrians and bicyclists only - $ 2.2 million
  - Alternative 3 – Bridge replacement and open to 2-lanes of vehicular traffic and pedestrians/bicyclists (58’ wide bridge) - $ 8.8 million
  - Alternative 4 – Bridge replacement and open to 4-lanes of vehicular traffic and pedestrian/bicyclists (80’ wide bridge) - $ 11.6 million

C. Topics for discussion
- Ching explained the justification for the intention of submitting an extra work order (EWO). Yasamin directed WRA to submit the draft version of the EWO for review
- Public Meeting No. 2 is tentatively scheduled for 27th or 28th of September, pending confirmation from MCDOT and availability of venue
- Public Meeting No. 2 is presumed to be hybrid format
- WRA and County agreed that the view of the bridge will be used for artistic/graphic renderings
- Ching submitted 4 potential locations for hosting public meeting no. 2 to Yasamin for considerations

D. Action Items

- Yasamin will follow up and confirm with Dan the format of public meeting no. 2
- Ching will follow up with MDOT SHA to get an update on the Stewart Lane/US 29 intersection project
- MCDOT to select and confirm venue and date of public meeting no. 2
- Yasamin will forward comments from MCDOT regarding sub-alternatives memo
- Ching to submit revised purpose and need document next week

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: November 1, 2023

Date of Meeting: October 31, 2023
Time of Meeting: 2pm – 3pm
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@ montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov
Lori Main	Montgomery County		Lori.Main@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project progress with preparing for Public Meeting No. 2 and receive feedback on the materials prepared for the meeting.

A. Project Status Update
   - Preparing for public meeting no. 2

B. Topics for discussion
   - Public Meeting No. 2
     - Schedule and location
       November 14 (Tuesday). White Oak Community Center 1700 April Lane
     - Format
       Hybrid (In person and virtual conducted simultaneously)
     - Outline
     - Public meeting rollplots
     - Artistic/graphic renderings
     - Alternatives to be presented
       - Alternative 1 – No Build
       - Alternative 2 – Improve intersections, and add sidewalk and sidepath
       - Alternative 3 – Alternative 2 + bridge open to traffic
       - Alternative 4 – Four lanes
       - Intersection options
         - Industrial Parkway at Old Columbia Pike

- Tech Road at Old Columbia Pike / Prosperity Drive

C. Outstanding Task
- Next public meeting – November 14, 2023
- Traffic study report
- Purpose and need
- Cost estimates
- Prepare project prospectus

Graphics
- Ching went over the final roll plots to be shown at the public meeting to get feedback from MCDOT.
- For the Alternative 2 roll plot, Yasamin commented that the property lines around Old Columbia Pike and Industrial Parkway, around the Progressive Insurance building, are confusing. Ching to revisit and make clear.
- Dan recommended wherever it says "New Old Columbia Pike Bridge" to change to Proposed Old Columbia Pike Bridge for clarity.
- Dan asked if any traffic analysis has been done to compare alternatives 3 and 4 to know the benefits of each alternative. Recommended being prepared to answer this question during the public meeting.
- Dan recommended testing the file opening before the meeting to make sure the process goes smoothly since the files are large.
- Dan recommended bringing stationary items (sticky notes, markers, etc.) to the public meeting so people can physically comment on displays.

Presentation
- Dan will do the instructions and then Lori will go over the zoom meeting instructions.
- Yasamin will do the outline, project overview, and vicinity map slides.
- Mark will then take over and go over the Project purpose, Bridge over Paint Branch, Potential Improvements etc. until the slides on the different street types.
- Ching will take over to talk about the different alternatives, summary of main alternatives, and Industrial and Tech Road sub-alternatives.
- Yasamin will take over to talk about the project schedule.

- Dan had a comment on the Tech Road and Old Columbia Pike/Prosperity Drive slide – suggested having only 2 pictures on the slide and pairing the pictures with the bullet points rather than having bullet points on a different slide.

Action Items
- Yasamin to follow up with Mark Terry to see if anyone from Montgomery County Traffic group will be attending the public meeting.
- Ching to send responses Montgomery County's Traffic group's comments and let them know the date of the public meeting to find out if someone can attend.

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MEMORANDUM of MEETING

Date: December 1, 2023

Date of Meeting: November 29, 2023
Time of Meeting: 2:30 pm – 3:30 pm
Meeting Location: Teams Meeting

Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike/Prosperity Drive Improvements Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@ montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Purpose
To debrief with MCDOT on the Old Columbia Pike (OCP)/Prosperity Drive Improvements Project after Public Meeting No. 2 and discuss next steps.

- Ching suggested removing the comments form from the MCDOT website and noting that the comment period for providing comments is over. Yasamin to make sure form is removed from the website.
- For the meeting with the developers of the Viva White Oak project, Yasamin will coordinate and send out meeting invite.
- In the current schedule, the project prospectus is scheduled for January 2024 – MCDOT stated the date can be pushed back as needed.
- Ching asked about next steps after the feedback we received from Public Meeting No. 2 and how to respond to comments from the public that said they felt like their comments were not acknowledged from the first Public Meeting.
    - Dan said our main responsibility is to verify what is in the master plan, discuss the pros/cons of each alternative, and make a recommendation on an alternative. We must present all options and then we will move forward with what the DOT decides.
    - Dan stated we should summarize all the questions and comments received and quantify them to put into the report. We should also provide answers to questions that were frequently asked.

- Yasamin stated she prefers to move forward with Alternative 2.
- Ching stated that Alternatives B and D are currently one lane but have the possibility to serve higher volumes in the future. Dan stated this should be included in the report.
- Dan stated that we should include a recommendation in the project prospectus which will be given to the chief of traffic and chief of transit. They will then give us comments and the prospectus can be revised based on their comments.
- Yasamin stated we could use the Bradley Boulevard project prospectus as an example.

- Yasamin asked about the status of the Purpose and Need report and Ching responded that the report was submitted to Park and Planning, they provided comments and WRA submitted responses and an updated copy of the report.

Action Items

- Yasamin to follow up with Andrew Bossi to determine the best way to respond to the comment received from Eileen Finnigan during Public Meeting No. 2 about the traffic model.
- MCDOT to send to Ching example project prospectus.

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: January 15, 2024

Date of Meeting: January 12, 2024
Time of Meeting: 10am – 11am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Agenda Topics:

A. Project Status Update
- Finalized preferred alternative to move forward for traffic analysis
- RJM is performing traffic analysis on the revised design
- Preparing project prospectus

B. Topics for discussion
- Present finalized preferred alternative
  - Ching stated WRA has selected an alternative to move forward and recommend in the project prospectus.
  - Ching presented an overview of the minor changes that were made to the intersections at Industrial Parkway and Tech Road.
- Updates on Stewart Lane and US 29 MDOT SHA project MO8445176
  - Yasamin stated that no further updates since Ron Landrum's email dated 12/8/2023 providing vertical clearance of existing overhead lines
- Updates on VIVA White Oak Development
  - No updates since meeting with VIVA White Oak Developer on 12/11/2023
  - Yasamin confirmed that WRA should move forward with project design since we need to finalize work for Phase 1 Facility Planning.
  - Ching stated that VIVA White Oak development is significantly outside of this project limits and the proposed design does not preclude VIVA White Oak Development's desire for two eastbound receiving lanes at Industrial Parkway and Tech Road intersections with Old Columbia Pike/Prosperity Drive
- Schedule
  - Yasamin agreed to schedule of submitting project prospectus on 3/29/2024

C. Outstanding Task

- Traffic study report
  - RJM will update traffic analysis with this revised alternative. WRA will have weekly meetings to coordinate with RJM
  - Yasamin asked if we would need to coordinate with MDOT SHA since our proposed improvements at Industrial Parkway and Tech Road intersections will affect the signal timing along US 29. Ching stated we will share information with MDOT SHA once we have more information from the traffic analysis
- Project prospectus
  - WRA is in progress of developing an outline for the report

Action Items

- Ching to send PDFs of the updated intersection layouts of Industrial Pkwy and Tech Road to Yasamin to submit to MCDOT traffic division for review/comment
- Yasamin to request latest MicroStation files from Ron Landrum and send to Ching. Subsequently after this meeting, Ron has sent Ching the current MicroStation files

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: May 19, 2023

Date of Meeting: May 19, 2023
Time of Meeting: 2pm – 3pm
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC:

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Stephen Harr	WRA	302-778-9682	sharr@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Frederick Ophardt	WRA	443-224-1806	fophardt@wrallp.com
Corey Pitts	Montgomery County		Corey.Pitts@montgomerycountymd.gov
Alex Rixey	Montgomery County		Alex.Rixey@montgomeryplanning.org
Mark Terry	Montgomery County		Mark.Terry@montgomerycountymd.gov
Stephen Aldrich	Montgomery County		stephen.aldrich@montgomeryplanning.org
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status and progress, review comments from the public meeting, review concrete testing results, come to a consensus on roadway improvements at Tech Rd and Industrial Pkwy, and solicitate feedback on the main alternatives.

A. Project Status Update
Ching provided a brief project overview, reviewed project purpose and recommendations from WOSG Master plan.
Ching gave a project status update:

- Held 1st Public meeting on 3/16/2023.
- Submitted combined public comments and responses.
- Concrete testing field work and draft report completed.

Ching reviewed some comments received from the first public meeting:

- Comment 8: Dan Sheridan said this project will likely not be made a stand-alone CIP and that we currently do not have enough information on the cost of the project– Montgomery County to respond to this comment.

- Comment 10: MCDOT to look into traffic volumes/analysis in the White Oak LATIP area.
- Stephen mentioned that once the White Oak Science Gateway (WOSG) master plan is published, the County will not update the traffic modeling of this master plan.
- MWCOG model Round 10 was done post-COVID (April 10, 2023).
- There is no update to VIVA White Oak development.
- Dan Sheridan mentioned that appropriate lighting will be provided for new pedestrian and bicyclist facilities.

B. Structures Team Update

Fred gave an overview of the existing conditions on the Bridge over Paint Branch and reviewed four potential improvement alternatives to rehabilitate, replace or widen bridge. Fred also gave a summary of the concrete testing report.

- Received a comment from MCDOT that an order of magnitude cost analysis for each bridge alternative will be necessary for decision makers.
- Dan Sheridan offered the question on how the historic impact of the bridge will impact the decision on bridge alternatives.

C. Main Alternatives Overview

Mark provided an overview of the main alternatives for proposed improvements to Old Columbia Pike.
Ching reviewed each alternative and sub alternatives in more detail.
Comments received from MCDOT:

- Mark suggested that Alternative D (Roundabout at Broadbirch Dr) should be removed as it is too far removed from the original project scope.
    - MCDOT said we should not include this alternative in the public meeting presentation but should include it in the report for development review to possibly be pursued in a separate project in the future.
- Alternative B (Roundabout at Industrial Pkwy) should also not be presented in the public meeting but included in the report.
- Alternative C (Adding a slip ramp north of Tech Rd) can be considered and presented as an option since it addresses some traffic issues right at OCP.
- Although the Master Plan recommends a four-lane road for OCP, WRA determined a four-lane road is not feasible. Dan Sheridan recommended WRA should highlight the major issues with the four-lane road concept in the report.
- If a road diet is proposed, there should be traffic modeling done to prove that it works.

<u>Action Items</u>

- WRA to develop order of magnitude cost for each bridge alternative as it will be a determining factor on how decision makers come to a decision on which option to pursue.
- Steve Aldrich to investigate Comment 8 received from Public Meeting combined comments and provide a response to the comment.
- Alex Rixey to check on traffic analysis done at Viva White Oak related to Comment 10 from the Public Meeting combined comments.
- Yasamin to give Montgomery County planning board a briefing

<u>Upcoming Important Dates</u>

- Public Meeting No. 2 – Summer 2023

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: June 29, 2023

Date of Meeting: June 27, 2023
Time of Meeting: 10am – 11am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Mark Roberts	WRA	443-224-1573	mroberts@wrallp.com
Stephen Harr	WRA	302-778-9682	sharr@wrallp.com
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@montgomerycountymd.gov
Stephen Aldridge	Montgomery County		stephen.aldrich@montgomeryplanning.org
Andrew Bossi	Montgomery County		Andrew.bossi.@ montgomeryplanning.org

<u>Meeting Purpose</u>
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status, come to a consensus on the most beneficial improvements at Industrial Parkway and Tech Road, and solicitate feedback on the sub-alternatives.

A. Project Status Update
- WRA submitted concrete testing report and Yasamin has forwarded the report to MCDOT Structural group and expects to receive comments back by the end of the month (June).

B. Main Alternatives
- Ching provided an overview of the main alternatives for proposed improvements to Old Columbia Pike.

C. Sub Alternatives
- Ching provided a detailed overview of the sub alternatives at Industrial Parkway and Tech Road including the proposed features, the problems addressed by the proposed improvements, and the advantages and disadvantages of each sub alternative.

Industrial Parkway Intersection – Sub-Alt A
- Received a comment from Steve Aldridge that there seems to be a lot of extra pavement near the right turn lane from NB US-29 onto EB Industrial Pkwy and would recommend removing as much as possible.
- Steve acknowledged that modification to US-29 shoulder will require MDOT SHA's consent.

- Steve commented that he would prefer to not have a multistage pedestrian crossing along WB Industrial Pkwy.
  - WRA can revise the design of channelizing island to address multi-stage crossing concern
- Steve has concern about minimum single lane width requirement of 20’ for emergency vehicles (fire and rescue) on a county road.
  - It was determined that for short distances, as long as the the fire truck can fit, this requirement should not be an issue but this should be confirmed.

Industrial Parkway Intersection – Sub-Alt B

- Andrew Bossi commented that the County is trying to move away from the channelized right turns and suggested looking into a direct pedestrian crossing NB US-29.
  - The right turn movement could be signalized to mitigate pedestrian safety concerns
- Dan Sheridan suggested showing both sub-alternatives for Industrial Pkwy to get comments from the public on both alternatives rather than choosing one alternative to present at the public meeting.

Tech Road Intersection – Sub-Alt A

- Received a question from MCDOT asking to explain the reasoning behind the desire to prevent SB Prosperity Drive movements from making a right turn on Tech Road then weaving into left turn lane to access SB US 29.
  - Vehicles entering WB Tech Rd to SB US-29 left turn lanes contributing to vehicles blocking the right turn lane and therefore blocking the intersection
  - Safety concerns with vehicles trying to weave through other queued vehicles
- Dan requested, for each sub-alternative, to provide a list of the existing traffic problems at the Industrial Pkwy and Tech Rd intersections and how the proposed improvements are attempting to address these problems.

Tech Road Intersection – Sub-Alt B

- Andrew Bossi commented that the proposed Tech Rd typical section does not preclude adding separated bike lanes in the future, even though the current design does not propose it.
  - Existing ROW width along Tech Road is approximately 70 feet wide, there is no intention to widen Tech Road and acquire new ROW at this moment.
- Steve Aldridge suggested to shift the two through lanes along WB Tech Road to the left to add right turn lane on the right side.

Tech Road Intersection – Sub-Alt C

- Dan suggested to change the numbering/lettering of the sub-alternatives Industrial Parkway intersection A and B; Tech Rd intersection C, D, and E.
- Dan commented that although this sub-alternative improves safety and traffic capacity, but the impacts to the Flash Bus stop and NB US-29 traffic need to be considered.
- MCDOT to solicit feedback from their traffic operations and transit groups on this sub-alternative before showing this alternative to the public.

Action Items

- Ching to provide a summary of sub-alternatives at the Industrial Parkway and Tech Road intersections for MCDOT to review and share with their traffic and transit groups.
- Ching to provide more traffic analysis for sub-alternative c to MCDOT.
- Ching to revise EB Industrial Parkway channelizing island of Sub-alternative A and B to remove multi-stage crossing of Industrial Parkway.
- Ching to revise WB Tech Road lane shift and lane add design for Tech Road sub-alternative B.
- Dan preferred public meeting no. 2 to be held in September 2023.

Upcoming Important Dates

- Public Meeting No. 2 – Estimated September 2023

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

MEMORANDUM of MEETING

Date: August 24, 2023

Date of Meeting: August 18, 2023
Time of Meeting: 10am – 10:30am
Meeting Location: Teams Meeting
Meeting Description: Progress Meeting

CC: Meeting participants listed below

Work Order Number: 32207-06
Contract Number: CIP No. P508768
Project: Old Columbia Pike Planning Project

Participants:

Name	Company	Phone	Email
Ching Tee	WRA	443-224-1912	stee@wrallp.com
Samantha Suero	WRA	443-224-1712	ssuero@wrallp.com
Daniel Sheridan	Montgomery County	240-777-7283	Daniel.Sheridan@ montgomerycountymd.gov
Yasamin Esmaili	Montgomery County	240-777-7226	Yasamin.Esmaili@montgomerycountymd.gov
Lori Main	Montgomery County		Lori.Main@montgomerycountymd.gov

Meeting Purpose
To update MCDOT on the Old Columbia Pike (OCP) Planning Project status, progress, and next steps

A. Project Status Update
- Submitted sub-alternatives memo and supplemental traffic analysis
    - Yasmin will forward the comments from other MCDOT reviewers once received to WRA. Comments are expected on August 23rd
- Preparing for public meeting no. 2
    - Public Meeting No. 2 is scheduled on September 27th from 6:30-8:30pm. Yasamin will send share the location of the public meeting

B. Topics for discussion
- Public Meeting No. 2
    - Schedule and location
    - Format
    - Outline
    - Public meeting website
    - Artistic/graphic renderings
    - Sub-alternatives
- Dan suggested working with the Office of Racial Equity and Social Justice (ORESJ) to ensure inclusivity and not unintentionally excluding people from receiving the information being presented at the meeting
- Dan suggested working with ORESJ to reach out to Spanish speaking and other minority groups
- ORESJ may help provide language translators if warranted
- Lori shared that for past meetings, they have had interpreters and had flyers in multiple languages, and this could be considered for this meeting as well

- Lori suggested that instead of postcards, the information can be shared using newsletter format printed on front and back
- Yasamin will work with a third-party company to have an agreement to provide audio/visual technical support during the public meeting
- The public meeting will be a hybrid format - in person and virtual on zoom. It will also be recorded for those who cannot attend
- Dan suggested having sticky notes for people to make notes/comments and post it directly on the boards or roll maps on table
- MCDOT agreed with the current proposed presentation outline
- Dan agreed with using the bridge view for 3D rendering
- Yasamin suggested not including all the alternatives and sub alternatives in the presentation as it can get confusing since there are so many alternatives.
- Dan suggested not going over each alternative in detail during presentation; instead, send out all alternatives to the public and ask that they send us their comments
- Dan suggested having a meeting the week of September 11 to September 15 to rehearse the presentation

C. Outstanding Task
- Next public meeting – Estimated mid-September 2023
- Traffic study report
- Purpose and need
- Cost estimates
- Prepare project prospectus

Action Items
- Lori will send out a flyer for the public meeting 2-3 weeks prior to the date of the meeting
- Lori will send out “hold the date” notification
- Ching to send EWO proposal to MCDOT for extra funding required by RJM to finish traffic analysis
- Ching to prepare displays for the upcoming public meeting for a later breakout meeting with MCDOT

The above is a memorandum of understanding between the parties regarding the topics discussed and the decisions reached. Any participants desiring to add to, or otherwise amend the minutes, are requested to put their comments in writing to the writer within seven (7) days; otherwise, the minutes will stand as written.

Appendix E

Purpose and Need – November 2023

Old Columbia Pike/Prosperity Drive Improvements Project Purpose and Need

Prepared for:
Montgomery County Department of Transportation

Prepared by:

November 2023

Table of Contents

A. Project Description

The Montgomery County Department of Transportation (MCDOT) Division of Transportation Engineering (DTE) initiated a Phase 1 Facility Planning Study for Old Columbia Pike (OCP) / Prosperity Drive from Stewart Lane to Cherry Hill Road to evaluate ways to improve existing traffic patterns, operations, and geometric deficiencies and to resolve intersection safety and capacity issues. The recent regional population and economic growth has spurred interest to study this project corridor. Recent developments under construction, including the White Oak Town Center and nearby planned developments may attract additional traffic and pedestrian activities along the project corridor. The project length is approximately 1.8 miles, which includes a bridge over Paint Branch that is currently closed to vehicular traffic but open to pedestrians and bicyclists. The County is motivated to seek ways to upgrade this corridor to advance towards goals described in Montgomery County's Complete Street Design Guide, Vision Zero Action Plan, and General Plan update, Thrive Montgomery 2050. The study will evaluate the condition of the bridge, investigate improvement options for it, develop recommendations to address safety, improve bicycle and pedestrian connectivity, accommodate future development plans, and improve existing traffic patterns and operations along the corridor.

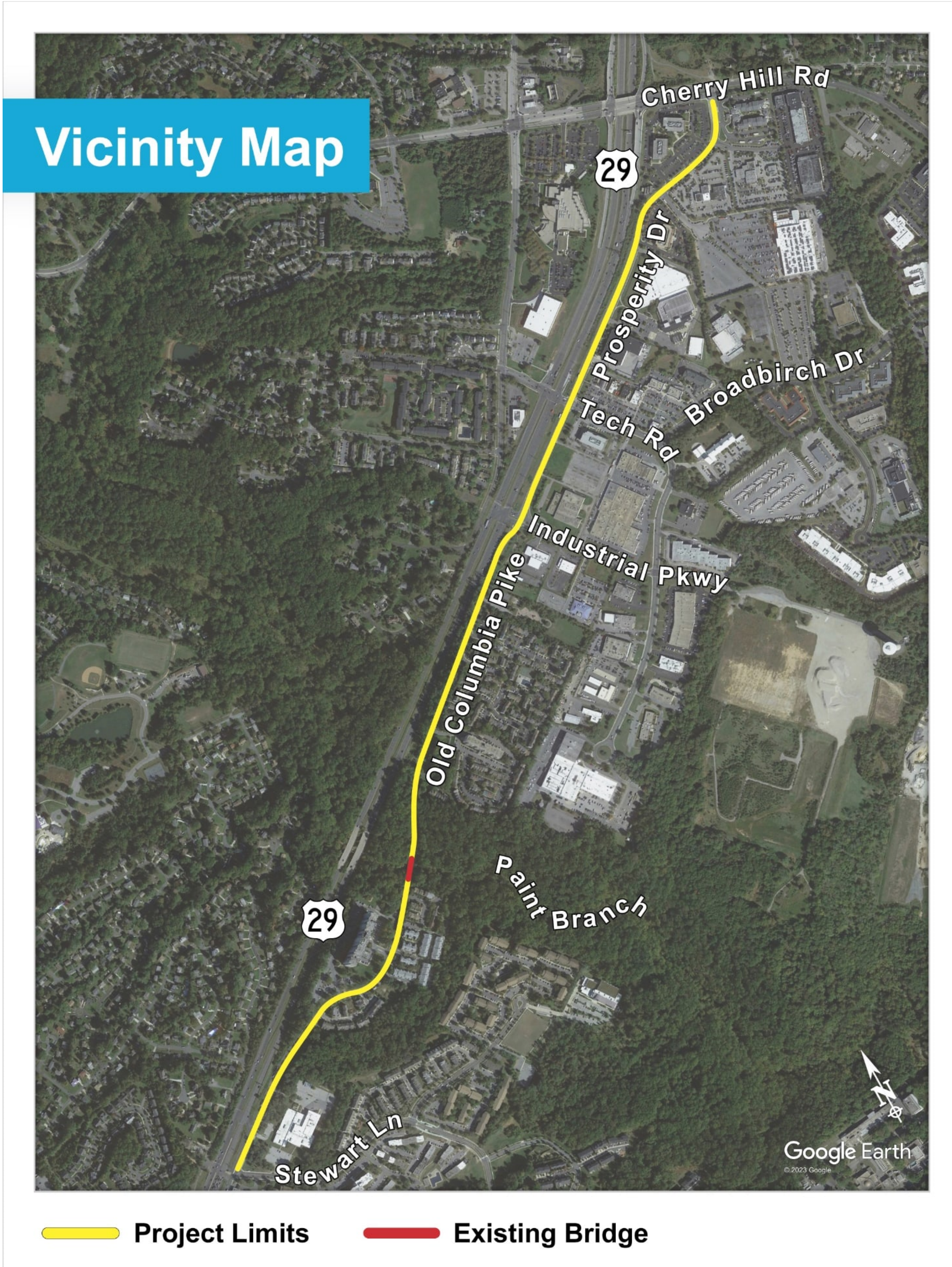


Figure 1 – Vicinity Map

B. Project Background

The study area extends from Fairland, Maryland on the north to White Oak, Maryland on the south. The study limits extend along Old Columbia Pike from Stewart Lane to Cherry Hill Road (See *Figure 1*). The segment of road from Tech Road to Cherry Hill Road is currently named Prosperity Drive.

1. Master Plan

This study included a review of the *White Oak Science Gateway Master Plan* (July 2014) and the *Approved and Adopted Fairland Master Plan* (1997). Montgomery County Planning Board has approved the *Fairland and Briggs Chaney Master Plan* on May 25, 2023, which succeeded the *Fairland Master Plan (1997).* However, this project's study area is outside of the Fairland and Briggs Chaney Master Plan's boundary.

2014 White Oak Science Gateway Master Plan

According to the *White Oak Science Gateway Master Plan*, which is the most recent master plan for this area, White Oak will evolve from conventional, auto-dependent district with suburban shopping centers, business parks, and light industrial areas to a vibrant, mixed-used region that is well served by transit. . Shared use path and bike lanes are proposed along Old Columbia Pike to provide connections to the surrounding residential communities. The Master Plan also recommends a trail from Old Columbia Pike to Martin Luther King Recreational Park to improve connectivity for walking and cycling. It also recommends a sidepath along Lockwood Drive, Stewart Lane, and Old Columbia Pike to connect the surrounding, residential communities.

This *White Oak Science Gateway Master Plan* also recommended that the bridge along Old Columbia Pike over the Paint Branch be rebuilt and reopened to vehicular traffic, and that Old Columbia Pike be reconstructed as a four-lane arterial between Industrial Parkway and Stewart Lane. This would improve connectivity in the area and provide an alternative to US 29 for local travel. The Plan notes that if the widening and reopening of the road and bridge precede the building of a new interchange at US 29 and Stewart Lane, then the intersection of Stewart Lane and Old Columbia Pike, US 29, and Milestone Drive will very likely need to be reconstructed.

This Master Plan recommended a grade-separated interchange at both US 29 and Stewart Lane and US 29 and Industrial Parkway/Tech Road. The Plan recognizes that future social and technological changes may permit mobility and capacity goals to be achieved without constructing additional grade-separated interchanges. Such mobility and capacity enhancements would need to be considered in a transportation planning study as alternative solutions to a grade-separated interchange. Alternatively, the improvements could be included in a land development project review. These enhancements could include increased transit service, implementation of robust pedestrian and bicycle networks, managed parking supply, provision of proactive travel demand management services, and operational improvements to at-grade intersections, streets, arterials and highways.

Additionally, the Master Plan recommends the development of a Bus Rapid Transit (BRT) system to improve transit service within the existing corridors to reduce congestion and reliance on automobiles. The development of the BRT system is essential to improve transportation capacity and meet demands for existing and future land uses identified in the Plan. The Master Plan also proposes grade-separated interchanges at US 29 and Stewart Lane and US 29 and Industrial Parkway/Tech Road to accommodate the full level of potential development in the area.

The Master Plan recommends rezoning existing commercial areas to Commercial-Residential (CR) zones, to allow for a broad range of uses, including general offices, scientific research and development, hospitals, educational institutions, manufacturing and production, multi-family dwellings, and supportive retail services.

1997 Approved and Adopted Fairland Master Plan

The Fairland Master Plan included Old Columbia Pike from Cherry Hill Road to Industrial Parkway and classified Old Columbia Pike as a "Primary Road" within those limits. In the *Approved and Adopted Fairland Master Plan*, pedestrian improvements are recommended for the entire length of Old Columbia Pike. This Master Plan also recommended Old Columbia Pike be reclassified as a four-lane arterial between East Randolph Road and Tech Road. This Plan also recommends grade-separated interchanges at Randolph Road, Tech Road/Industrial Parkway and Stewart Lane. In this Master Plan, a continuous off-road sidewalk/path on the east side of Tech Road to MD 198 is recommended, including pedestrian crossings, while remaining consistent with the residential character of Old Columbia Pike.

2023 Fairland and Briggs Chaney Master Plan

The Montgomery County Planning Board approved the Fairland and Briggs Chaney Master Plan in June 2023 succeeding the Fairland Master Plan in 1997. A public hearing was held on September 27, 2023. The project limits fall outside the Fairland and Briggs Chaney Master Plan boundary. This Master Plan eliminated a previously recommended grade-separated interchange at US 29 and Tech Road and recommended that the existing signalized intersection remain and be improved to allow for greater safety, mobility, and comfort for all transportation users. The recommendation for a grade-separated interchange at Tech Road/Industrial Parkway in the 2014 White Oak Science Gateway Plan should be amended and the interchange should be placed only at the Industrial Parkway intersection. This Master Plan recommends that an additional needs study and/or a facility study be for this interchange to consider current policies and priorities. If the interchange recommendation is no longer supported, the White Oak Science Gateway Plan and supporting White Oak Local Area Transportation Improvement Program should be amended.

Montgomery County Master Plan of Highways and Transitways and Complete Streets Guide

The Montgomery County Master Plan of Highways and Transitways Functional Classification effective February 7, 2023 classifies Old Columbia Pike / Prosperity Drive:

- from 1,000 feet west of Stewart Lane to Industrial Parkway as a *Town Center Boulevard*
- from Industrial Parkway to Tech Road as a *Neighborhood Connector*
- from Tech Road to East Randolph Road as *Boulevard*.

However, the proposed Complete Streets classification for Old Columbia Pike / Prosperity Drive is designated as follows:

- Old Columbia Pike from Stewart Lane to Industrial Parkway as *Neighborhood Connector*
- Old Columbia Pike / Prosperity Drive from Industrial Parkway to Cherry Hill Road as *Town Center Street*

According to the Montgomery County Complete Streets Design Guide, *Town Center Boulevard* (See *Figure 2*) includes:

- Multiple lanes (more than one lane per direction) with a target speed of 30 mph
- Median (raised or painted) and a center turn lane
- Street buffer between the edge of vehicle travelway and sidewalk/sidepath
- Separated bicycle lanes (default width of 11 feet wide minimum 8 feet width) on both sides of the street
- Sidewalk (default width of 10 feet; minimum of 8 feet)

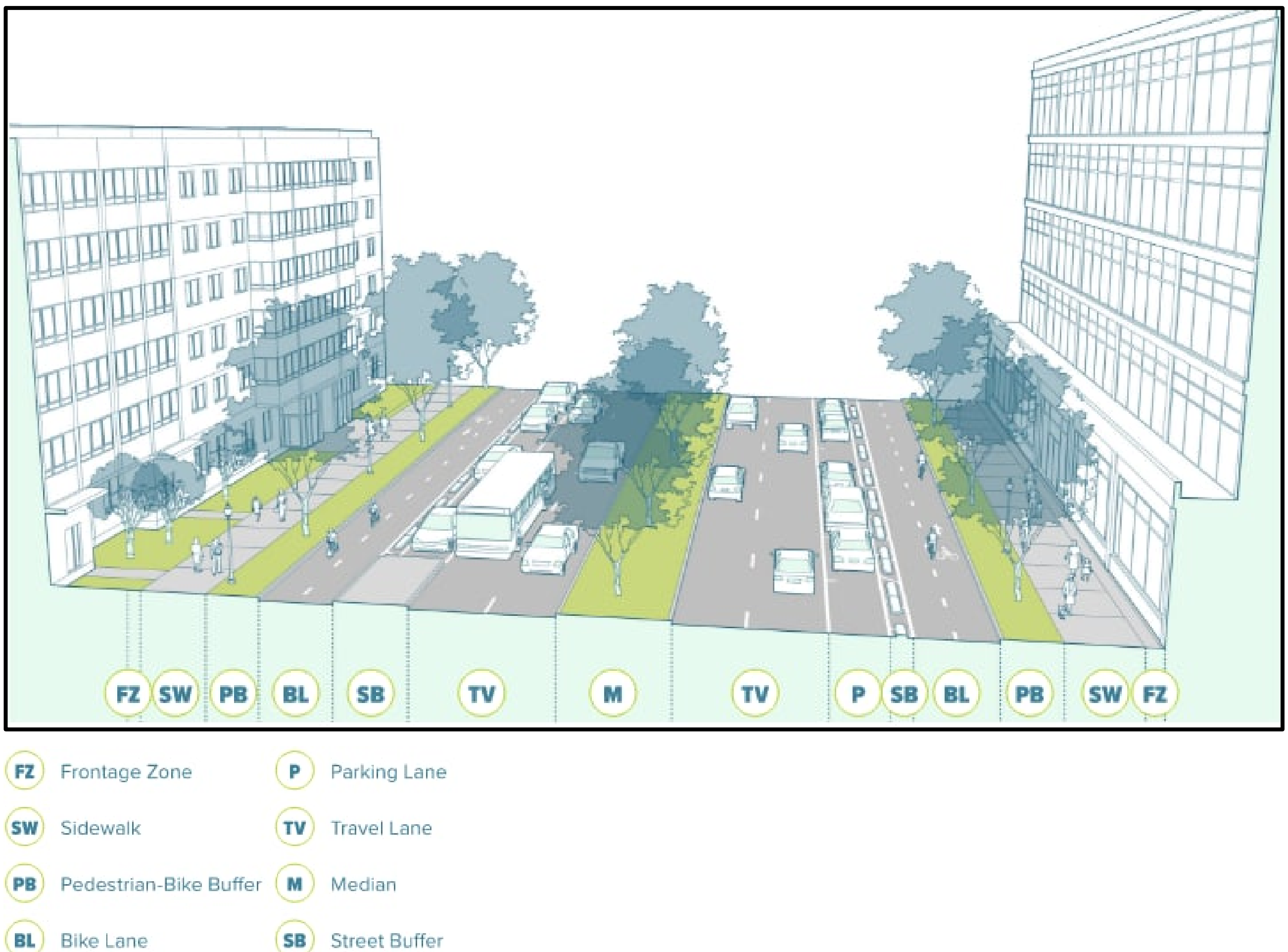


Figure 2 – Typical Town Center Boulevard

According to the Montgomery County Complete Streets Design Guide, *Neighborhood Connector* (See *Figure 3*) includes:

- A travel lane in both directions with target speed of 25 mph
- Left turn lanes where appropriate
- Buffer between edge of vehicle travelway and sidewalk or sidepath
- Sidepath (default 10 feet wide; minimum 8 feet) on one side of the street and sidewalk (minimum 6 feet)

Figure 3 – Typical Neighborhood Connector

According to the Montgomery County Complete Streets Design Guide, *Boulevard* (See *Figure 4*) includes:

- Multiple lanes (more than one lane per direction, maximum 6 lanes total) with target speed of 35 mph
- Center median (6 feet to 16 feet wide)
- Dedicated transitway (default 13 feet wide; minimum 12 feet with transit buffer that is 6 feet wide; minimum 2 feet)
- Street buffer between edge of vehicle travelway and sidewalk/sidepath (default 8 feet wide; minimum 6 feet)
- Sidepaths (default 11 feet wide; minimum 8 feet) on both sides of the street

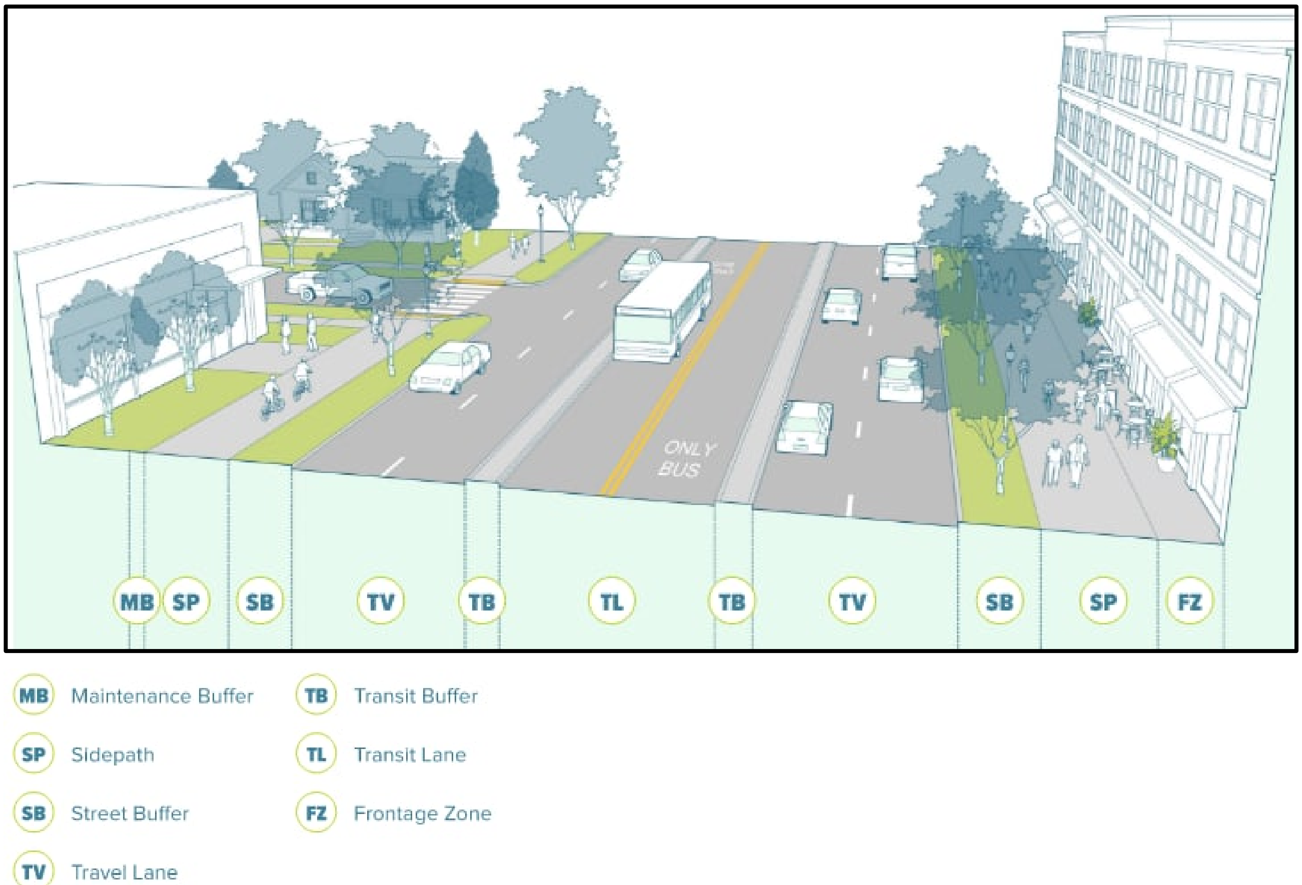


Figure 4 – Typical Boulevard

According to the Montgomery County Complete Streets Design Guide, *Town Center Street* (See *Figure 5*) includes:

- Two-lanes, one lane in each direction with target speed of 25 mph
- Center media is optional (6 feet to 10 feet wide)
- Left turn lanes where it is appropriate
- Street buffer between edge of vehicle travelway and sidewalk/sidepath (6 feet wide)
- Sidepath and sidewalk (default 10 feet wide; minimum 8 feet)

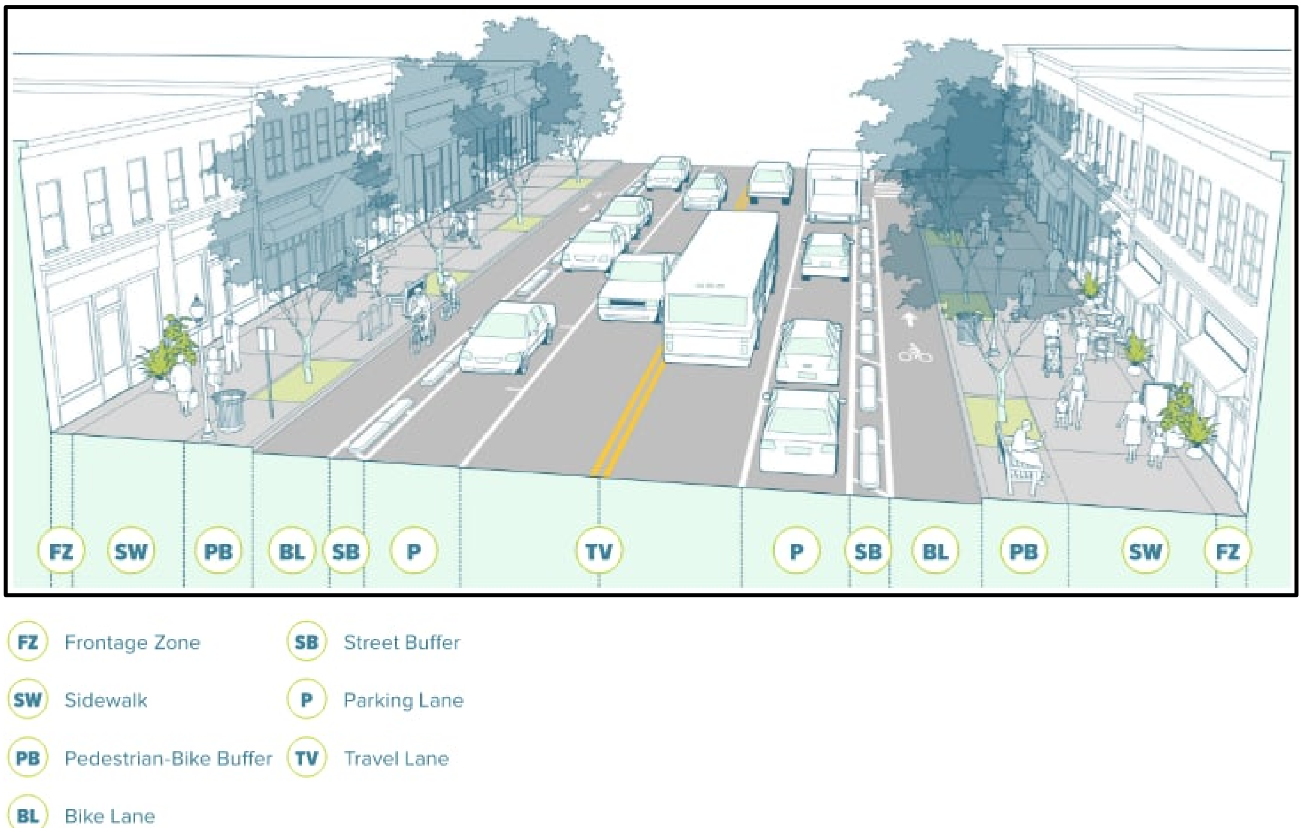


Figure 5 – Typical Town Center Street

2. Existing Features

From Stewart Lane to South Side of Paint Branch

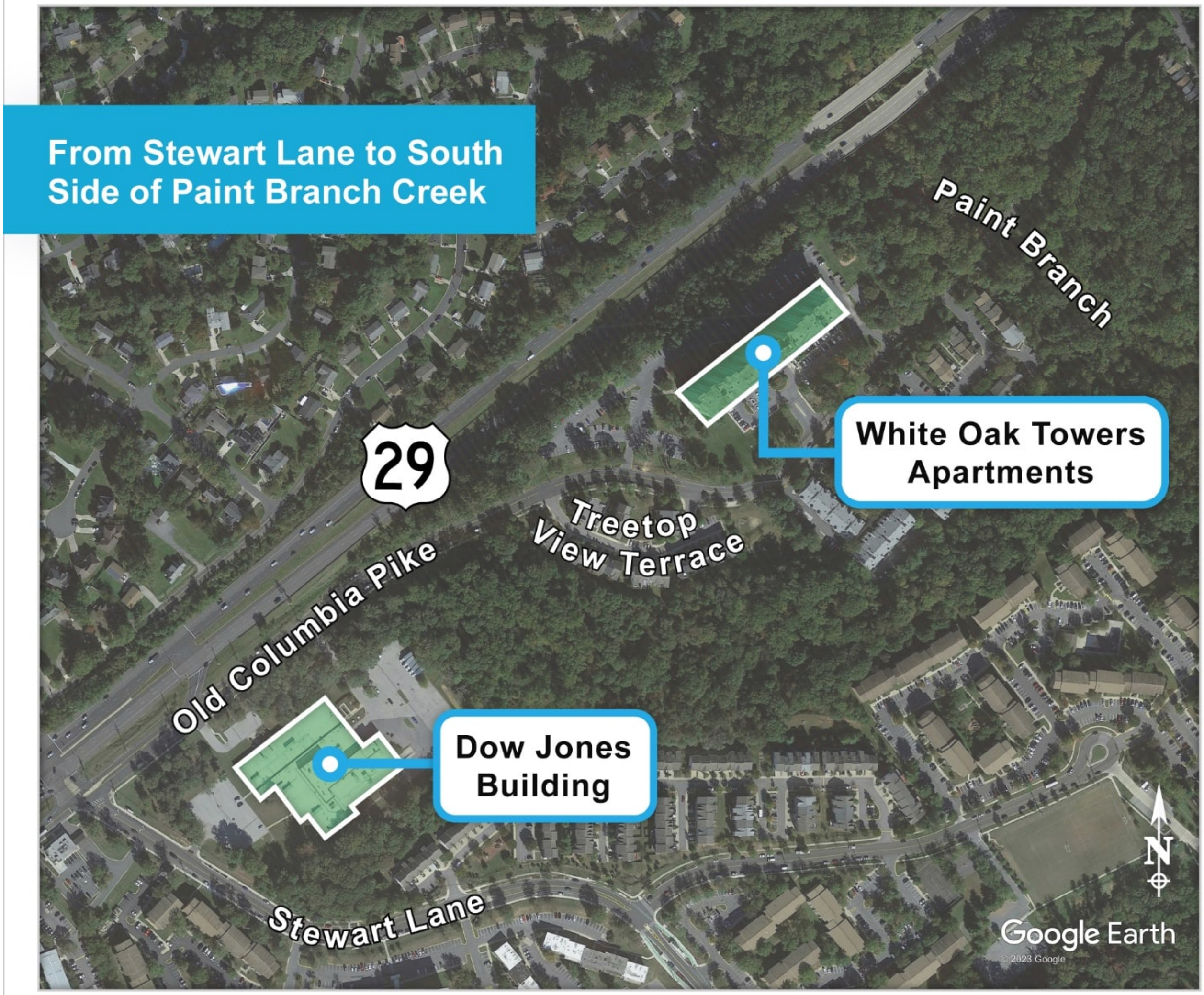


Figure 6 - Aerial Map from Stewart Lane to Paint Branch

Old Columbia Pike from Stewart Lane to south of Paint Branch bridge has two travel lanes - one in each direction. There is a sidewalk on the east side of Old Columbia Pike, connecting Stewart Lane to Treetop View Terrace. This sidewalk terminates approximately 120 feet north of Treetop View Terrace. There is no sidewalk available to connect people from this point to the bridge over Paint Branch. There is no available sidewalk connecting White Oak Towers Apartments to the existing sidewalk along east side of Old Columbia Pike. The posted speed limit is 30 mph.

There is curb and gutter along most of the east side of the roadway, and there are segments of open shoulder, asphalt curb, and concrete curb along the west side. Parking is allowed along some sections of the east side of Old Columbia Pike. Parking is not permitted along the west side of Old Columbia Pike; illegal parking was observed during a field visit.

- The Dow Jones Building is located on the northeast corner of Old Columbia Pike and Stewart Lane; it is the only commercial building in this area. The remaining buildings along Old Columbia Pike south of Paint Branch, are townhouses and the White Oak Towers Apartments complex. The properties in this area are zoned as commercial/residential mix (CR), townhouse low density (TLD), and residential of various densities (R-10, R-20, R-90). There is an existing SHA project at Stewart Lane and US 29 intersection (SHA No. MO8445176) whose project limits are from Stewart Lane and US 29 intersection to approximately 1,500 feet north along Old Columbia Pike. The purpose of SHA's project is to improve safety of the pedestrian crossing of US 29 at Stewart Lane and improve traffic safety and operation capacity. This project proposed the following improvements: ADA ramps, curb and gutter, sidepath and sidewalk improvements along Old Columbia Pike and at the Stewart Lane and US 29 intersection.

- Modified, median channelizing island at Stewart Lane and Old Columbia Pike intersection
- Full depth pavement reconstruction and pavement widening
- Relocate the existing connection to northbound US 29 from Old Columbia Pike approximately 400 feet north of Stewart Lane further north by approximately 375 feet
- Curb extensions and parking lane
- Pavement markings and signage
- Stormwater management facilities between northbound US 29 and Old Columbia Pike
- Drainage improvements

This project is currently in semi-final design phase, and coordination between MCDOT and SHA is ongoing.

Bridge over Paint Branch

Figure 7 – Aerial Map of Paint Branch

The existing bridge along Old Columbia Pike over Paint Branch (Montgomery County No. 15035) was built in 1930. It is registered with the Maryland Historical Trust (MHT) and the inventory number is M:33-26. It is recommended to be eligible for listing in the National Register of Historic Places (NRHP). Any improvements or modifications to the bridge will require MHT coordination and concurrence. The clear roadway width on the bridge is approximately 27’-3”. Currently the bridge is open to pedestrians and bicyclists but closed to vehicular traffic; however, the railing on the bridge is not ADA-compliant. The *White Oak Science Gateway Master Plan* recommends this bridge be reconstructed and opened to vehicular traffic. The existing forested area along Paint Branch is designated as parkland. Maryland Department of the Environment (MDE) designated Paint Branch as a Class III: Nontidal Cold Water. An online database environmental investigation and a Forest Stand Delineation (FSD) was completed as part of this project that will be included in the project prospectus report. All floodplain maps will be considered when studying floodplain impacts. If this project progresses into Phase II design, impacts to floodplain, forest, and stream will be evaluated in detail. The only floodplain within the project limits is along Paint Branch. See Figure 8 for the floodplain boundary map. The 100-year floodplain near Old Columbia Pike and Paint Branch is at elevation 232. The existing Old Columbia Pike roadway is significantly above the 100-year floodplain elevation at approximately elevation 272 near the bridge according to FEMA flood map.

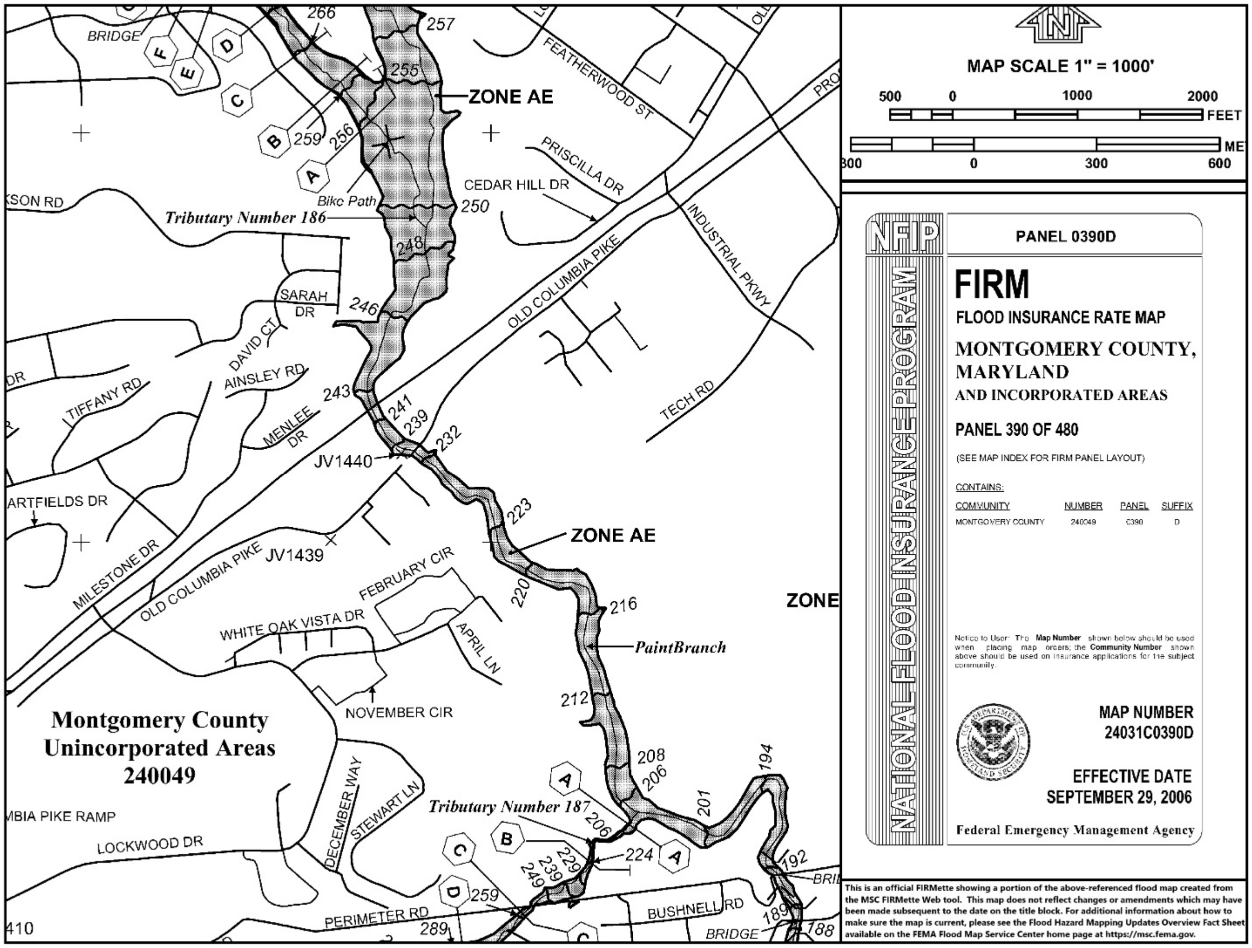


Figure 8: FEMA National Flood Map

From Paint Branch to Industrial Parkway

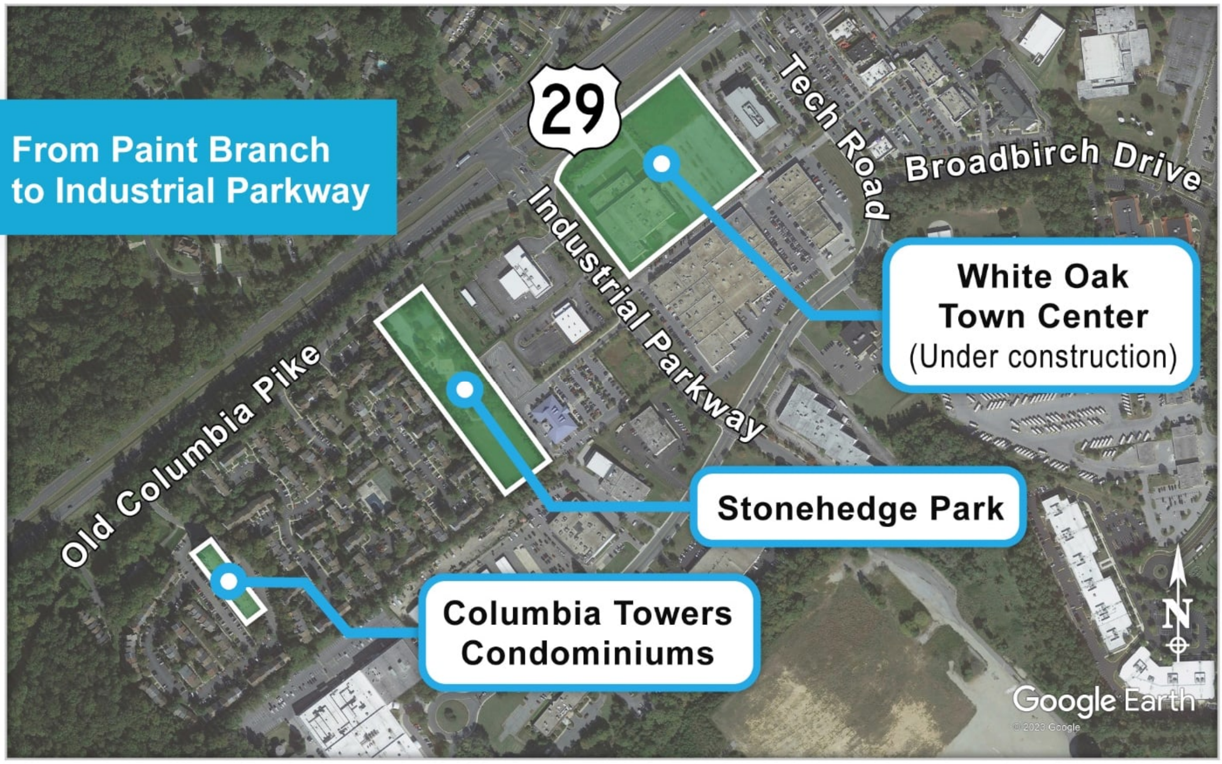


Figure 9 - Aerial Map from Paint Branch to Tech Road

Old Columbia Pike from Paint Branch to Industrial Parkway has two travel lanes with one lane in each direction. The existing posted speed limit is 30 mph. Below are existing pedestrian infrastructure of this area:

- Sidewalk on the east side of Old Columbia Pike, from the first entrance north of the bridge to the entrance of Stonehedge Park.
- Sidepath connecting the entrance of Stonehedge Park, it transitions to a sidewalk before connecting to Industrial Parkway.
- Sidewalk along south side of Industrial Parkway from the intersection with Old Columbia Pike.

There is curb and gutter on one east side of roadway and open shoulder on the west side. The existing roadway south of the townhouse community surrounding Columbia Towers Condominium is closed to motorized traffic. There are townhouse communities and a condominium building, Stonehedge Park, and a commercial building adjacent to Industrial Parkway. The properties in this area are zoned as residential estate (RE), high density residential (R-10), and commercial/residential mix (CR). Montgomery County Department of Parks has plans to improve Stonehedge Park beginning in the fall of 2024. There are three stormwater management ponds and a forested area located between Old Columbia Pike and US 29 and two recently upgraded curb inlets on the south side of Old Columbia Pike and Industrial Parkway.

From Industrial Parkway to Tech Road

Figure 10 – Aerial Map from Industrial Parkway to Tech Road

Old Columbia Pike from Industrial Parkway to Tech Road has two travel lanes with one lane in each direction. The existing posted speed limit is 35 mph. There is no sidewalk along Old Columbia Pike continuing north of Industrial Parkway. There are no ADA compliant crosswalks at Industrial Parkway and Tech Road intersections with Old Columbia Pike/Prosperity Drive. There is a development plan designated as White Oak Town Center (MCPB No. 21-069. Site Plan No. 820180240) located at 12345 Columbia Pike, in the northeast quadrant of the Prosperity Drive and Industrial Parkway intersection that was approved in 2021. There will be surface parking and retail/office buildings planned for this site. There is another development plan designated as Viva White Oak (Preliminary Plan No. 120180240) located approximately 0.8 mile southeast of Industrial Parkway and Old Columbia Pike intersection. This development has not progressed since 2019. The properties in this area are zoned as commercial/residential mix (CR). The proximity of Old Columbia Pike and Industrial Parkway intersection to US 29 and Industrial Parkway intersection creates traffic and safety challenges for vehicular, pedestrian, and bicycle traffic.

From Tech Road to Cherry Hill Road

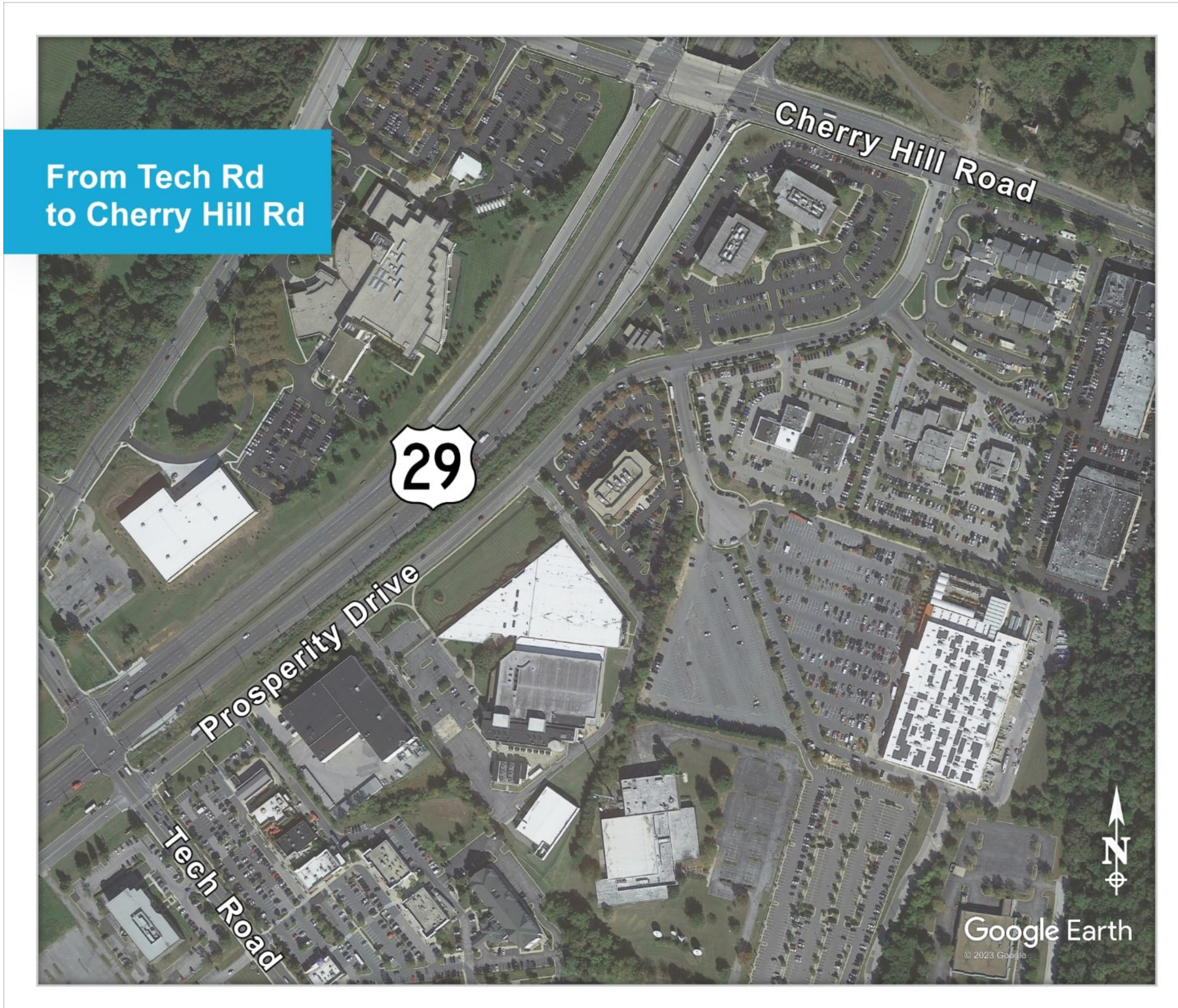


Figure 11 - Aerial Map from Tech Road to Cherry Hill Road

Prosperity Drive from Tech Road to Cherry Hill Road has two travel lanes with one lane in each direction. The posted speed limit is 30 mph. There is sidewalk along east side of Prosperity Drive from Tech Road to approximately 240 feet south of Cherry Hill Road intersection where it transitions to a sidepath to Cherry Hill Road. There is sidewalk along the west side of Prosperity Drive from approximately 1,100 feet south of Cherry Hill Road to Cherry Hill Road. There is a parking lane along the east side of Prosperity Drive from north of the high-security building to Prosperity Terrace with “No Parking 10pm – 6am” sign. The zoning designation of the properties along Prosperity Drive, from Tech Road to Cherry Hill Road, is commercial/residential mix (CR). There are existing restaurant/retail businesses in the northeast quadrant of Prosperity Drive and Tech Road. The remaining buildings include a public storage facility, a high-security office building, a medical services building, car dealerships, and a hotel.

3. Existing Utilities

There are utility poles supporting overhead utility lines that run parallel along both sides of Old Columbia Pike from Stewart Lane to the south end of the bridge extending over Paint Branch. There are fire hydrants and gas lines near the White Oak Towers apartment complex. There are gas lines along the project corridor that are owned by PEPCO and Washington Gas Light Company (WGLCO). There are existing fiber optic lines owned by various companies, including Crown Castle, DF&I, Fiberlight, Windstream, and Zayo. There are also water and sanitary lines owned by Washington Suburban Sanitary Commission (WSSC) in the project area. If this project advances from planning to the design phase, the design team will coordinate with utility companies, request as-built plans and perform test pits to determine accurate locations for existing utilities, seeking to reduce impacts to the utilities, and to coordinate the relocation of utilities if necessary.

4. Traffic and Safety

Intersection capacity of the existing conditions are described in Table A below. Additional traffic related information can be found in the *Old Columbia Pike/Prosperity Drive Improvements Project: Traffic Study Report*.

Table A – Existing Intersection Capacity Analysis

Study Intersection	2022 Existing Condition Level of Service (LOS)	
	AM	PM
(1) Old Columbia Pike at Stewart Lane	A	B
(2) Old Columbia Pike at Industrial Parkway	A	A
(3) Old Columbia Pike / Prosperity Drive at Tech Road	A	A
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	A
(6) Prosperity Drive at Cherry Hill Road	A	C

Corridor crash history was provided by SHA and MCDOT for the five-year period from February 16, 2017 to December 22, 2021 for Old Columbia Pike and from April 7, 2017 to July 15, 2021 for Prosperity Drive. A total of 19 crashes along Old Columbia Pike and a total of 6 crashes along Prosperity Drive occurred during the study period. Nine of the 19 reported crashes along Old Columbia Pike occurred at study intersections, with 8 of 19 crashes occurring at night. All six reported crashes along Prosperity Drive occurred at study intersections, and all occurred during the daytime. This project limits includes six intersections along Old Columbia Pike and Prosperity Drive listed below:

1. Old Columbia Pike at Stewart Lane (including the adjacent spur connection from Old Columbia Pike to US 29, located approximately 350 feet north of Stewart Lane)
2. Old Columbia Pike at Industrial Parkway
3. Old Columbia Pike / Prosperity Drive at Tech Road
4. Prosperity Drive at Whitethorn Court
5. Prosperity Drive at Prosperity Terrace
6. Prosperity Drive at Cherry Hill Road

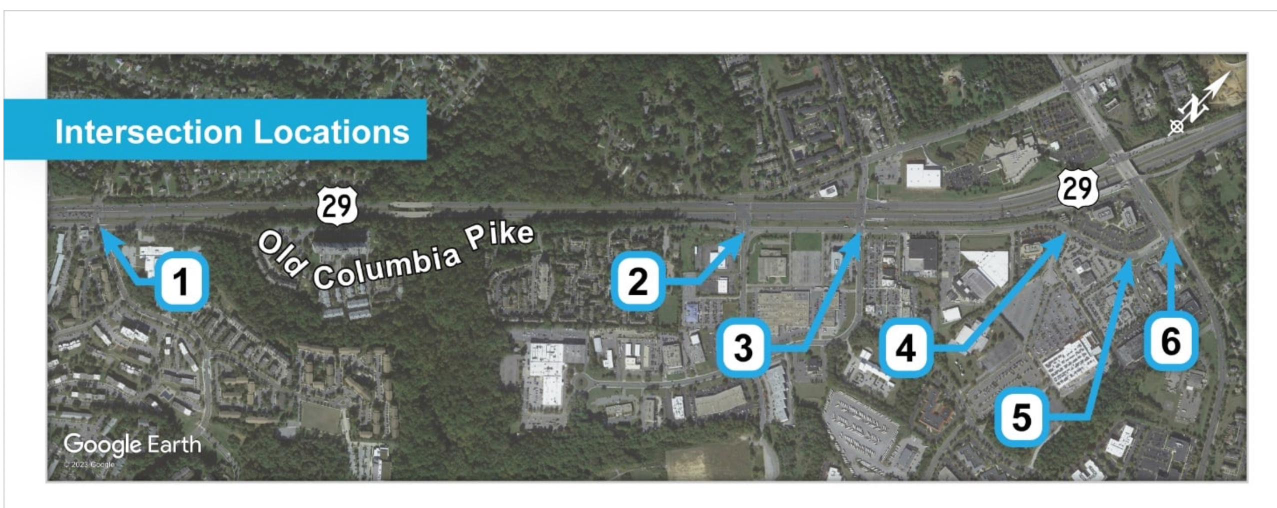


Figure 12 – Intersection Locations

There are some existing conditions that impact safety of all users and traffic capacity:

- Long traffic queue length during peak AM and PM periods and blocking intersections
- Lack of clear pavement marking to direct traffic and delineate lane use
- Close proximity to intersections with US 29 may contribute to drivers making unsafe U-turns
- Following too closely to run red light signal
- Failure to yield to another vehicle that has the right-of-way
- Roadside landscaping obstructs drivers' line of sight entering main roadway from driveways
- Lack of ADA compliant pedestrian / bicyclist crosswalk
- Absence of continuous pedestrian sidewalk and / or sidepath connectivity
- Absence of street lighting along Old Columbia Pike from Carriage House Terrace to the first driveway north of bridge over Paint Branch

Montgomery County has adopted a Vision Zero plan whose goal is to prevent transportation-related deaths and severe injuries. The Vision Zero plan states that transportation-related deaths and injuries are preventable and unacceptable, human life takes priority over mobility and other objectives of the road system and people are inherently vulnerable. Subsequently, the transportation system should be designed for speeds that protect human life. Montgomery County is committed to Vision Zero and to eliminate severe and fatal, countermeasures will be tailored to the unique environments in Montgomery County. The improvements proposed in this project will improve the overall safety of the corridor by addressing existing traffic safety and operational issues.

5. Public Transportation

There are multiple public transportation lines within and near the project's study area. Montgomery County's FLASH Orange Bus Rapid Transit line runs along US 29 from WMATA's metro station in Silver Spring to the Briggs Chaney Park and Ride lot in Fairland. The FLASH Orange Route has stops in the vicinity of the project limits, as shown in Figure 13 below:

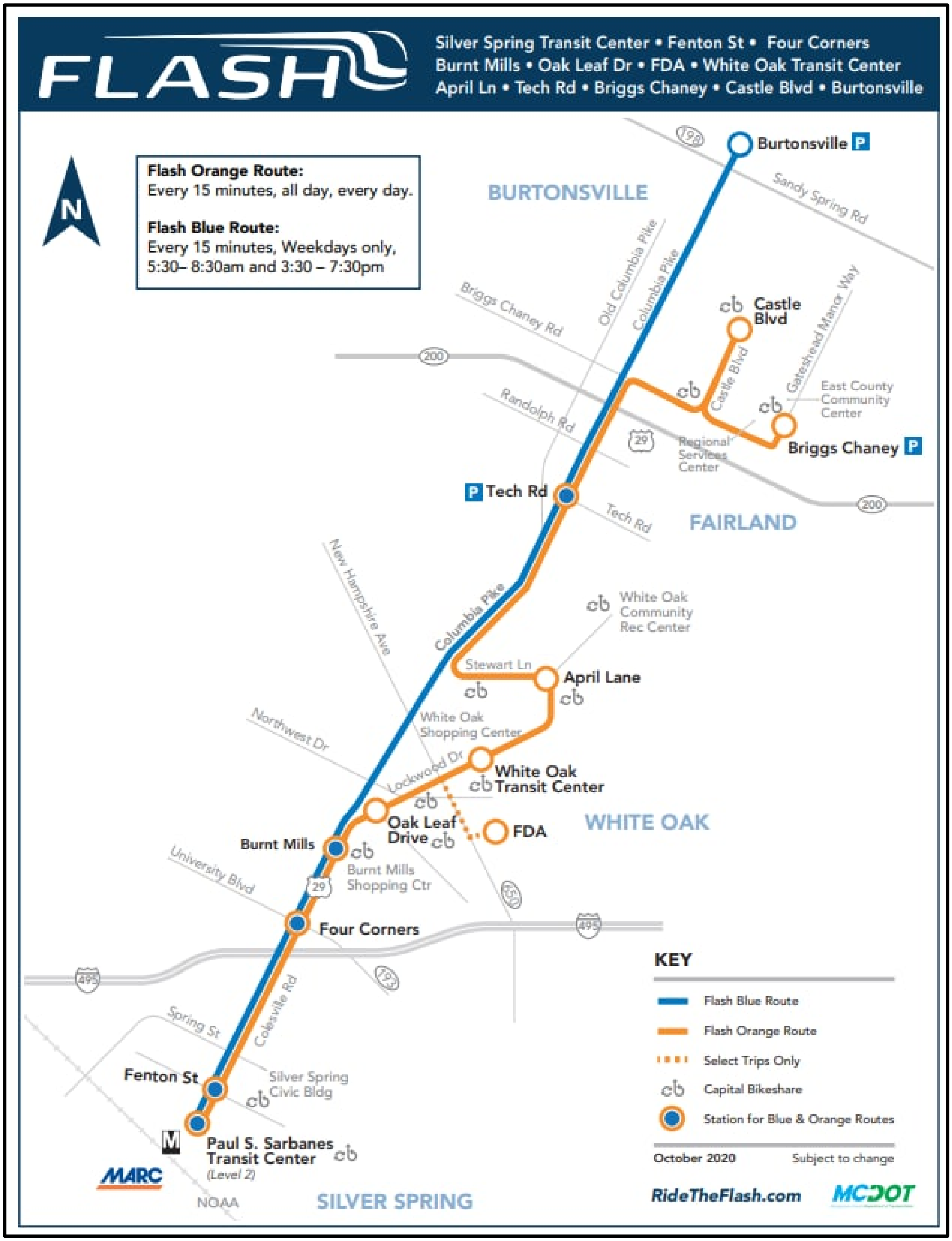


Figure 13 - FLASH Orange Route Map

Montgomery County Ride On Bus Route No. 10 and WMATA Metro Bus Route Nos. Z6 and Z8 service Stewart Lane near the intersection with Old Columbia Pike. Montgomery County Ride On Bus Route No. 10, 27 and WMATA Metro Bus Route No. Z6 service Industrial Parkway and Tech Road. Route maps of these routes are provided in Figures 14 and 15 below.

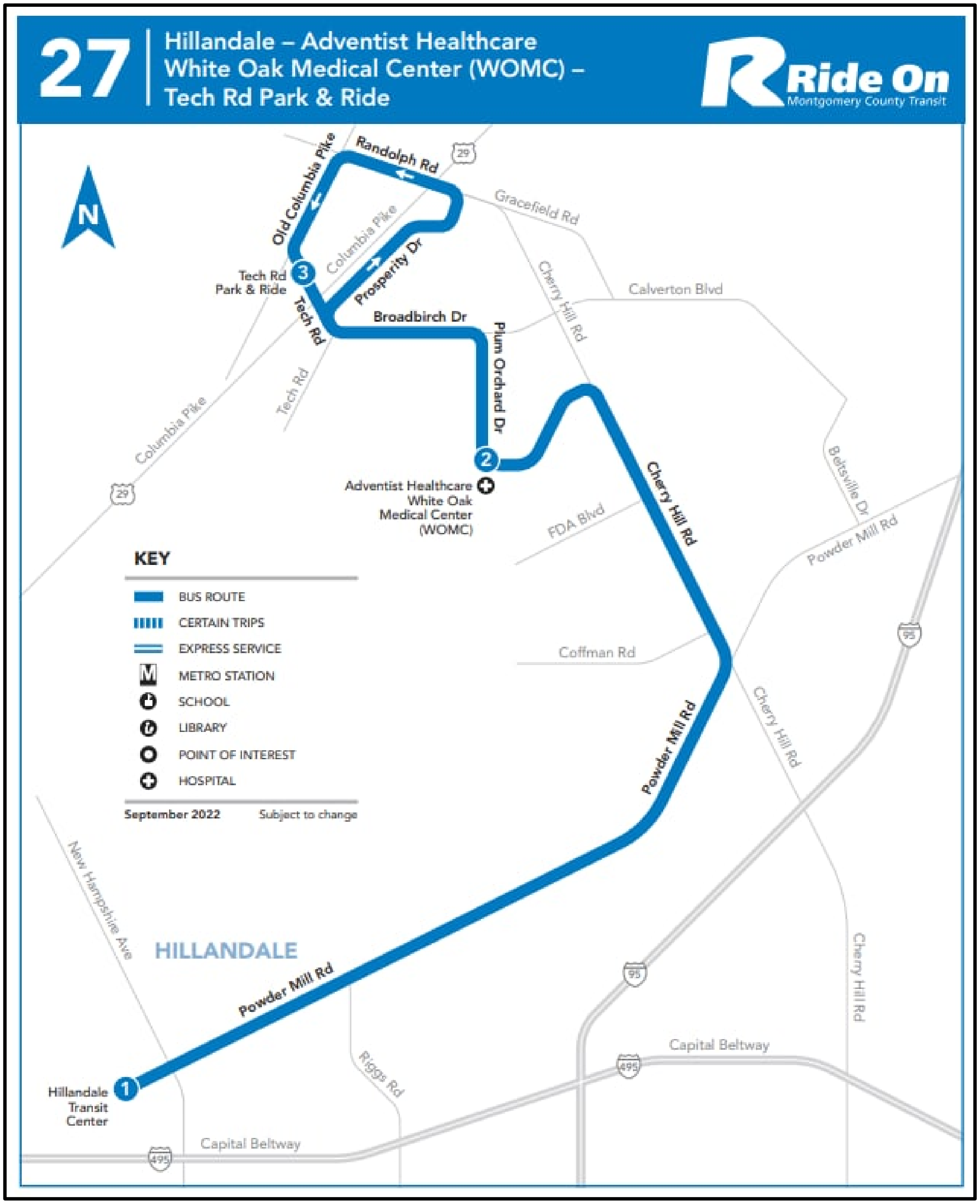


Figure 14 - Ride On Route No. 27 Route Map

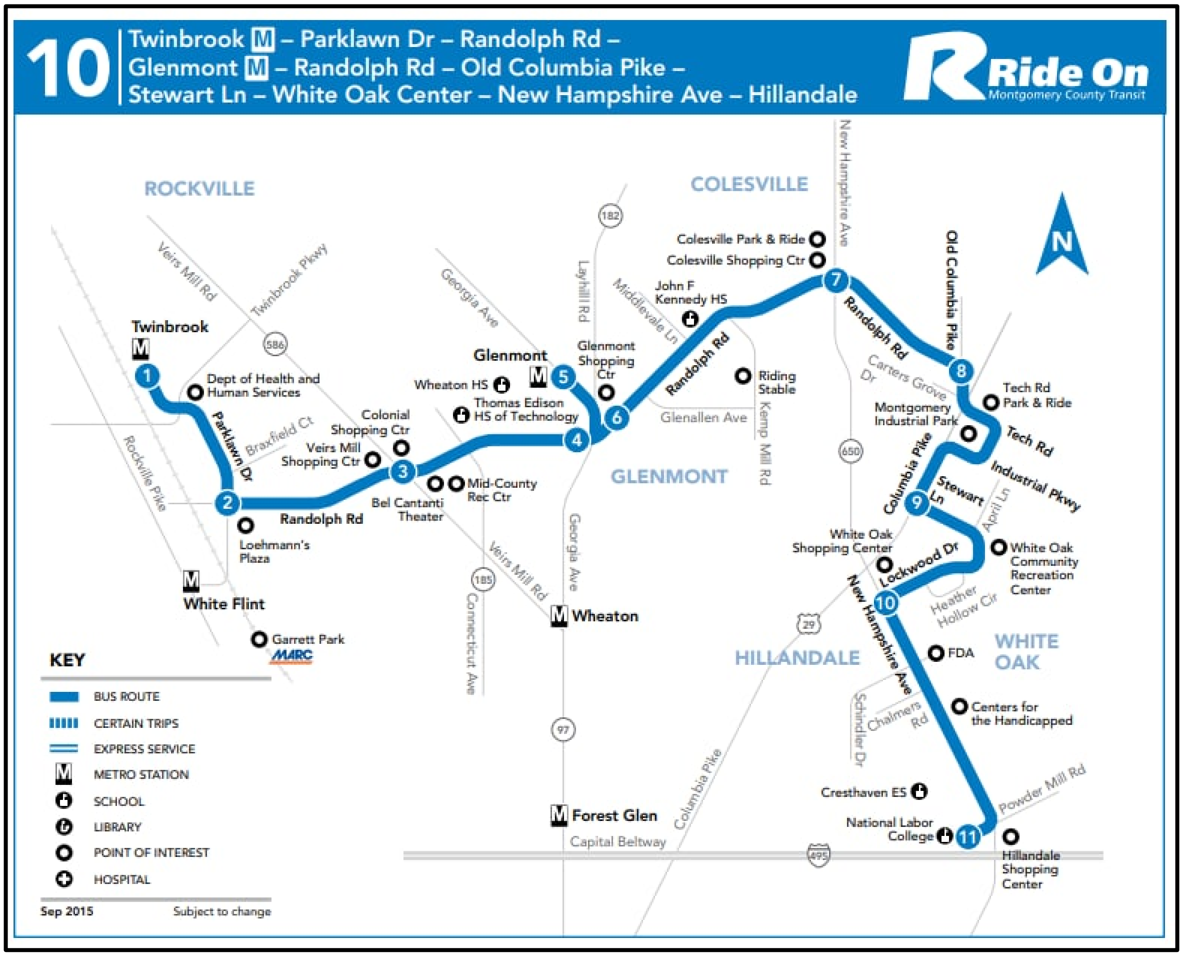


Figure 15 - Ride On Route No. 10 Route Map

The Montgomery County Public Schools identifies the residents living in the project area north of Paint Branch as served by Galway Elementary School, Briggs Chaney Middle School, and Paint Branch High School; residents in the project area south of Paint Branch are served by Burnt Mills Elementary School, Francis Scott Key Middle School, and James Hubert Blake High School. According to MCPS's policy, residents within these project limits are eligible to receive transportation services. According to MCPS' bus route information, school buses traverse Old Columbia Pike and Stewart Lane intersection to access school bus stops at White Oak Towers Apartment (11700 Old Columbia Pike) and traverse Old Columbia Pike and Industrial Parkway intersection to access Columbia Towers Condominium (12001 Old Columbia Pike).

There are two Capital Bikeshare locations along Stewart Lane east of the intersection with Old Columbia Pike; one is located approximately 370' east of intersection of Old Columbia Pike and Stewart Lane and the other is located approximately 180 feet east of intersection of Stewart Lane and April Lane.

C. Project Purpose

The purpose of the Old Columbia Pike / Prosperity Drive Improvements Project is to:

- Review and coordinate with recommendations adopted in the *White Oak Science Gateway Master Plan* (2014), the *Approved and Adopted Fairland Master Plan* (1997), and the Master Plan of Highways and Transitways Functional Classification (effective 02/07/2023)
- Propose incremental improvements that aligns with *White Oak Science Gateway Master Plan* and complies with *Montgomery Complete Streets Guide*
- Improve local connectivity to local destinations along and beyond the study area as recommended in the White Oak Science Gateway Master Plan
- Achieve the planned target speed of 25 mph along the project corridor
- Evaluate options for short-term and long-term improvements of the bridge over Paint Branch
- Improve safety by implementing Montgomery County's protected intersection design concept
- Enhance safety for all roadway users and modes of transportation including pedestrians and bicyclists, in accordance with Montgomery County's *Vision Zero Plan 2017*
- Promote equity and accessibility by providing continuous pedestrian facilities in accordance with Montgomery County's *Vision Zero Plan 2017*
- Shift the preferred mode of transportation away from automobile to public transit, walking, bicycle, and micromobility as outlined in *THRIVE Montgomery 2050*
- Address connectivity and safety needs along Old Columbia Pike/Prosperity Drive
- Stimulate economic growth, incentivize job creation, and improve the quality of life for residents and visitors of the White Oak area
- Improve traffic safety, capacity, and operations along the Old Columbia Pike corridor and at the following intersections:
    - Stewart Lane
    - Industrial Parkway
    - Tech Road
    - Whitethorn Court
    - Prosperity Terrace
    - Cherry Hill Road
- Explore opportunities to expand US 29 FLASH and Ride On bus service network coverage and improve public transit connectivity between residential areas and major employment centers, including:
    - Food and Drug Administration (FDA) Headquarters at the Federal Research Center
    - White Oak Shopping Center
    - White Oak Town Center
    - Washington Adventist White Oak Medical Center
    - Orchard Center Retail
    - Westech Village Center
    - Hotels, car dealerships, and health care offices near Cherry Hill Rd

D. Project Need

The need for this project is to:

- Address sidewalk and bicycle facility gaps near White Oak Towers Apartments, Stonehedge Park, Industrial Parkway intersection, and Tech Road intersection
- Provide safe and ADA compliant pedestrian / bicyclist crossing facilities at all intersections and entrances within the project limits
- Improve traffic safety and operations to resolve critical safety and capacity issues at the following intersections:
    - Stewart Lane
    - Industrial Parkway
    - Tech Road
    - Whitethorn Court
    - Prosperity Terrace
    - Cherry Hill Road
- Assess existing conditions of the bridge over Paint Branch and identify improvement measures to ensure continued safety of all users
- Upgrade Old Columbia Pike / Prosperity Drive to accommodate anticipated increasing demand of vehicular and pedestrian traffic volume due to the following recent and upcoming developmental projects:
    - White Oak Town Center (Preliminary Plan No. 120150100; Site Plan No. 820180240)
    - White Oak Apartments (Preliminary Plan No. 120220060; Site Plan No. 820220110)
    - Viva White Oak (Preliminary Plan No. 120180240)

Appendix E

Environmental Assessment

MEMORANDUM

Date: March 8, 2022 (updated April 15, 2024)

To: Suid Tee
From: Tim Hess/Brendan Little
Subject: Online Database Environmental Investigation

CC: Mark Roberts

Work Order Number: 32207.006
Contract Number: CIP No. P508768
Project: Old Columbia Pike/ Prosperity Drive – Phase I Facility Planning Project

Project Description

The Montgomery County Department of Transportation (MCDOT), Division of Transportation Engineering (MCDOT-DTE) has requested a Scope of Services and Price Proposal for Facility Planning Phase I for Old Columbia Pike/Prosperity Drive (OCP) from Stewart Lane to Cherry Hill Road in Montgomery County (Figure 1). The approximate length of the project is 1.8 miles. The facility planning will include alternatives for OCP based on the number of lanes, intersection configurations, and sidepath/breezeway/sidewalk locations. The typical section for OCP will vary along different parts of the corridor. The alternatives will also be developed based on master plans, MDOT SHA projects and adjacent developments in the area.

Available Online Environmental Information

WRA has been tasked with compiling available online environmental database information for the purpose of evaluating potential permitting implication for proposed roadway alternatives. WRA will use online databases to investigate soils, historical properties, documented NWI wetlands and streams, floodplains, and sensitive species.

Wetlands

Merlin online mapping displays a freshwater forested/shrub wetland habitat, classified as PFO1A, approximately 1.04 ac. located adjacent to the project (Figure 2). PFO1A is palustrine forested broad-leaved deciduous, temporary flooded wetland; it also display one perennial stream, Paint Branch. The Maryland Department of the Environment (MDE) has assigned a Use III designation to Paint Branch. Use III streams are generally non-tidal cold-water streams with a time of year restriction for instream construction from October 1 to April 30. Paint Branch is associated with MD 8-digit code 02140205, and 12-digit federal HUC code 020700100202. Use III streams often increase the likelihood of requests from MDE for mitigation for impacts to streams and wetlands.

Merlin's wetland data is a combination of any mapped wetlands from both the National Wetland Inventory (NWI) database and the Department of Natural Resources (DNR) database. NWI and DNR mapping is not a compete system of all wetlands, but a database of wetlands known to exist. An official wetland delineation will be necessary to confirm the absence of wetlands and streams.

Floodplain

Merlin online mapping provides floodplain information from FEMA (Figure 3). Based upon that mapping there is a mapped 100-year floodplain within the project area that is associated with Paint Branch. Impacts to the 100-year floodplain are regulated by MDE and therefore require a Wetlands and Waterways Permit for associated impacts.

Historic Properties

Merlin online mapping provides information from both the Maryland Inventory of Historical Places and the National Register of Historic Places (Figure 4). The following historical places/properties are within 500-600 feet of the project area. Description provided from MD Inventory of Historical Places are attached.

MD Inventory of Historical Places:
- #1 – M-33-26 - Bridge No. 15035
- #2 – M-34-11 – Cherry Hill Plant Research Farm
- #3 – M-34-37 – Walter Ramsburg Property
- #4 – M-34-25 – Charles Ramsburg House
- #5 – M-34-9 - St. Mark's/Paint Chapel Episcopal Church and Cemetery
- #6 – M-34-10 - Conley House/Green Ridge

National Register of Historic Places
- None listed

WRA sent a letter to MHT and received a response on August 22, 2023. MHT requested additional information as design progresses to provide input on how this project could affect historical structures and properties.

Sensitive Species

Merlin Online Mapping provides a host of databases that catalog areas of special concern for living resources (Figure 5). A portion of the wooded areas surrounding Paint Branch are designated as a Forest Interior Dwelling Species (FIDS) area and is designated by the olive green shading. Coordinating agencies ask that projects within a FIDS areas avoid and minimize impacts to forested areas. If impacts to forest are deemed unavoidable, then FIDS guidance requests that impacts take place on the outer edge of the forest stand. Impacts that bisect a forest stand are highly discouraged.

WRA has completed an Information for Planning and Consultation (IPac) report through U.S. Fish and Wildlife Service (USFWS). An IPac report is a preliminary finding of the presence of habitat within a given area that USFWS considers suitable for a sensitive species. It does not mean that the species is present. The IPac for this project area is attached. The Northern Long Eared Bat is the only sensitive species of concern that reported. Impacts to wooded areas of less than 15 acres of clearing are unlikely to negatively affect this species.

WRA sent a letter to the Maryland Department of Natural Resources (MD-DNR) to request any information that they have on sensitive species within the project area. MD-DNR responded with a letter stating that no official endangered species are known to be in this area, however the Acuminate Crayfish if often found in this area and "is in need of conservation". MD-DNR has requested that the design adhere stringently to best practices of erosion and sediment control practices. MD-DNR also emphasized the time of year restriction for in stream work for a Use III stream (October 1st through April 30th).

USGS Topographic Grid

Merlin online mapping provides the USGS Topographic map overlays (Figure 6). The USGS topographic map may display historical conditions areas of concern such as streams or wetlands that were previously altered in the past. Based upon the Beltsville SW USGS topographic grid map, nothing of concern has been observed.

Soils

The Natural Resource Conservation Service (NRCS) and the United States Department of Agriculture (USDA) provide soil mapping through an online database called Web Soil Survey. The Web Soil Survey provides mapping of soil types that are projected to be located on-site (Figure 7). Based upon the length of the project area there are several soil types present (Figure 9).

Web Soil Survey uses the soil type to provide information on typical hydric ratings (Figure 8) and erodibility if that data is available. Based upon this mapping, there are hydric soil present, which are often associated with wetland features. Soils with a high K-Factor (>0.4) assigned to them are viewed as highly erodible. Highly erodible and hydric soils should be factored into design when applicable.

Zoning

Based upon Montgomery County Mapping the project area crosses through several zoning categories (Figure 10). Zoning and land uses include, but are not limited to offices, residential, warehouse, parks, and vacant property. The commercial and residential zoning designations are the most prevalent within the project area and are located primarily in the north of the proposed alignment. A mixed commercial/residential designation is represented with a red shading and is located primarily in the middle to southern portion of the alignment. The brown and yellow shading represents various densities of residential zoning. The proposed project appears to be consistent with the zoning. Alignments may need to account for building setbacks.

Emergency Facilities

A basic search was performed for emergency facilities. No fire departments, police stations, or hospitals are located within or adjacent to the project area. However, several facilities are known to exist within 3 to 5 miles of the project area.

Forest

MRA will be preparing a combined Natural Resource Inventory (NRI)/Forest Stand Delineation (FSD) for the project area. The NRI/FSD will document the vegetative communities present onsite, as well as other environmental features. The NRI/FSD will be used as a basis for a Forest Conservation Plan (FCP) to comply with Maryland Forest Conservation Law as design progresses.

Existing Parklands

M-NCPPC provides an online mapping service MCAtlas that displays parkland and recreation facilities (Figure 11). Paint Branch Stream Valley Park (Unit 4), Old 29'er Trail, and Stonehedge Local Park all fall within the project study area.

MD Inventory of Existing Parklands:

- #1 – Paint Branch Stream Valley Park (Unit 4)
- #2 – Old 29'er Trail
- #3 – Stonehedge Local Park

Known Hazardous Materials or Underground Tanks

A search of a 0.5-mile radius around the project study area was completed using the EPA EnviroAtlas and UST Finder online mapping, which provide information on EPA regulated facilities (Figure 12). The following hazardous materials related sites are within 0.5 miles of the project.

- 36 RCRA Hazardous Waste Management Sites
  - 31 active
  - 5 inactive
- 13 past Hazardous Materials releases (improper leak, spillage, discharge, or disposal)
  - All received determinations of “no further action required”.
- 22 sites with underground Storage
  - 19 tanks that are in current use or open
  - 41 tanks that have been closed permanently.

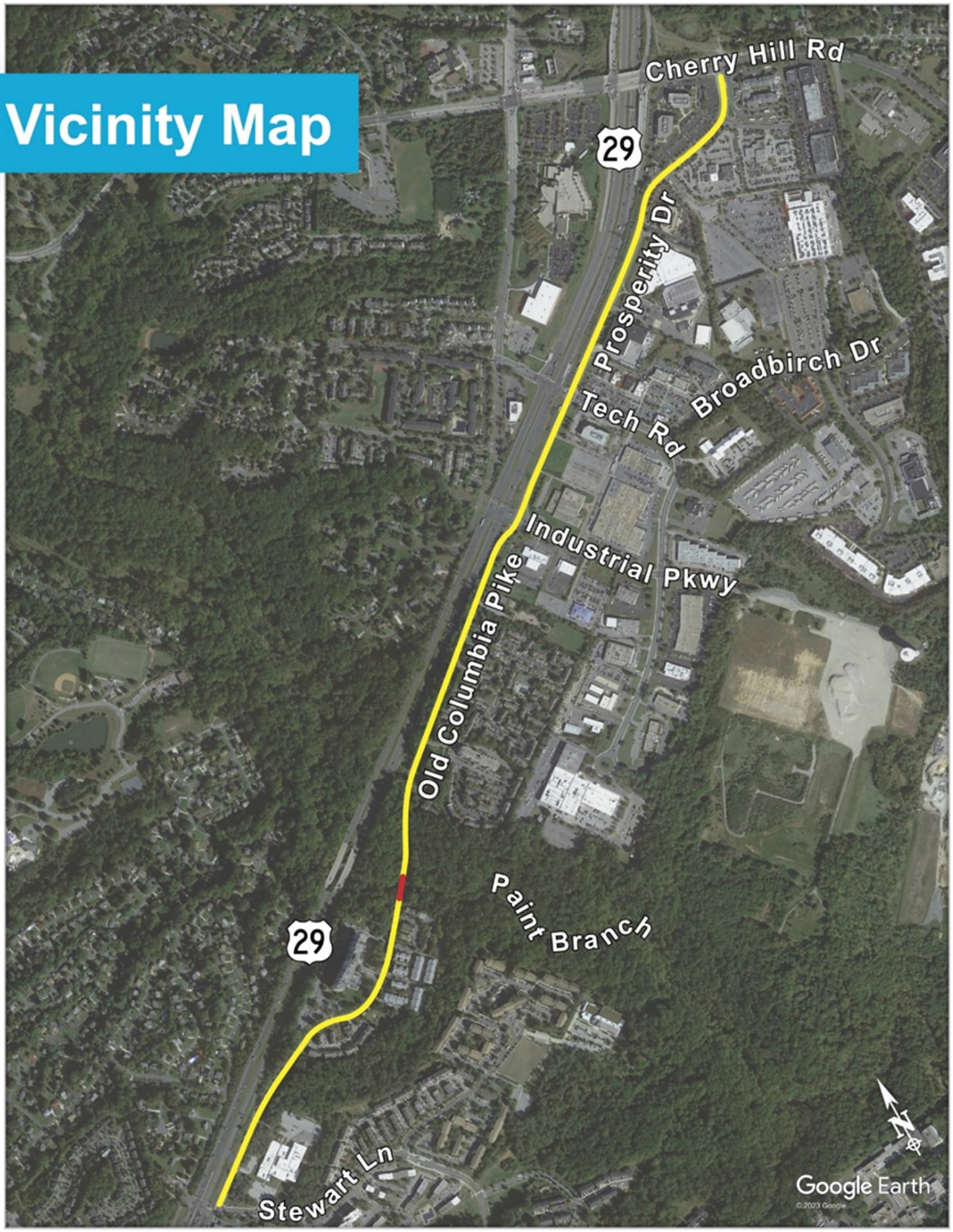
Conclusion

Based upon available online mapping from Merlin, USFWS, and Web Soil Survey, there are several areas of concern for known environmental permitting implications. There is a PFO1A NWI wetland (1.04 ac.) adjacent to the project, and present of hydric soils and erodible soils within the project area, which could indicate a possibility for previously unmapped wetlands. A Wetlands and Waterways Permit from MDE will be necessary if the 100-yr floodplain or Paint Branch is impacted. As design progresses the NRI/FSD will be used as a base for the development of an FCP to comply with MD Forest Conservation Law. FIDS consideration will need to be incorporated into the project design during the FCP process to limit impacts to forest areas.

Timothy Hess, WRA Environmental Scientist

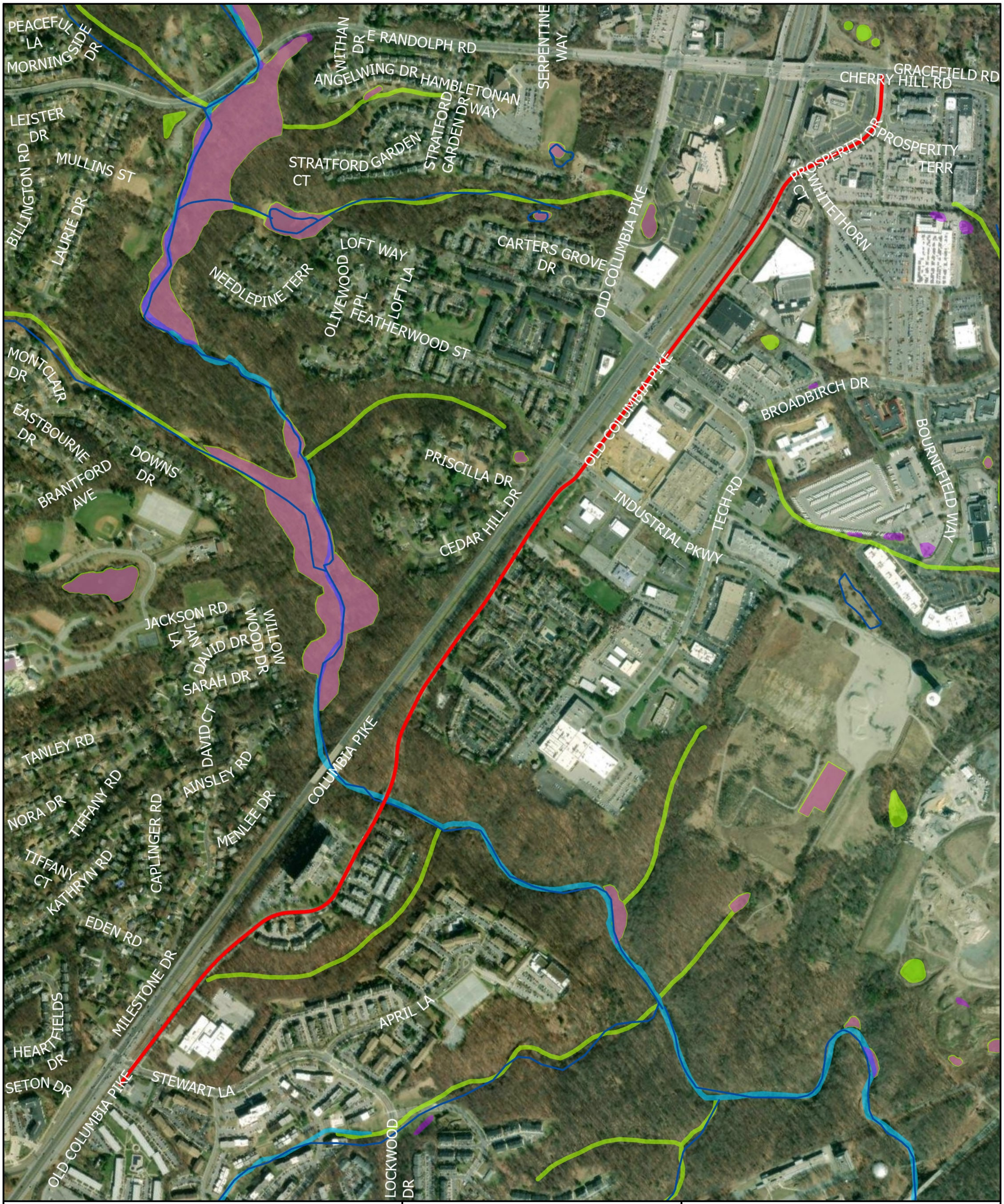
Figure 1- Project Area

Vicinity Map



Project Limits
Existing Bridge

Figure 2- Merlin Wetland and Stream Mapping
(NWI and DNR)



Project Alignment
DNR Waterbody
DNR Wetland
NWI Wetland
NWI Riverine Feature

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

WRA

Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

Source: ESRI, NWI, DNR, MD iMap

Figure 2
Wetlands and Streams

Figure 3- Merlin FEMA Floodplain Mapping

Project Alignment

100 Year Floodplain

500 Year Floodplain

No preliminary FEMA floodplains present in the vicinity.

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

Source: ESRI, MD iMap, FEMA

Figure 3
FEMA Floodplain

Figure 4- Merlin Historical Mapping

Project Alignment

Historic Properties

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

Source: USGS, USACE, FEMA, ESRI

Figure 4
Historic Properties

Figure 5- Merlin Sensitive Species/Living Resources

Project Alignment

Fish Blockage Locations

Forest Interior Dwelling Species

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

Old Columbia Pike/Prosperity Drive

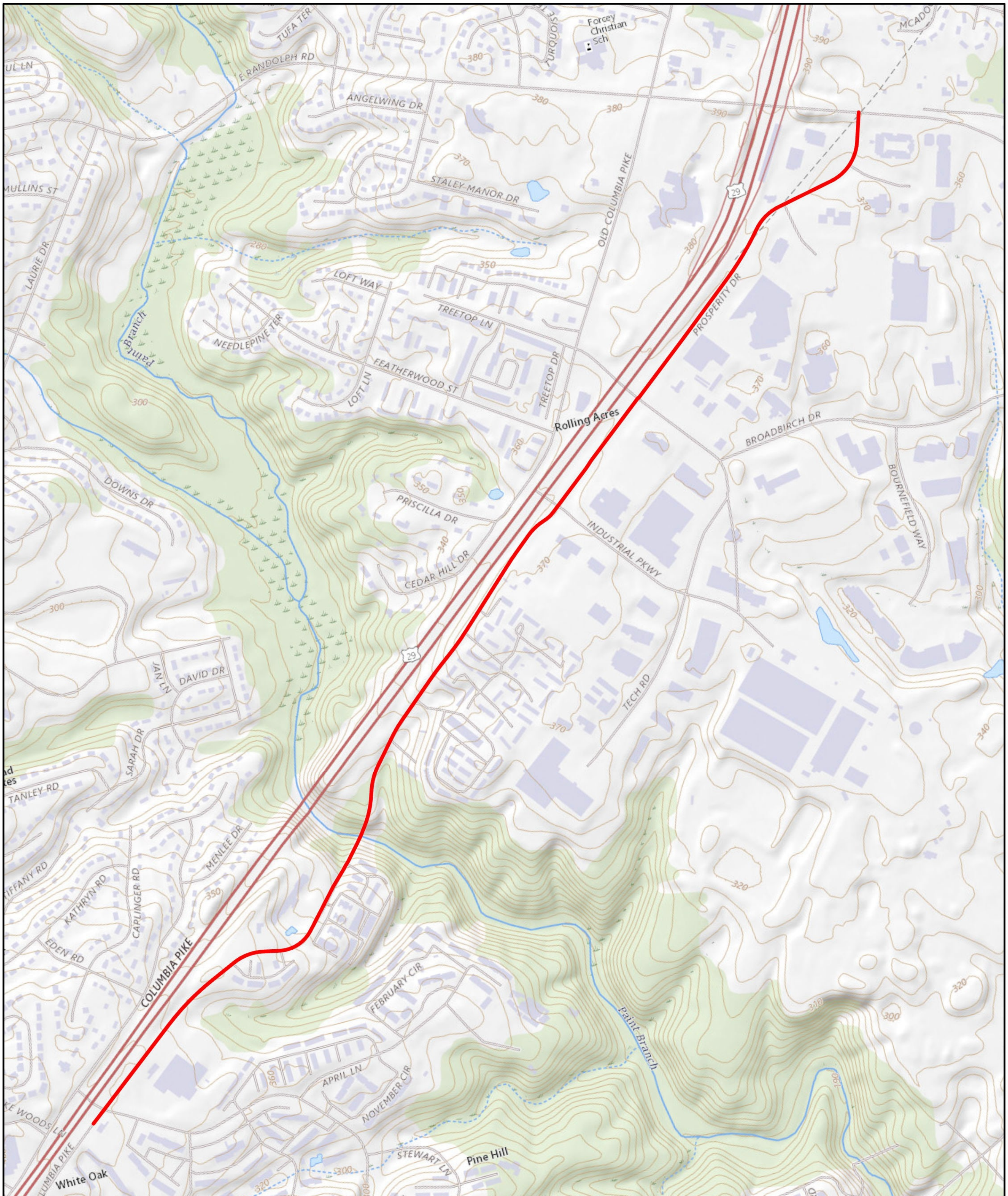
Montgomery County Department of Transportation

Source: ESRI, DNR, MD iMap

Figure 5
Living Resource Map

MD Amphibian and Reptile Grid:
Beltsville Quad

Figure 6- Merlin USGS Topographic Mapping and Grid



Project Alignment

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

Old Columbia Pike/Prosperity Drive

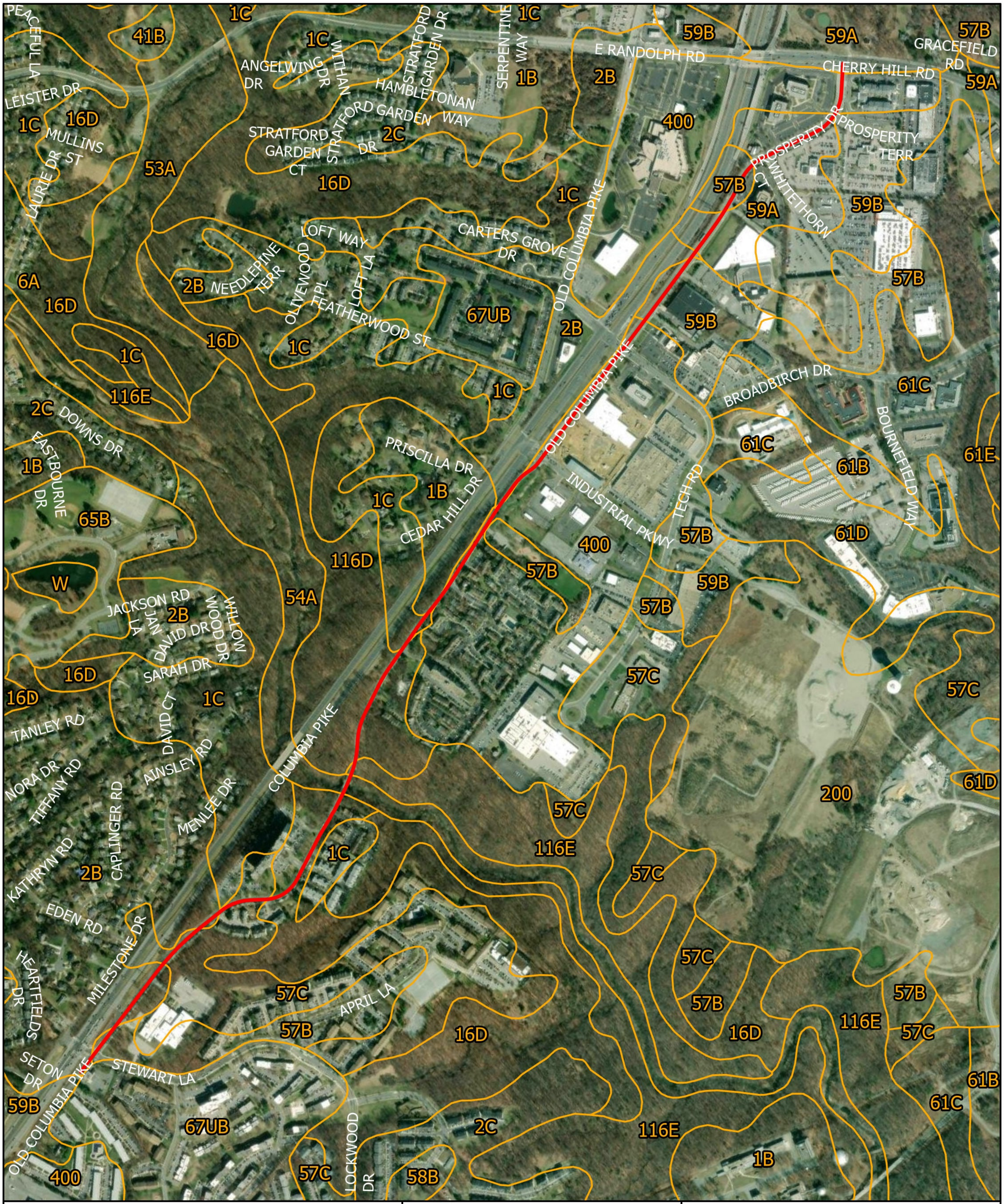
Montgomery County Department of Transportation

Source: ESRI, USGS

Figure 6
USGS Topographic Map

Quadrangle: Beltsville

Figure 7- NRCS/USDA Web Soil Survey



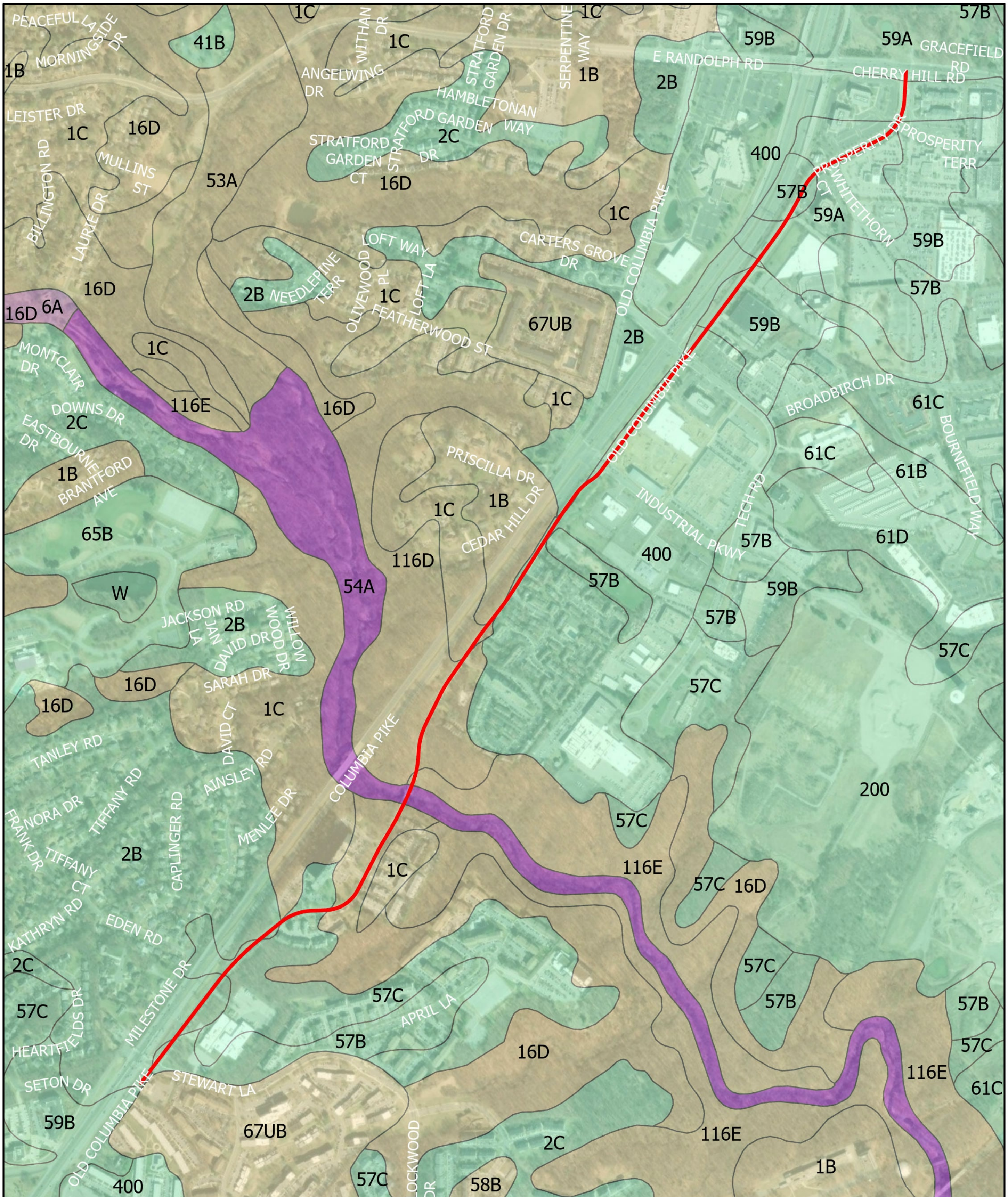
Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

Source: ESRI, USDA, NRCS

Figure 7
Web Soil Survey

Figure 8- NRCS/USDA Web Soil Survey Hydric Rating



- Project Alignment
- 0% Hydric
- 1-32% Hydric
- 33-65% Hydric
- 66-99% Hydric
- 100% Hydric

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

MONTGOMERY COUNTY MARYLAND 1776

WRA

Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

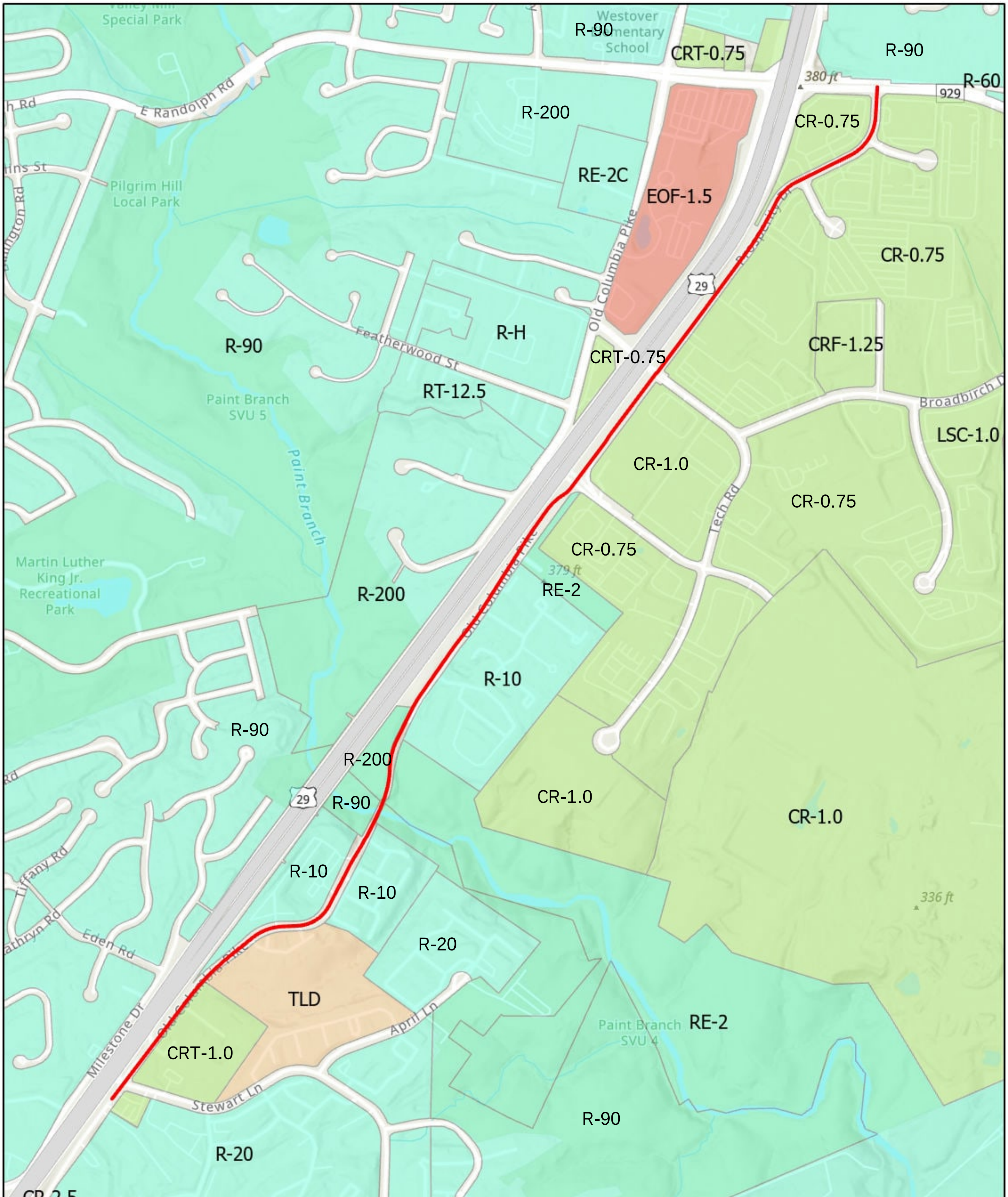
Source: ESRI, USDA, NRCS

Figure 8
Web Soil Survey
Hydric Rating

Figure 9- NRCS/USDA Web Soil Survey Soil Types

Symbol	Soil Description	Hydric	K-Factor	Erodible
1B	Gaila silt loam, 3 to 8 percent slopes	Y	0.43	Y
1C	Gaila silt loam, 8 to 15 percent slopes	Y	0.43	Y
2B	Glenelg silt loam, 3 to 8 percent slopes	N	0.37	Y
16D	Brinklow-Blocktown channery silt loams, 15 to 25 percent slopes	Y	0.24	N
54A	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded	Y	N/A	N
57B	Chillum silt loam, 3 to 8 percent slopes	N	0.49	Y
57C	Chillum silt loam, 8 to 15 percent slopes	N	0.49	Y
59A	Beltsville silt loam, 0 to 3 percent slopes	N	0.37	Y
59B	Beltsville silt loam, 3 to 8 percent slopes	N	0.49	Y
67UB	Urban land-Wheaton complex, 0 to 8 percent slopes	Y	N/A	N
116D	Blocktown channery silt loam, 15 to 25 percent slopes, very rocky	Y	0.28	N
400	Urban land	N	N/A	N

Figure 10- Zoning Map



Project Alignment

Zoning Code

Commercial/Residential

Employment

Residential

Townhouses

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

WRA

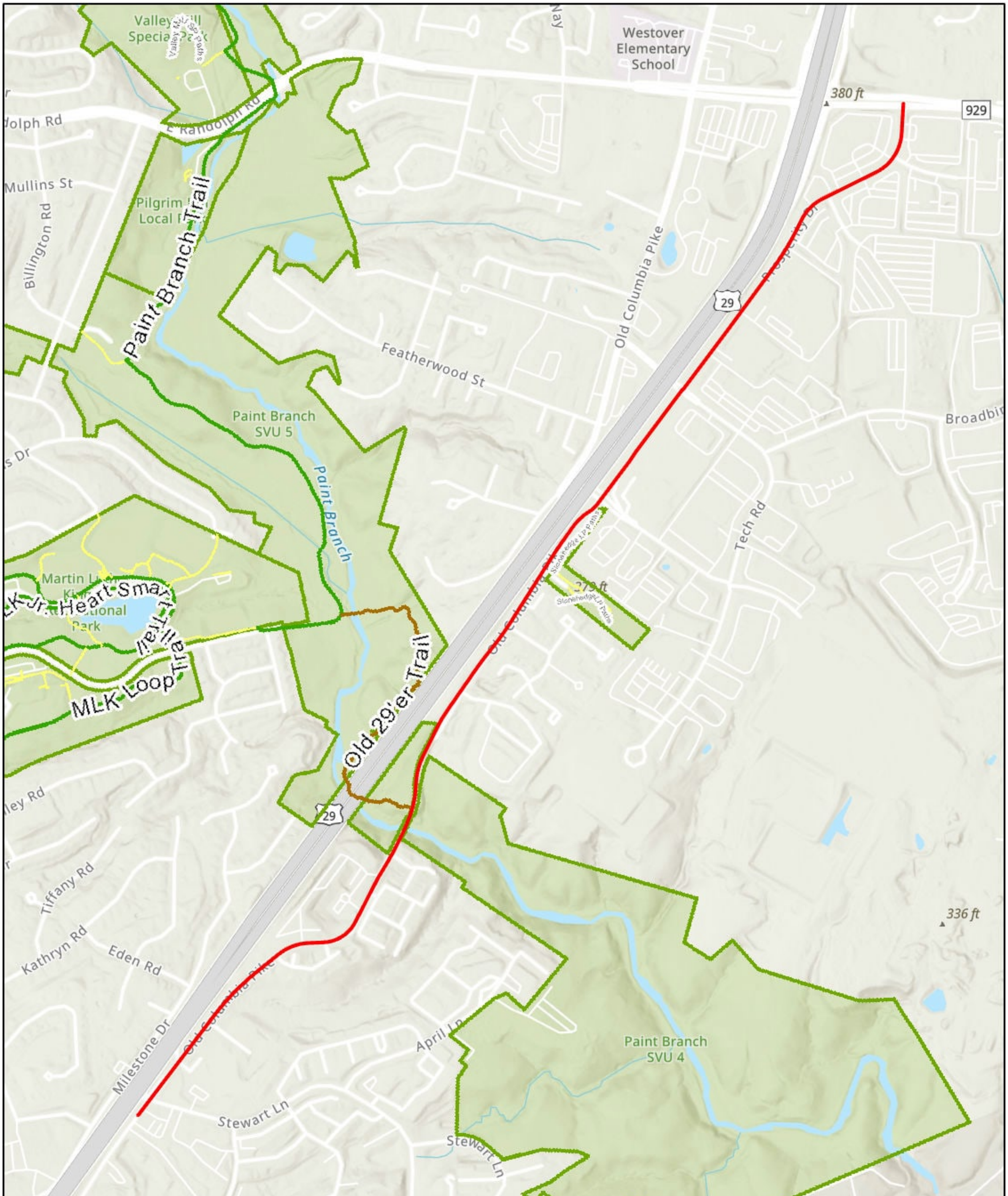
Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

Source: ESRI, Montgomery County

Figure 10
Zoning

Figure 11- Parkland and Recreation Facilities



Project Alignment

Park Trail and Path System

- Other Connections
- Park Paths and Trail Connector
- Hard Surface Trails
- Natural Surface Trails
- Water Trails
- Parkland outline

1 inch equals 1,000 feet

0 500 1,000 2,000 Feet

WRA

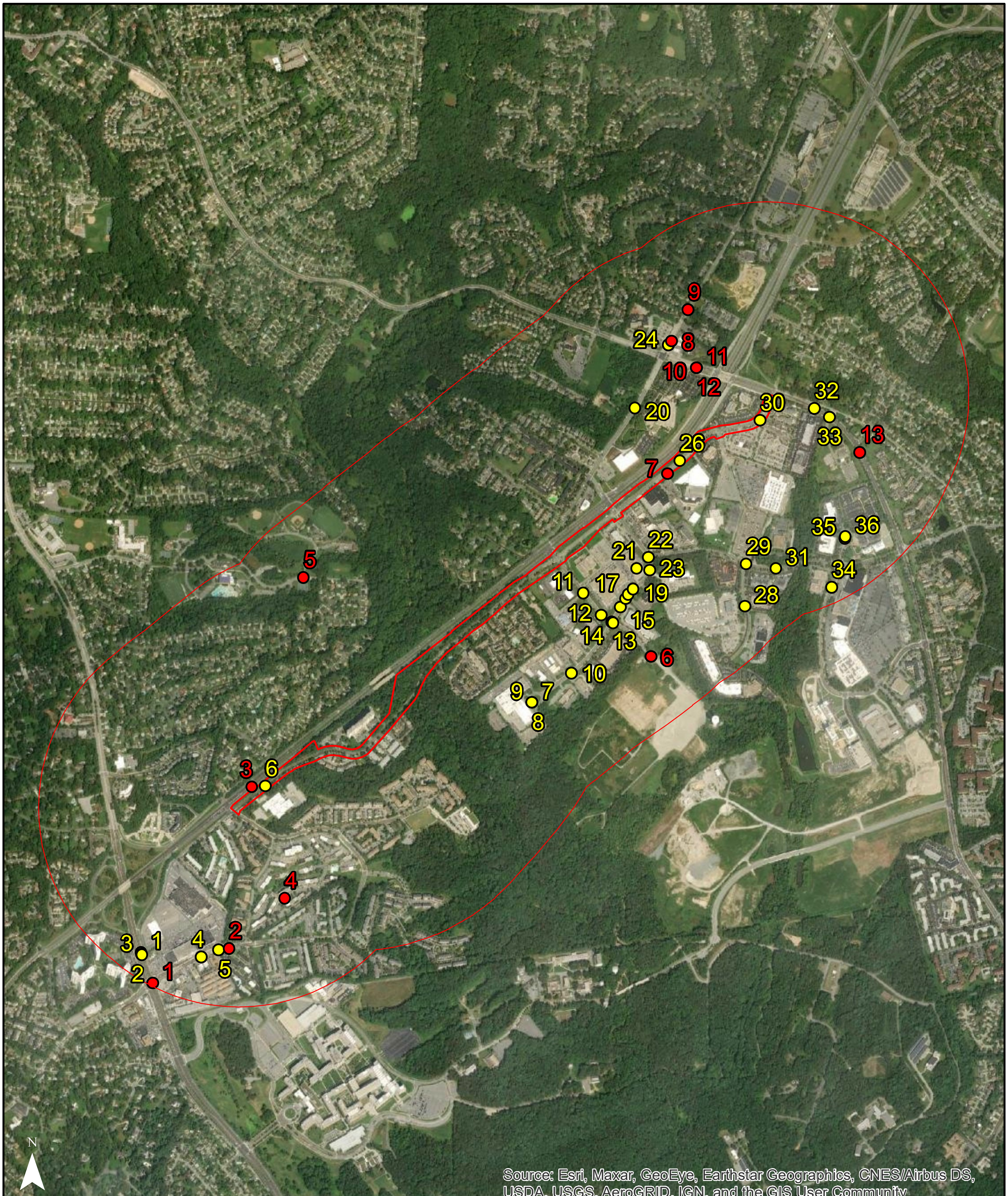
Old Columbia Pike/Prosperity Drive

Montgomery County Department of Transportation

Source: MCAtlas, ESRI

Figure 11
Parkland and Recreational Facilities

Figure 12- Hazardous Materials



1 inch = 1,833 feet

0 0.1 0.2 0.3 0.4 Miles

HazBuffer

Hazardous Releases

RCRA Sites

Env.StudyArea

Old Columbia Pike/Prosperity Drive (OCP) from Stewart Lane to Cherry Hill Road

Montgomery County, Maryland

Source: EPA EnviroAtlas, ESRI

Figure 12:

Hazardous Materials Map

Hazardous Materials Releases Table					
Number	LUST_ID	Name	Address	Reported_D	Status
1	MD03-2072MO1	PEPCO SPILL	LOCKWOOD & NEW HAMPSHIRE AVE	2003-06-30	No Further Action
2	MD96-0017MO1	WHITE OAKS APTS	11431 LOCKWOOD DR	1995-07-06	No Further Action
3	MD97-0779MO1	OAK HILL APTS	11497 COLUMBIA PIKE	1996-10-25	No Further Action
4	MD02-0364MO1	MONTGOMERY WHITE OAK APTS	11530 LOCKWOOD DR	2001-09-10	No Further Action
5	MD12-0103MO	ARTIN LUTHER KING MAINTENANCE FACILIT	1120 JACKSON RD	2011-08-18	No Further Action
6	MD00-0689MO1	WSSC MO CO COMPOST SITE	2201 INDUSTRIAL PKWY	1999-10-08	No Further Action
7	MD05-1234MO1	CITI CORP	12401 PROSPERITY DR	2005-06-20	No Further Action
8	MD99-0960MO1	EXXON	12601 OLD COLUMBIA PIKE	1998-10-09	No Further Action
9	MD00-0565MO1	HESSAN HASSHEMIPOUR/PATER	12715 OLD COLUMBIA PIKE	1999-09-20	No Further Action
10	MD98-1396MO1	AMOCO	2222 E RANDOLPH RD	1998-01-14	No Further Action
11	MD00-1206MO1	AMOCO	2222 E RANDOLPH RD	2000-01-13	No Further Action
12	MD02-1549MO1	STATE HWY ADMIN	2222 E RANDOLPH RD	2002-06-05	No Further Action
13	MD8-1007MO1	NATIONAL GUARD ARMORY - WHITE OAK	12200 CHERRY HILL RD	1987-12-21	No Further Action

RCRA Site Table								
Number	Registry ID	Name	Address	Date Created	Date Updated	PGM_SYS_ID	Interest Type	Active Status
1	110002000000	SEARS ROEBUCK AND COMPANY	11255 NEW HAMPSHIRE AVENUE	2001-05-23	2012-05-09	MDR000006189	SQG	Active
2	110060000000	WALGREENS DRUG STORE 12817	11215 NEW HAMPSHIRE AVE	2020-10-13		MDR000526482	UNSPECIFIED UNIVERSE	Active
3	110004000000	WHITE OAK CLEANERS	11209 NEW HAMPSHIRE AVE	2001-05-16	2014-04-29	MDD985369743	SQG	Active
4	110002000000	WHITE OAKS AUTO SERVICE	11415 LOCKWOOD DRIVE	2001-10-15	2016-09-19	MDD114400815	SQG	Active
5	110001000000	HOPE DRY CLEANERS	11411 LOCKWOOD DRIVE	2020-10-13		MDD052446382	UNSPECIFIED UNIVERSE	Active
6	110020000000	DOW JONES & COMPANY	11501 OLD COLUMBIA PIKE	2022-01-13		MDD003241379	UNSPECIFIED UNIVERSE	Active
7	110004000000	HIAC/ROYCO	11801 TECH RD	2020-10-13		MD0000370882	UNSPECIFIED UNIVERSE	Active
8	110006000000	TOWNSEND PROPERTY TRUST LP	11800 TECH ROAD	2020-10-13		MDR000016329	UNSPECIFIED UNIVERSE	Active
9	110004000000	CAE-LINK CORP	11800 TECH ROAD	2020-10-13		MDD058599473	UNSPECIFIED UNIVERSE	Active
10	110004000000	PALLACE INC	11931 TECH RD	2020-10-13		MDR000001990	UNSPECIFIED UNIVERSE	Active
11	110004000000	BTI SYSTEM INC	2120 INDUSTRIAL PARKWAY	2007-11-26	2013-07-29	MDD981945280	UNSPECIFIED UNIVERSE	Inactive
12	110029000000	COMPUTER ENTRY SYSTEMS CORP	2141 INDUSTRIAL PKWY	2001-05-16	2016-08-25	MDD066778614	SQG	Active
13	110004000000	NIR SYSTEM INC	12101 TECH RD	2001-05-16	2016-03-30	MDD985396795	SQG	Active
14	110004000000	CASE COMMUNICATIONS INC	2144 INDUSTRIAL PARKWAY	2007-11-26	2013-07-29	MDD990812778	UNSPECIFIED UNIVERSE	Inactive
15	110004000000	MURRAY'S AUTO CLINIC II INC	12132 TECH RD	2001-05-16	2016-03-30	MDD985417237	SQG	Active
16	110004000000	DIGENE DIAGNOSTICS INC	12150 TECH RD	2001-05-16	2016-03-30	MDD982575060	SQG	Active
17	110004000000	QUALITY AUTO PAINTING	12160 TECH RD	2001-05-16	2016-08-25	MDD092398064	SQG	Active
18	110002000000	ELITE AUTOHAUS	12120 TECH ROAD	2020-10-13		MDR000011809	UNSPECIFIED UNIVERSE	Active
19	110004000000	SIEBE ENVIRONMENTAL CONTROLS	12144 TECH ROAD	2020-10-13		MDD985417328	UNSPECIFIED UNIVERSE	Active
20	110004000000	HOME STUDY INTERNATIONAL PRESS	12501 OLD COLUMBIA PIKE	2020-10-13		MDD985419803	UNSPECIFIED UNIVERSE	Active
21	110001000000	SAFETY-KLEEN SERVICE CENTER	12164 TECH RD	2002-09-04	2014-05-20	MDD000737395	TSD	Active
22	110002000000	INTERNATIONAL FABRICARE INSTITUTE	12251 TECH ROAD	2007-11-26	2013-07-29	MDD098695562	UNSPECIFIED UNIVERSE	Inactive
23	110020000000	WSSC CONSOLIDATED LABORATORY	12245 TECH ROAD	2019-06-24		MDR000501817	UNSPECIFIED UNIVERSE	Active
24	110002000000	EXXON	12601 OLD COLUMBIA PIKE	2007-11-26	2014-05-20	MDD985381797	UNSPECIFIED UNIVERSE	Inactive
25	110002000000	EXXON	12601 OLD COLUMBIA PIKE	2007-11-23	2014-05-20	MDD985383397	UNSPECIFIED UNIVERSE	Inactive
26	110004000000	PROSPERITY DRIVE DATA CENTER, LLC	12401 PROSPERITY DR	2020-10-13		MDR000023143	UNSPECIFIED UNIVERSE	Active
27	110010000000	AMOCO SERVICE STATION # 84848	2222 EAST RANDOLF ROAD	2001-05-16	2016-03-30	MDD985387570	SQG	Active
28	110060000000	CAPITAL CHOICE PATHOLOGY	12041 BOURNEFIELD WAY	2018-06-28		MDR000526326	LQG	Active
29	110004000000	HOME DEPOT 2551	2300 BROADBIRCH DR	2004-11-08	2012-01-31	MDR000001545	SQG	Active
30	110004000000	LEXUS OF SILVER SPRING	2505 PROSPERITY TER	2001-05-16	2012-05-09	MDD985422161	SQG	Active
31	110004000000	DIGENE DIAGNOSTICS INC	2301B BROADBIRCH DR	2001-05-16	2016-03-30	MDD982575003	SQG	Active
32	110002000000	ACTION TOYOTA DAR CARS	12210 CHERRY HILL ROAD	2001-05-16	2016-03-30	MDD985366947	SQG	Active
33	110010000000	MARYLAND MILITARY FACILITY	12200 CHERRY HILL ROAD	2001-05-16	2016-10-24	MDD981938111	SQG	Active
34	110004000000	ANACOMP INC	12120-A PLUM ORCHARD DR	2001-05-16	2012-05-09	MDR000004515	SQG	Active
35	110055000000	KAISER PERMANENTE SILVER SPRING	12201 PLUM ORCHARD DR	2020-10-13		MDR000526298	UNSPECIFIED UNIVERSE	Active
36	110004000000	ADA CORP	12210 PLUM ORCHARD DR	2020-10-13		MD0000366666	UNSPECIFIED UNIVERSE	Active

Underground Storage Tank Table					
Number	**Facility ID**	**Name**	**Address**	**Open USTs**	**Closed USTs**
1	MD20424	3rd District Police Station	1002 Milestone Drive	1	0
2	MD7927	Sears, Roebuck & Co., Inc.	11255 New Hampshire Avenue	0	10
3	MD19246	Sears Auto Center	11259 New Hampshire Avenue	0	1
4	MD17280	Dow Jones & Co., Inc.	11501 Old Columbia Pike	0	1
5	MD4310	Martin Luther King Jr. Park Maintenance Facility	1120 Jackson Road	0	3
6	MD3169	Percontee, Inc.	11900 Tech Road	2	3
7	MD11602	Colesville SOC GLC - 05076	11920 Tech Road	0	2
8	MD18688	The Singer Company (Tenant)	2121 Industrial Parkwahy	0	2
9	MD894	Security Storage Company	12000 Tech Road	0	1
10	MD9040	Safety-Kleen Corp.	12164 Tech Road	0	2
11	MD12600	ByteGrid Silver Spring	12401 Prosperity Drive	4	3
12	MD2488	22801 Columbia Road Exxon	12601 Old Columbia Pike	4	2
13	MD9881	Donald E. Gerald, Inc.	2210 E. Randolph Rd.	0	2
14	MD17461	Meadows Corporate Ctr. Bldg #3	12501 Prosperity Drive	0	1
15	MD4748	Amoco Service Station #84848	2222 East Randolph Road	0	5
16	MD3573	Gannett Maryland Operations Center	2240 Broadbirch Drive	1	0
17	MD19939	West Farm Bus Depot	11920 Bournefield Road	2	0
18	MD3506	Silver Spring Data Center	11961 Bournefield Way	2	1
19	MD2291	MedStar Health White Oak Data Center	2331 Broadbirch Drive	1	0
20	MD8009	Manor Care Silver Spring	2501 Musgrove Road	1	0
21	MD5217	Silver Spring Medical Center	12201 Plum Orchard Drive	1	0
22	MD14691	White Oak Armory - Maryland Army National Guard	12200 Cherry Hill Road	0	2

Larry Hogan, *Governor*
Boyd Rutherford, *Lt. Governor*
Jeannie Haddaway-Riccio, *Secretary*
Allan Fisher, *Deputy Secretary*

June 17, 2022

Mr. Timothy Hess
Whitman, Requardt & Associates, LLP
801 South Caroline Street
Baltimore, Maryland 21231

RE: Environmental Review for Montgomery County Department of Transportation, Old Columbia Pike, Silver Spring, WR&O WO #32207.006, Montgomery County, Maryland.

Dear Mr. Hess:

The Wildlife and Heritage Service has determined that there is a record for the Acuminate Crayfish (*Cambarus acuminatus*) documented within very close proximity to a portion of the project route, where it crosses part of Paint Branch. This species has In Need of Conservations status in Maryland. We would encourage the applicant to adhere stringently to all appropriate best management practices for sediment and erosion control during all phases of work, in order to reduce the likelihood of adverse impacts to this and other important native aquatic species in Paint Branch.

Please be sure to let us know if the limits of proposed disturbance or overall site boundaries change and we will provide you with an updated evaluation. Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at lori.byrne@maryland.gov or at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2022.0553.mo

August 23, 2022

Tim Hess
Whitman, Requardt & Associates, LLP
801 South Caroline Street
Baltimore, MD 21231

Re: Old Columbia Pike/Prosperity Drive
Montgomery County, Maryland

Dear Mr. Hess:

Thank you for providing the Maryland Historical Trust (Trust) with information regarding the above-referenced project. We have reviewed the information in accordance with Section 106 of the National Historic Preservation Act and the Maryland Historical Trust Act of 1985, as appropriate, and we are writing to provide you with information on historic properties and specific recommendations for continuing consultation with our office.

According to your letter, the Montgomery County Department of Transportation is exploring various alternatives to improve a 1.8-mile section of Old Columbia Pike/Prosperity Drive between Stewart Lane and Cherry Hill Road. The alternatives include various roadway widening, intersection configurations and pedestrian facilities. In addition to the potential historic properties listed in your letter, there are a few known archeological sites located along the existing roadway in the vicinity of the Paint Branch waterway and at the intersection with Stewart Lane. The National Register eligibility of these archeological sites have never been assessed.

In order to determine if this project has the potential to impact historic properties, including properties that have not yet been identified, we request the following information:

- Please provide a more detailed description of the proposed project and include preliminary plans, if available. Be sure to highlight areas of disturbance beyond the existing roadway footprint (i.e. road widening, realignment, staging areas, stormwater management, etc.).

Once we have received the additional information requested in this letter, the Trust will continue its review of the undertaking and provide appropriate comments and recommendations, *including the need for any archeological investigations*.

If you have questions or require further assistance, please contact Beth Cole (for archeology) at beth.cole@maryland.gov or me (for the historic built environment) at tim.tamburrino@maryland.gov. Thank you for providing us this opportunity to comment.

Sincerely,

Tim Tamburrino
Preservation Officer

TJT/ 202201555

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Montgomery County, Maryland

Local office

Chesapeake Bay Ecological Services Field Office

(410) 573-4599
(410) 266-9127

177 Admiral Cochrane Drive
Annapolis, MD 21401-7307

http://www.fws.gov/chesapeakebay/
http://www.fws.gov/chesapeakebay/endsppweb/ProjectReview/Index.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found This species only needs to be considered if the following condition applies: • Projects with a federal nexus that have tree clearing = to or > 15 acres: 1. REQUEST A SPECIES LIST 2. NEXT STEP: EVALUATE DETERMINATION KEYS 3. SELECT EVALUATE under the Northern Long-Eared Bat (NLEB) Consultation and 4(d) Rule Consistency key No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found This species only needs to be considered if the following condition applies: • The monarch is a candidate species and not yet listed or proposed for listing. There are generally no section 7 requirements for candidate species (FAQ found here: https://www.fws.gov/savethemonarch/FAQ-Section7.html). No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

Black-billed Cuckoo Coccyzus erythropthalmus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Cerulean Warbler Dendroica cerulea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 28 to Jul 20
Kentucky Warbler Oporornis formosus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

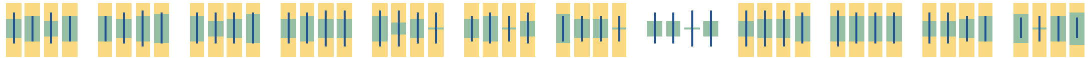
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

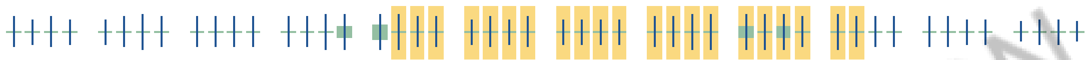
■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

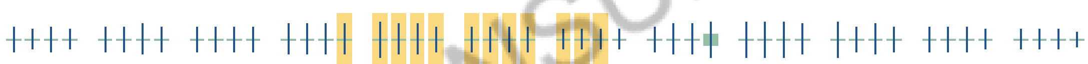
Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



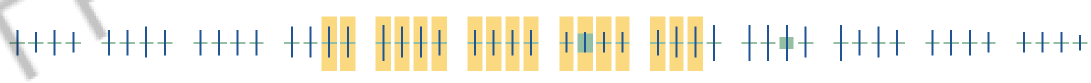
Black-billed Cuckoo
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



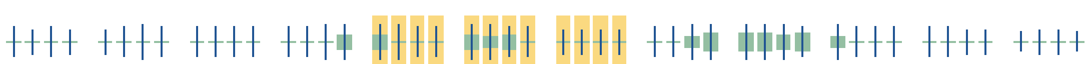
Cerulean Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



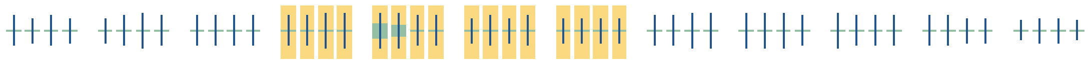
Kentucky Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



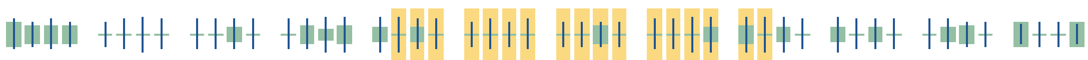
Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

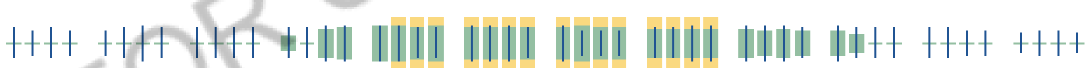


Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rusty Blackbird
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures] describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures] or [permits] may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern (BCC)] and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review.

Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NRI/FSD INVENTORY

ABSTRACT

Characterization of existing forest cover and inventory of significant and specimen trees.

Mahan Rykiel Associates

- Methodology Text – Describe process and tools used for tree inventory

Prior to conducting site inventory work, a base map was compiled for the site including contours, parcel boundaries, roads, structures, sidewalks, forested areas, and the limits of the project study area. The team conducted the field work over the course of three site visits. On the first visit, the team walked the full study area along Old Columbia Pike and Prosperity Drive collecting significant and specimen tree data and gathering and overall understanding of the forested areas.

After the initial site visit, a second trip to the site was focused on the gathering forest samplings in the 3 identified forested areas within the project boundary. The team followed the forest sampling methodology outlined in the State Forest Conservation Technical Manual (Third Edition, 1997). As required by the manual, the team collected a minimum of one 1/10-acre sample plot per 4 acres of forest stand area; a minimum of two plots per forest stand; and a minimum of three plots for the total forested area of the site. The sample plots were randomly selected within the forested area at the time of the second site visit. Using the Forest Sampling Data Worksheet provided in the Manual, the team recorded data for two plots within each forested area. First, the team marked off the 1/10-acre plot by measuring out a 37.24’ radius circle. The Basal Area in sf/acre was determined by using a 10-factor prism at each sampling point. Next, a caliper tape was used to tally the sizes and species of trees in each plot. The team documented field notes of the common understory species (3’-20’), list of herbaceous species (0-3’), percent canopy closure, percent of invasive species cover, and plot successional stage based on observation. Finally, the team documented the site with photos and collected 5 GPS points to generally locate the center and edges of the plot sampling area.

During the third and final site visit, the team conducted a final walk through of the forested areas to identify, locate, and document any significant and specimen trees.

- Stand Descriptions – Descriptive text for 3 forest stands

The field study determined the presence of 3 forest stands within the project study area.

Stand 1 – 1.45 acres

Stand Composition: Stand 1 is dominated by Black Locust, Ash, Hickory, Red Maple, Pin Oak, Sassafras, and Tulip Poplar. The understory is comprised of Multi-Flora Rose, Honeysuckle, Black Raspberry, Daylilies, Poison Ivy, and Garlic Mustard. The stand is comprised of an average of 70% invasive cover.

Stand Structure: Stand 1 is in an early successional stage with established canopy and understory layers. It has an average of 300 stems per acre. The forest stand showed no major signs of disturbance via adjacent development and construction activities. The stand did seem to be impacted by the Emerald Ash Borer as most of the identified Ash trees within the sample areas were stressed or dying. There are approximately 5 standing dead trees per 1/10 of an acre within Stand 1 and a total of 6 specimen and significant trees.

Stand Function: Stand 1 is adjacent to a stormwater management facility located between Route 29 and Old Columbia Pike. The topography of the site is such that the forested area provides preliminary treatment for stormwater before runoff reaches the stormwater management facility. The forested area also provides a visual and sound buffer between Route 29 and the adjacent Columbia Towers Condominiums and nearby townhouse parcels.

- Forest Stand Summary Table

Stand 1 – average of sample A & B	
Dominant species/Codominant species	Black Locust, Ash, Hickory, Red Maple, Pin Oak, Sassafras, and Tulip Poplar
Successional stage	Early Successional
Basal area in S.F. per acre	300
Size class of dominant species	6”-19.9”
Percent of canopy closure	65%
Number of tree species	10
Common understory species per acre	Multiflora Rose, Ash, Honeysuckle, Black Gum
Percent of understory cover 3’ to 20’ tall	40%
Common herbaceous species 0’ to 3’ tall	Black Raspberry, Daylily, Knotweed, Garlic Mustard, Poison Ivy, Greenbriar
Percent of herbaceous & woody plant cover 0’ to 3’ tall	58%
List of major invasive plant species & percent of cover	Multi-Flora Rose, Honeysuckle, Knotweed, Garlic Mustard 80%
Number of standing dead trees	10

Species	**# Tallied**	**% Dominance**
Black Locust	22	35%
Ash	13	20%
Shagbark Hickory	6	9%
Sassafras	3	5%
Tulip Poplar	7	11%
White Oak	1	2%
Black Gum	4	6%
Sycamore	5	8%
Black Cherry	1	2%
American Holly	1	2%
TOTAL	63	100%

- Forest Structure Analysis Table – composition and structure analysis & function analysis

  - The total structure value is defined by:

    15-21 Priority

    7-14 Good

    0-6 Poor

Composition and Structure	
Percent canopy closure	
70-100%	
40-69%	2
10-39%	
0-9%	
Number of shrubs under 20' tall	
15 or more	2
10-14	
5-9	
0-4	
Number of tree species 6" DBH and greater	
6 or more	2
4-5	
2-3	
0-1	
Size class of dominant trees	
Greater than 20"	
6-19.9"	2
3-5.9"	
Less than 3"	
Percent understory cover	
75-100%	
25-74%	2
5-24%	
0-4%	
Percent herbaceous cover under 3'	
75-100%	
25-74%	2
5-24%	
0-4%	
Number of Specimen trees	
6 or more	
4-5	
2-3	
0-1	1
Composition and Structure TOTAL	13

Stand Function

Stand	Water quality protection	Visual screening	Wildlife habitat	Energy conservation	Personal woodlot	Other function
1	X	X				

Stand 2 – 0.89 acres

Stand Composition: Stand 2 is dominated by Red Maple, Tulip Poplar, Red Oak, White Oak, American Holly, Sassafras, Black Locust, Shagbark Hickory. The understory is comprised of Multi-Flora Rose, Honeysuckle, Bittersweet, and Japanese Barberry. The stand is comprised of an average of 62.5% invasive cover.

Stand Structure: Stand 2 is in an early successional stage with established canopy and understory layers. It has an average of 305 stems per acre. The forest stand showed no major signs of disturbance via adjacent development and construction activities. There are approximately 8 standing dead trees per 1/10 of an acre within Stand 2 and no specimen and significant trees.

Stand Function: Stand 2 is located between Route 29 and Old Columbia Pike, just south of the White Oak Towers Apartments. The forested area also provides a visual and sound buffer between Route 29 and the adjacent nearby townhouse parcels.

- Forest Stand Summary Table

Stand 2 – average of sample A & B	
Dominant species/Codominant species	Red Maple, Tulip Poplar, Red Oak, White Oak, American Holly, Sassafras, Black Locust, Shagbark Hickory
Successional stage	Early Successional
Basal area in S.F. per acre	305
Size class of dominant species	3”-5.9”
Percent of canopy closure	62.5%
Number of tree species	9
Common understory species per acre	Multiflora Rose, Honeysuckle, Bittersweet, Japanese Barberry
Percent of understory cover 3’ to 20’ tall	44.5%
Common herbaceous species 0’ to 3’ tall	Virginia Creeper, Poison Ivy, Fescue
Percent of herbaceous & woody plant cover 0’ to 3’ tall	38%
List of major invasive plant species & percent of cover	Multi-Flora Rose, Honeysuckle, Bittersweet 63%
Number of standing dead trees	8

Species	**# Tallied**	**% Dominance**
Red Maple	19	37%
Sassafras	2	4%
Black Locust	11	21%
Black Gum	1	2%
White Oak	5	10%
Shagbark Hickory	4	8%
Tulip Poplar	4	8%
Red Oak	2	4%
American Holly	3	6%
TOTAL	51	100%

- Forest Structure Analysis Table – composition and structure analysis & function analysis
  - The total structure value is defined by:

15-21 Priority

7-14 Good

0-6 Poor

Composition and Structure	
Percent canopy closure	
70-100%	
40-69%	2
10-39%	
0-9%	
Number of shrubs under 20' tall	
15 or more	2
10-14	
5-9	
0-4	
Number of tree species 6" DBH and greater	
6 or more	2
4-5	
2-3	
0-1	
Size class of dominant trees	
Greater than 20"	
6-19.9"	
3-5.9"	2
Less than 3"	
Percent understory cover	
75-100%	
25-74%	2
5-24%	
0-4%	
Percent herbaceous cover under 3'	
75-100%	
25-74%	2
5-24%	
0-4%	
Number of Specimen trees	
6 or more	
4-5	
2-3	
0-1	1
Composition and Structure TOTAL	13

Stand Function

Stand	Water quality protection	Visual screening	Wildlife habitat	Energy conservation	Personal woodlot	Other function
1	X	X				

Stand 3 – 6.57 acres

Stand Composition: Stand 3 is dominated by Tulip Poplar, Sassafras, Black Gum, Red Maple, Red Oak, Shagbark Hickory, White Oak, Hornbeam, Dogwood. The understory is comprised of Multi-Flora Rose, Honeysuckle, Japanese Euonymus, Bittersweet, Maple Leaf Viburnum, and Wineberry. The stand is comprised of an average of 57.5% invasive cover.

Stand Structure: Stand 3 is in an early-mid successional stage with established canopy and understory layers. It has an average of 325 stems per acre. The forest stand showed no major signs of disturbance via adjacent development and construction activities. There are approximately 7 standing dead trees per 1/10 of an acre within Stand 3 and a total of 27 specimen and significant trees.

Stand Function: Stand 3 is located between Route 29 and Old Columbia Pike, just south of the White Oak Towers Apartments. The forested area also provides a visual and sound buffer between Route 29 and the adjacent nearby townhouse parcels.

- Forest Stand Summary Table

Stand 3 – average of sample A & B	
Dominant species/Codominant species	Tulip Poplar, Sassafras, Black Gum, Red Maple, Red Oak, Shagbark Hickory, White Oak, Hornbeam, Dogwood
Successional stage	Early-mid Successional
Basal area in S.F. per acre	325
Size class of dominant species	3”-5.9”
Percent of canopy closure	57.5%
Number of tree species	9
Common understory species per acre	Multiflora Rose, Honeysuckle, Japanese Euonymus, Bittersweet, Maple Leaf Viburnum, Winterberry
Percent of understory cover 3’ to 20’ tall	40%
Common herbaceous species 0’ to 3’ tall	Virginia Creeper, Jack-in-the-Pulpit, Christmas Fern, Mayapple, Solomon’s Seal
Percent of herbaceous & woody plant cover 0’ to 3’ tall	49.5%
List of major invasive plant species & percent of cover	Multi-Flora Rose, Honeysuckle, Japanese Euonymus 58%
Number of standing dead trees	7

Species	**# Tallied**	**% Dominance**
Tulip Poplar	20	33%
Sassafras	1	2%
Black Gum	8	13%
Red Maple	8	13%
Red Oak	4	7%
Shagbark Hickory	10	17%
White Oak	2	3%
Hornbeam	3	5%
Dogwood	4	7%
TOTAL	60	100%

- Forest Structure Analysis Table – composition and structure analysis & function analysis
    - The total structure value is defined by:

      15-21 Priority

      7-14 Good

      0-6 Poor

Composition and Structure	
Percent canopy closure	
70-100%	
40-69%	2
10-39%	
0-9%	
Number of shrubs under 20’ tall	
15 or more	2
10-14	
5-9	
0-4	
Number of tree species 6” DBH and greater	
6 or more	2
4-5	
2-3	
0-1	
Size class of dominant trees	
Greater than 20”	
6-19.9”	
3-5.9”	1
Less than 3”	
Percent understory cover	
75-100%	
25-74%	1
5-24%	
0-4%	
Percent herbaceous cover under 3’	
75-100%	
25-74%	2
5-24%	
0-4%	
Number of Specimen trees	
6 or more	
4-5	
2-3	
0-1	1
Composition and Structure TOTAL	11

Stand Function

Stand	Water quality protection	Visual screening	Wildlife habitat	Energy conservation	Personal woodlot	Other function
1	X	X				

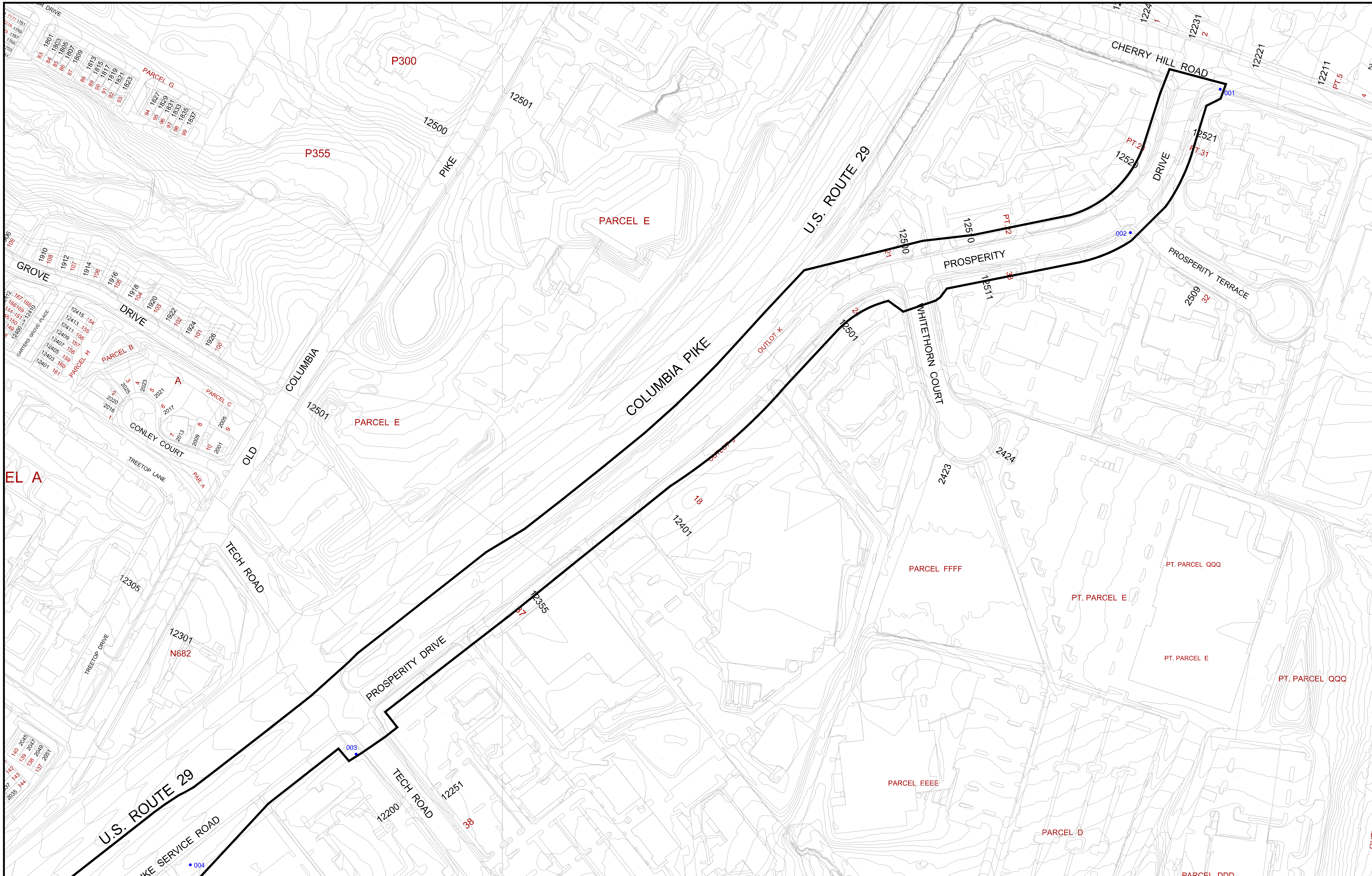
Appendix A - Specimen Tree Table – Listing pertinent info for trees 30”

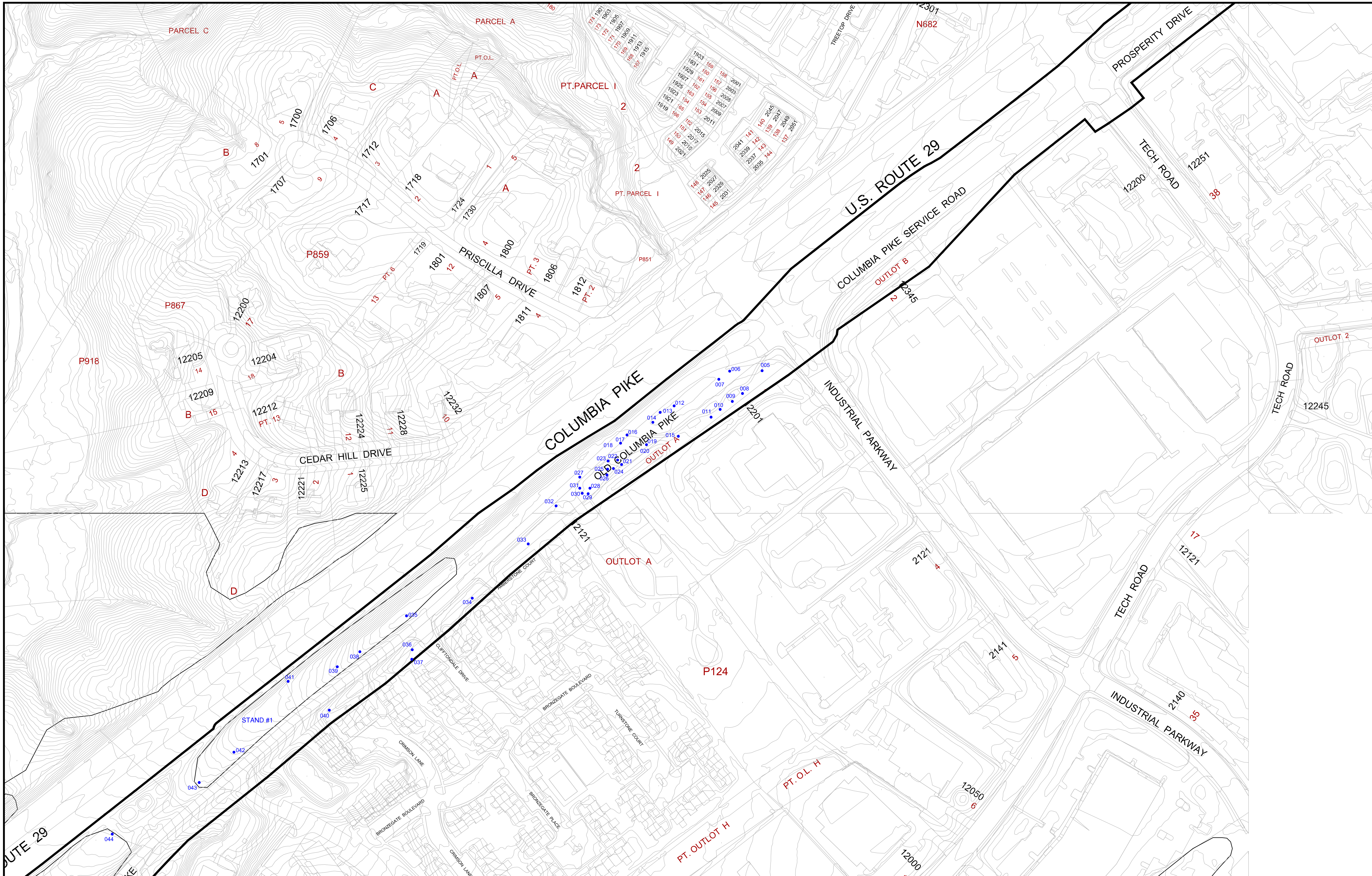
No.	Scientific Name	Common Name	DBH (inches)	Condition	Comments
016	Morus	Mulberry	40	Poor	Twin
037	Acer rubrum	Red Maple	33	Good	
039	Quercus rubra	Red Oak	33.5	Good	
043	Platanus occidentalis	Sycamore	37	Good/Fair	Twin
044	Quercus	Oak	33.5	Dead	Dead
045	Platanus occidentalis	Sycamore	34	Good	
046	Quercus alba	White Oak	49	Good	
047	Quercus alba	White Oak	31.5	Good	
055	Quercus rubra	Red Oak	32	Fair	
057	Quercus alba	White Oak	40	Good/Fair	
058	Liriodendron tulipifera	Tulip Tree	31	Good	
059	Quercus rubra	Red Oak	42	Good	
060	Platanus occidentalis	Sycamore	36.5	Good	
064	Liriodendron tulipifera	Tulip Tree	30	Good	
065	Liriodendron tulipifera	Tulip Tree	35.5	Good	
066	Liriodendron tulipifera	Tulip Tree	39.5	Good	
070	Platanus occidentalis	Sycamore	31	Good	
071	Platanus occidentalis	Sycamore	30	Fair	Triple
075	Quercus palustris	Pin Oak	33	Fair/Good	
076	Quercus alba	White Oak	40.5	Good	
080	Quercus alba	White Oak	31	Fair/Poor	
083	Quercus rubra	Red Oak	31.5	Fair	
084	Quercus alba	White Oak	32	Fair/Poor	
085	Quercus rubra	Red Oak	39.5	Good	Twin
086	Quercus alba	White Oak	34.5	Fair	

Appendix B - Significant Tree Table – Listing pertinent info for trees 24” – 29”

No.	Scientific Name	Common Name	DBH (inches)	Condition	Comments
034	Cedrus	Cedar	24	Fair	
035	Quercus rubra	Red Oak	28.5	Fair	
036	Platanus occidentalis	Sycamore	25.25	Poor	
038	Quercus alba	White Oak	25	Fair/Good	
040	Quercus alba	White Oak	28	Poor	Vines
041	Gleditsia triacanthos	Honeylocust	24	Poor	Twin
042	Platanus occidentalis	Sycamore	27	Fair/Good	
048	Liriodendron tulipifera	Tulip Tree	27	Good	
049	Quercus rubra	Red Oak	29	Good	
050	Quercus alba	White Oak	27	Good	
051	Platanus occidentalis	Sycamore	26	Good	
052	Liriodendron tulipifera	Tulip Tree	26	Good	
053	Quercus montana	Chestnut Oak	24	Good	
054	Quercus alba	White Oak	24	Fair	
056	Liriodendron tulipifera	Tulip Tree	28	Good	
061	Liriodendron tulipifera	Tulip Tree	27	Good	
062	Liriodendron tulipifera	Tulip Tree	26	Good	
063	-	-	24	Dead	Dead
067	Liriodendron tulipifera	Tulip Tree	28	Good	
068	Platanus occidentalis	Sycamore	25.5	Good	
069	Platanus occidentalis	Sycamore	24	Fair/Good	
072	Quercus phellos	Willow Oak	26.5	Fair/Good	
073	Acer platanoides	Norway Maple	26	Fair/Poor	
074	Quercus alba	White Oak	27.5	Fair/Poor	
077	Liriodendron tulipifera	Tulip Tree	24	Fair/Poor	
078	Pinus	Pine	25.25	Fair	
079	Pinus	Pine	24	Good	
081	Quercus alba	White Oak	27	Fair/Poor	
082	Quercus alba	White Oak	29.5	Poor	Guy wire
087	Quercus alba	White Oak	24	Fair	
088	Quercus alba	White Oak	27.5	Good	

Appendix C – Significant & Specimen Tree and Forest Stand Location Plans


CHERRY HILL ROAD
U.S. ROUTE 29
COLUMBIA PIKE
OLD COLUMBIA PIKE
PROSPERITY DRIVE
PROSPERITY TERRACE
WHITETHORN COURT
TECH ROAD
PIKE SERVICE ROAD
GROVE DRIVE
CONLEY COURT
TREETOP LANE
TREETOP DRIVE
CARTERS GROVE PLACE
P300
P355
PARCEL E
PARCEL G
PARCEL B
PARCEL C
PARCEL H
PARCEL FFFF
PARCEL EEEE
PARCEL D
PARCEL DDD
PT. PARCEL E
PT. PARCEL QQQ
OUTLOT K
OUTLOT 1
N682
PT.2
PT.31
PT.12
PT.5
12501
12500
12520
12521
12510
12511
12401
12355
12305
12301
12251
12200
2423
2424
2509
001
002
003
004


U.S. ROUTE 29
COLUMBIA PIKE
OLD COLUMBIA PIKE
COLUMBIA PIKE SERVICE ROAD
PROSPERITY DRIVE
TECH ROAD
INDUSTRIAL PARKWAY
PRISCILLA DRIVE
CEDAR HILL DRIVE
TREETOP DRIVE
CLIFFTONDALE DRIVE
BRONZEGATE BOULEVARD
BRONZEGATE PLACE
TURNSTONE COURT
CRIMSON LANE
PARCEL C
PARCEL A
PT.PARCEL I
PT. PARCEL I
OUTLOT A
OUTLOT B
OUTLOT 2
PT. OUTLOT H
PT. O.L. H
P859
P867
P918
P851
P124
N682
STAND #1
12345
2201
2121
2141
2140
12050
12000
12200
12251
12245
12121
12301
12205
12204
12209
12212
12213
12217
12221
12224
12225
12228
12232
12200
1700
1701
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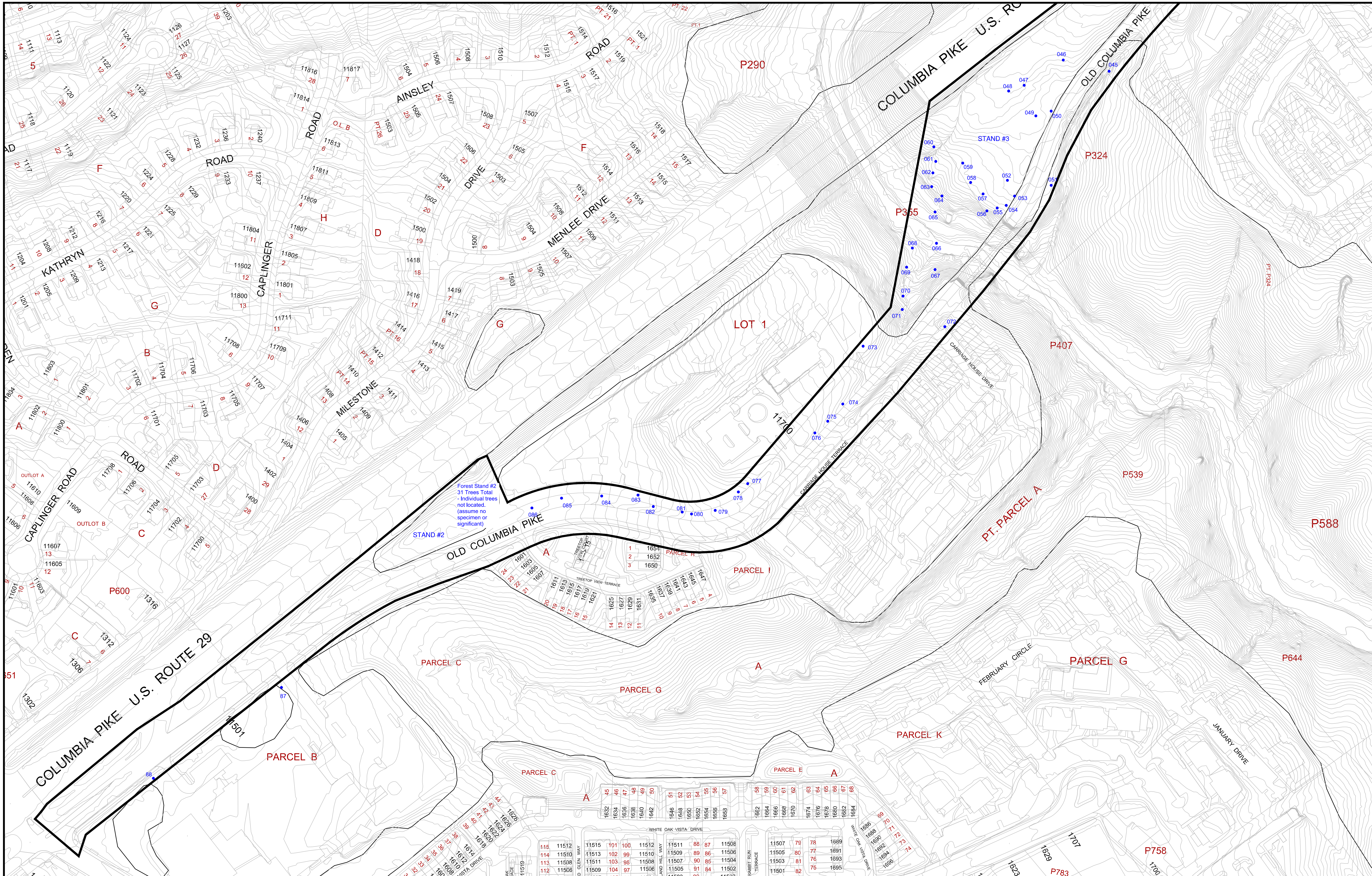
1806
1807
1811
1812


COLUMBIA PIKE U.S. ROUTE 29
COLUMBIA PIKE U.S. RO
OLD COLUMBIA PIKE
OLD COLUMBIA PIKE
Forest Stand #2
31 Trees Total
- Individual trees
not located.
(assume no
specimen or
significant)
STAND #2
STAND #3
LOT 1
11700
11501
P290
P324
P355
P407
P539
P588
P600
P644
P758
P783
PT. P324
PT. PARCEL A
PARCEL B
PARCEL C
PARCEL E
PARCEL G
PARCEL H
PARCEL I
PARCEL K
CARRIAGE HOUSE DRIVE
CARRIAGE HOUSE TERRACE
TREETOP VIEW TERRACE
FEBRUARY CIRCLE
JANUARY DRIVE
WHITE OAK VISTA DRIVE
CAPLINGER ROAD
KATHRYN ROAD
AINSLEY ROAD
MENLEE DRIVE
MILESTONE DRIVE
OUTLOT A
OUTLOT B
O.L. B

Appendix D – Forest Stand Delineation Field Sampling Data Sheets

Property: Old Columbia Pike Prepared By TB, RK, LG

Stand #: 1 Plot #: A Plot Size: 1/10 Acre Date: 05/09/2022

Basal Area in sf/acre: 300

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Black Locust / Robinia psuedoacacia		6		1	5		2									14
Sasafras / Sasafras albidum					1											1
Red Maple / Acer rubrum		2			1											3
Tulip Poplar / Liriodendron tulipifera							2									2
Pin Oak / Quercus palustris							2			1						3
Black Cherry / Prunus serotina				1												1
Green Ash / Fraxinus pennsylvania		2					1									3
Black Gum / Nyssa sylvatica		1			1											2
American Holly / Ilex opaca		1														1
Total Number of Trees per Size Class	12			10			7			1						30
Number & Size of Standing Dead Trees																6

List of Common Understory Species:

Multiflora Rose, Ash, Honeysuckle, Black Gum

List of Herbaceous Species:

Black Raspberry, Daylily

% of Canopy Closure

C	N	E	S	W	Total
60%	85%	60%	60%	30%	

% Understory Cover 3'-20'

C	N	E	S	W	Total
30%	40%	30%	65%	25%	

% of Herbaceous Cover

C	N	E	S	W	Total
80%	80%	65%	80%	35%	

Percent of Invasive Cover per Plot (All Layers): 85%

Plot Successional Stage: Early Successional

Comments

Sheet 1 of 6

Forest Sampling Data Worksheet **C:1**

Property: Old Columbia Pike	Prepared By TB, RK, LG	
Stand #: 1	Plot #: B	Plot Size: 1/10 Acre	Date: 05/09/2022

Basal Area in sf/acre: 300	Size class of trees > 20' height within sample plot															
Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Black Locust / Robinia psuedoacacia		1		3			4									8
Green Ash / Fraxinus pennsylvania		2		5			2									9
Shagbark Hickory / Carya ovata		3		1			2									6
Sasafras / Sasafras albidum					2											2
Tulip Poplar / Liriodendron tulipifera					1		2			2						5
White Oak / Quercus alba		1														1
Black Gum / Nyssa sylvatica		1			1											2
Sycamore / Platanus occidentalis	1			1			3									5
Total Number of Trees per Size Class	9			14			13			2						38
Number & Size of Standing Dead Trees																4

List of Common Understory Species:

Multiflora Rose, Honeysuckle

% of Canopy Closure					
C	N	E	S	W	Total
45%	45%	65%	50%	35%	

Percent of Invasive Cover per Plot (All Layers): 75%

Plot Successional Stage: Early Successional

List of Herbaceous Species:

Knotweed, Garlic Mustard, Poison Ivy, Greenbriar

% Understory Cover 3'-20'					
C	N	E	S	W	Total
20%	45%	30%	50%	65%	

% of Herbaceous Cover					
C	N	E	S	W	Total
60%	70%	15%	65%	25%	

Comments

Sheet 2 of 6

Forest Sampling Data Worksheet **C:1**

Property: Old Columbia Pike　　Prepared By TB, RK, LG

Stand #: 2　　Plot #: A　　Plot Size: 1/10 Acre　　Date: 05/09/2022

Basal Area in sf/acre: 310

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple / Acer rubrum		7			4											11
Sasafras / Sasafras albidum		1														1
Black Locust / Robinia psuedoacacia				7												7
Black Gum / Nyssa sylvatica		1														1
White Oak / Quercus alba										1						1
Shagbark Hickory / Carya ovata		2														2
Total Number of Trees per Size Class	11			11						1						23
Number & Size of Standing Dead Trees																5

List of Common Understory Species:

Multiflora Rose, Honeysuckle, Bittersweet

List of Herbaceous Species:

Virginia Creeper, Poison Ivy

% of Canopy Closure

C	N	E	S	W	Total
85%	50%	45%	45%	20%	

% Understory Cover 3'-20'

C	N	E	S	W	Total
45%	60%	60%	30%	70%	

% of Herbaceous Cover

C	N	E	S	W	Total
40%	35%	25%	30%	25%	

Percent of Invasive Cover per Plot (All Layers): 85%

Plot Successional Stage: Early Successional

Comments

Sheet 3 of 6

Forest Sampling Data Worksheet　　**C:1**

Property: Old Columbia Pike Prepared By TB, RK, LG

Stand #: 2 Plot #: B Plot Size: 1/10 Acre Date: 05/09/2022

Basal Area in sf/acre: 300

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Red Maple / Acer rubrum		8														8
Tulip Poplar / Liriodendron tulipifera					3					1						4
Red Oak / Quercus rubra										2						2
White Oak / Quercus alba		1					3									4
American Holly / Ilex opaca		3														3
Sasafras / Sasafras albidum		1														1
Black Locust / Robinia psuedoacacia		3			1											4
Shagbark Hickory / Carya ovata		2														2
Total Number of Trees per Size Class	18			4			3			3						28
Number & Size of Standing Dead Trees																3

List of Common Understory Species:

Bittersweet, Japanese Barberry

List of Herbaceous Species:

Fescue

% of Canopy Closure

C	N	E	S	W	Total
40%	55%	25%	75%	20%	

% Understory Cover 3'-20'

C	N	E	S	W	Total
15%	10%	65%	15%	75%	

% of Herbaceous Cover

C	N	E	S	W	Total
75%	40%	30%	60%	20%	

Percent of Invasive Cover per Plot (All Layers): 40%

Plot Successional Stage: Early Successional

Comments

Sheet 4 of 6

Forest Sampling Data Worksheet **C:1**

Property: Old Columbia Pike Prepared By TB, RK, LG

Stand #: 3 Plot #: A Plot Size: 1/10 Acre Date: 05/09/2022

Basal Area in sf/acre: 300

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Tulip Poplar / Liriodendron tulipifera		4		4			3			2						13
Sasafras / Sasafras albidum		1														1
Black Gum / Nyssa sylvatica		7			1											8
Red Maple / Acer rubrum		3			1											4
Red Oak / Quercus rubra							1									1
Shagbark Hickory / Carya ovata		5			1											6
White Oak / Quercus alba										1						1
Total Number of Trees per Size Class	20			7			4			3						34
Number & Size of Standing Dead Trees																3

List of Common Understory Species:

Multiflora Rose, Honeysuckle, Japanese Euonymus, Bittersweet, Maple Leaf Viburnum

List of Herbaceous Species:

Virginia Creeper

	C	N	E	S	W	Total
% of Canopy Closure	65%	70%	45%	70%	80%	
% Understory Cover 3'-20'	10%	10%	45%	45%	15%	
% of Herbaceous Cover	60%	65%	50%	45%	50%	

Percent of Invasive Cover per Plot (All Layers): 80%

Plot Successional Stage: Early Successional

Comments

Sheet 5 of 6

Forest Sampling Data Worksheet **C:1**

Property: Old Columbia Pike Prepared By TB, RK, LG

Stand #: 3 Plot #: B Plot Size: 1/10 Acre Date: 05/09/2022

Basal Area in sf/acre: 350

Size class of trees > 20' height within sample plot

Tree Species	# of Trees 2-5.9" dbh			# of Trees 6-11.9" dbh			# of Trees 12-19.9" dbh			# of Trees 20-29.9 dbh			# of Trees > 30" dbh			Total
Crown Position	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	Dom	CoD	Other	
Shagbark Hickory / Carya ovata		4														4
Red Maple / Acer rubrum		3						1								4
Tulip Poplar / Liriodendron tulipifera							3			4						7
White Oak / Quercus alba										1						1
Hornbeam / Carpinus caroliniana		3														3
Red Oak / Quercus rubra		3														3
Dogwood / Cornus florida		4														4
Total Number of Trees per Size Class	17						4			5						26
Number & Size of Standing Dead Trees																4

List of Common Understory Species:
Maple Leaf Viburnum, Multiflora Rose, Wineberry, Japanese Euonymus

% of Canopy Closure

C	N	E	S	W	Total
45%	30%	30%	75%	65%	

Percent of Invasive Cover per Plot (All Layers): 35%

Plot Successional Stage: Mid - Successional

List of Herbaceous Species:
Jack-in-the-Pulpit, Christmas Fern, Mayapple, Solomon's Seal

% Understory Cover 3'-20'

C	N	E	S	W	Total
45%	40%	70%	15%	10%	

% of Herbaceous Cover

C	N	E	S	W	Total
45%	40%	25%	60%	55%	

Comments

Sheet 6 of 6

Forest Sampling Data Worksheet **C:1**

Appendix E – Forest Stand Photos

Forest Stand 1 - Plot A **Old Columbia Pike NRI**
2022-05-09

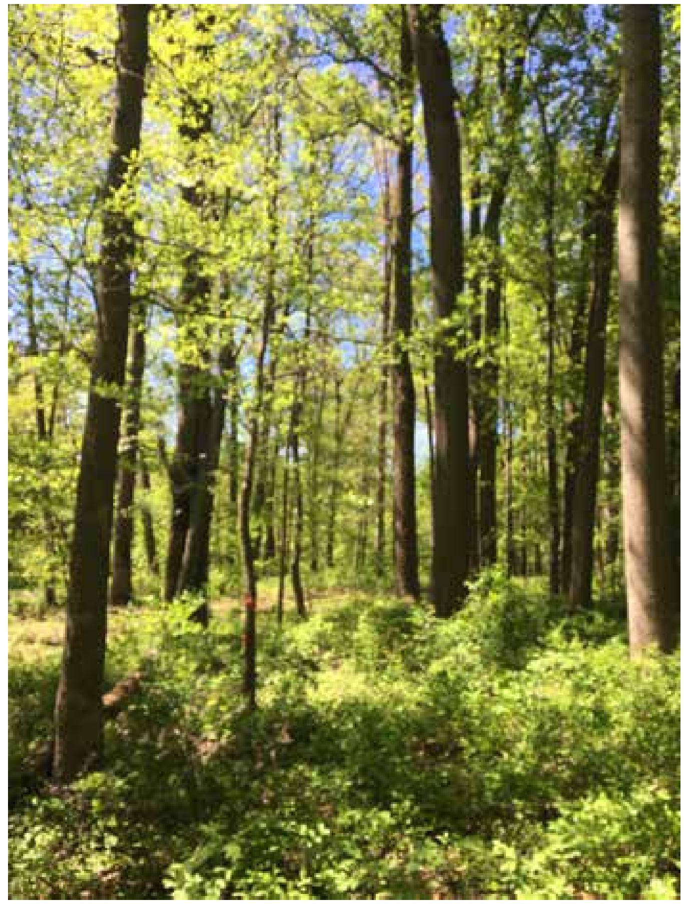



Forest Stand 1 - Plot B **Old Columbia Pike NRI**

2022-05-09




Forest Stand 2 - Plot A
2022-05-09



Forest Stand 2 - Plot B
2022-05-09

Forest Stand 3 - Plot A
2022-05-09

Old Columbia Pike NRI




Forest Stand 3 - Plot B
2022-05-09

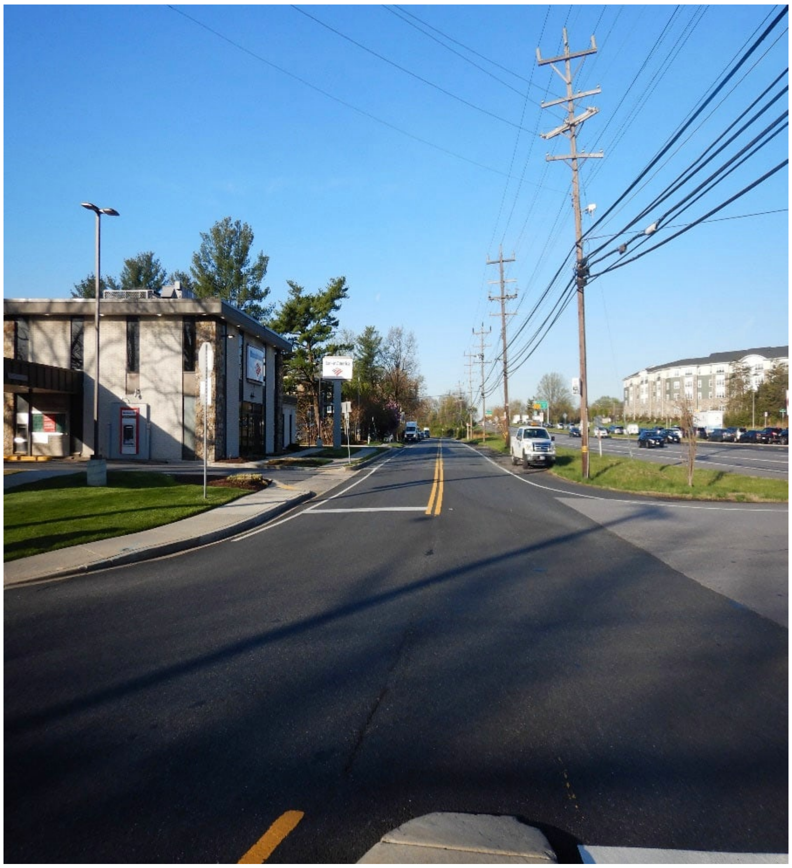
Old Columbia Pike NRI

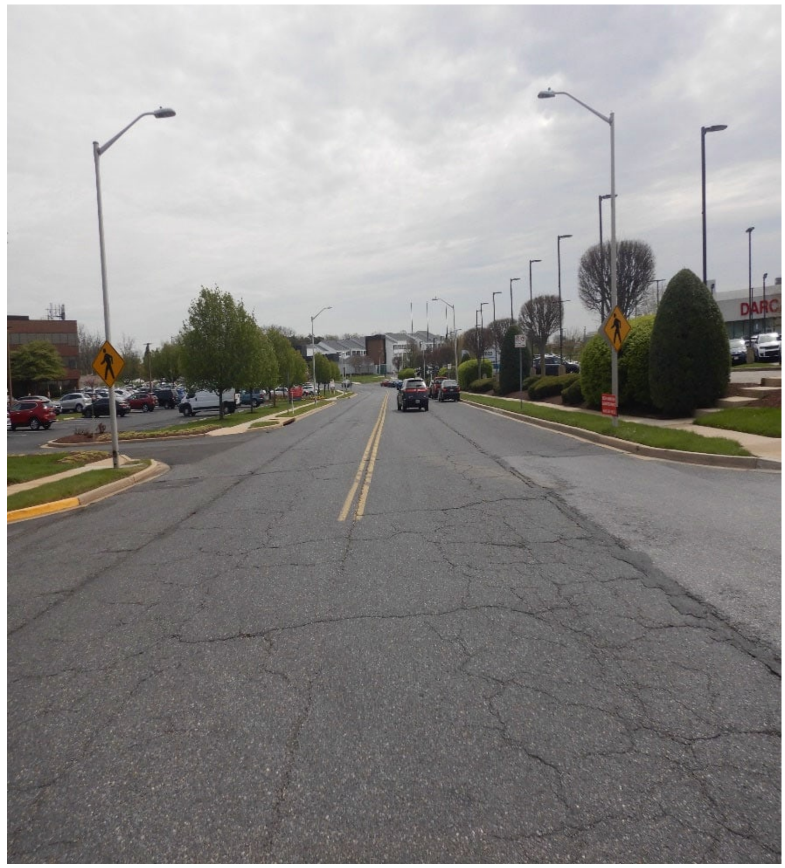
Appendix F

Traffic Study – March 2024

Old Columbia Pike / Prosperity Drive Improvements Project Traffic Study
from Stewart Lane to Cherry Hill Road

March 2024





Montgomery County
Contract No. 1111496 Task 6

Corridor Study
Old Columbia Pike / Prosperity Drive from Stewart Lane to Cherry Hill Road

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1. INTRODUCTION

This study assesses the corridor of Old Columbia Pike and Prosperity Drive, between Stewart Lane and Cherry Hill Road in Silver Spring, Montgomery County, Maryland. The study corridor runs parallel to US 29 (Columbia Pike) and is located between the Cherry Hill Road interchange and MD 650 (New Hampshire Avenue) interchange with US 29.

The study corridor is split into two segments by Bridge No. P-30 over Paint Branch. Bridge No. P-30 is considered a pedestrian bridge and is closed to vehicular traffic. The south segment of the study corridor is from Stewart Lane to the south end of the bridge, while the north segment of the study corridor is from the north end of the bridge to Cherry Hill Road.

Along the south half of the study corridor, from Stewart Lane to the south end of Bridge No. P-30, the corridor is predominantly served by residential land use. In this area of the corridor there are multiple apartment and condominium complexes, including those of White Oak Towers Apartments, Tiers at Silver Spring, and Montgomery White Oak Apartments.

On the north half of the study corridor, from the north end of Bridge No. P-30 to Cherry Hill Road, the corridor is predominantly made up of commercial land uses. However, in this segment there are also residential and recreational land uses near the Industrial Parkway intersection area. The residential land uses include both townhomes and condominiums. The recreational land use includes the Stonehedge Local Park. A few of the commercial land uses include White Oak Town Center, White Oak Motor Vehicle Administration (MVA), multiple restaurants near Broadbirch Drive, Home Depot, DARCARS dealerships, and the medical offices.

The study corridor consists of six study intersections along Old Columbia Pike and Prosperity Drive, as seen in **Figure 1**. Cherry Hill Road is the only intersection that is signalized, while the other five intersections are unsignalized along the Old Columbia Pike / Prosperity Drive corridor.

The six study intersections include:

- Intersection 1a: Old Columbia Pike at Stewart Lane
- Intersection 1b: The intersection is located approximately 375 feet north of Stewart Lane and is included in the Stewart Lane study intersection (this intersection is not named and will be known as “Old Columbia Pike at Dow Jones Parking Lot”. This intersection is included with Stewart Lane because this intersection allows the turn lanes onto US 29 that Stewart Lane does not.
- Intersection 2: Old Columbia Pike at Industrial Parkway
- Intersection 3: Old Columbia Pike / Prosperity Drive at Tech Road
- Intersection 4: Prosperity Drive at Whitethorn Court
- Intersection 5: Prosperity Drive at Prosperity Terrace
- Intersection 6: Prosperity Drive at Cherry Hill Road

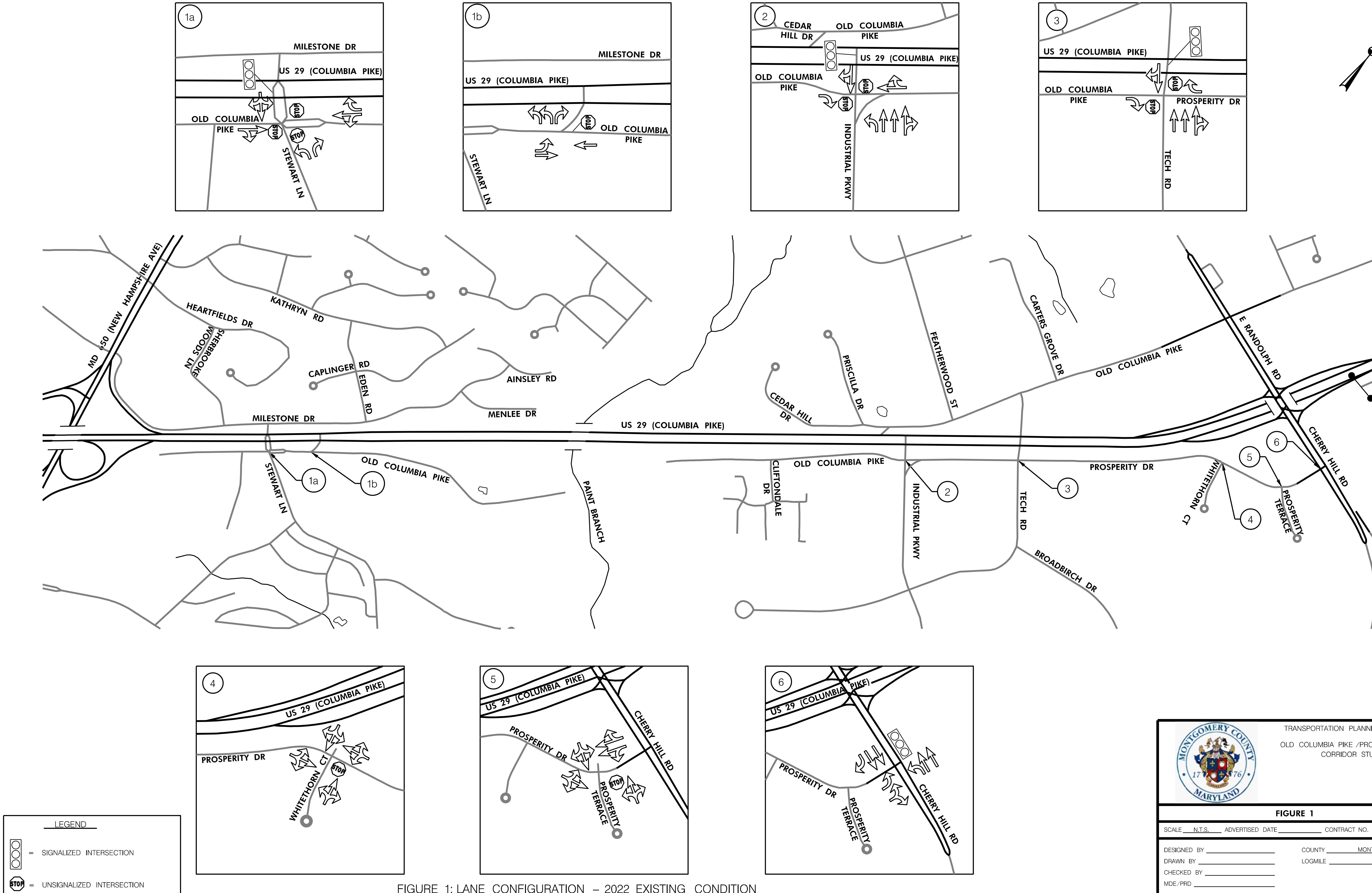


FIGURE 1: LANE CONFIGURATION – 2022 EXISTING CONDITION

SCALE : N.T.S.

TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 1

SCALE N.T.S. ADVERTISED DATE ________ CONTRACT NO. 1111496

DESIGNED BY ________ COUNTY MONTGOMERY

DRAWN BY ________ LOGMILE ________

CHECKED BY ________

MDE/PRD ________

DRAWING NO. – OF SHEET NO. OF

BY: Wengang –

PLOTTED: 3/15/2023
FILE: T:\Traffic\Reports\2022\WRA\MCDOT_111149 Task 6_Old Columbia Pike Corridor\3 Designs\pTD=P001_Ln Configuration 2022 Existing .dgn

The purpose of this study is to evaluate the traffic impact of the four (4) proposed alternatives in the study area, including pedestrian, bicycle, transit, and vehicular safety. The proposed alternatives include:

- Alternative 1: 2045 No-Build (with Developments)
- Alternative 2: 2045 (Intersection Improvements with added Sidewalks and Side Path)
- Alternative 3: 2045 (Alternative 2 with Bridge Open to Traffic)
- Alternative 4: 2045 (Four-Lanes with Bridge Open to Traffic)

The field observation was conducted by RJM Engineering, Inc. The traffic data was collected by RJM Engineering, Inc. The analysis includes capacity analysis through Synchro/SimTraffic Software for the study intersections.

2. EXISTING CONDITIONS

2.1. Study Roadways

Old Columbia Pike is a north-south roadway that runs parallel to US 29 (Columbia Pike) and is split into a northern and southern portion at Tech Road. The northern portion of Old Columbia Pike is located west of US 29 and extends north from Tech Road to its termination at MD 216 and isn't within the study. The southern portion is located east of US 29, from 995' south of Stewart Lane (Sears Appliance Center parking lot) to Tech Road and mostly within the traffic study. The roadway is an undivided, two-lane roadway, classified as an urban major-collector. Along the southern portion of Old Columbia Pike there are existing sidewalks and on-street parking along the east side of the roadway. The posted speed limit is 30 MPH at the south of Bridge No. P-30, and 35 MPH at the north of the bridge.

Prosperity Drive is a north-south roadway that runs parallel east to US 29 (Columbia Pike) and spans from Tech Road to Cherry Hill Road. The roadway is an undivided, two-lane roadway (except near Cherry Hill Road intersection where four lanes are present), classified as an urban-local road. The posted speed limit is 30 mph in both the north and south directions. Along Prosperity Drive there is existing sidewalks along the east side of the roadway from north of Tech Road to Cherry Hill Road, and existing sidewalks along the west side of the roadway from approximately 175 feet south of Whitethorn Court to Cherry Hill Road. Additionally, on-street parking is present along both sides of the roadway.

Stewart Lane is an east-west roadway that extends approximately 0.50 miles from Milestone Drive to where it transitions to Lockwood Drive. The roadway is an undivided, two-lane roadway with a posted speed limit of 30 mph in both the east and west directions. Along both the north and south sides of the roadway there are existing sidewalks.

Industrial Parkway is an east-west roadway that extends approximately 0.40 miles from US 29 (Columbia Pike) to its termination point near business parking lots at the east end of the roadway. The roadway is an undivided, two-lane roadway with a posted speed limit of 30 mph in both the east and west directions. Along both the north and south sides of the roadway there are existing sidewalks.

Tech Road is an east-west roadway that extends approximately 0.65 miles from US 29 (Columbia Pike) to its termination point at the roundabout located at the east end of the roadway. The roadway is an undivided, four-lane roadway with a posted speed limit of 30 mph in both the east and west directions. Along both the north and south sides of the roadway there are existing sidewalks.

Whitethorn Court is an east-west roadway that extends approximately 0.10 miles from Prosperity Drive to its termination point near the Home-Depot parking lot area on the east side of the roadway. The roadway is an undivided, two-lane roadway with a posted speed limit of 25 mph in both the east and west directions. Along both the north and south sides of the roadway there are existing sidewalks.

Prosperity Terrace is an east-west roadway that extends approximately 0.10 miles from Prosperity Drive to its termination point at the entrance of the DACAR vehicle dealership. The roadway is an undivided, two-lane roadway with a posted speed limit of 25 mph in both the east and west directions. Along both the north and south sides of the roadway there are existing sidewalks.

Cherry Hill is an east-west roadway that extends approximately 4.10 miles from US 29 (Columbia Pike) to its termination point at US 1 (Baltimore Ave). The roadway is an undivided roadway with a posted speed limit of 40 mph in both the east and west directions. Along both the north and south sides of the roadway there are existing sidewalks.

2.2. Study Intersections

Study intersection 1a, Old Columbia Pike at Stewart Lane, is located approximately 125 feet east of intersection of US 29 at Stewart Lane. It is a four-legged intersection with stop-control on the northbound, southbound, and westbound approaches as seen in **Photo 1**. Southbound approach has a shared through/right turn lane with a right turn bay working as westbound approach for the adjacent US 29 intersection, and an approximately 135' concrete median that extends into the intersection and prevents the northbound left turn traffic and westbound through traffic. Northbound approach has a shared through/right turn lane and left turn movement is prohibited by the raised concrete median extended from southbound approach and a "No Left Turn" sign. Westbound approach has a separate left-turn and right-turn lane and has no through traffic due to the raised median extended from southbound approach. There is an existing crosswalk at westbound approach without APS/CPS system in place. Eastbound approach has a shared left/right/through turn lane with a concrete median and no movements is restricted. There are existing overhead lightings at all four corners of the intersection.

Photo 1 – Study Intersection 1a: Old Columbia Pike at Stewart Lane (Looking West)

Study intersection 1b, Old Columbia Pike at Dow Jones Parking Lot as seen in **Photo 2**, is included with study intersection 1a and is located approximately 300’ north of Stewart Lane. The three-legged intersection is not named and operates as the access point to US 29 for the traffic movements restricted at intersection 1a. Southbound approach is stop-controlled with a through only lane and a “No Right-Turn Arrow” sign. The northbound approach has a left turn bay and a through lane. The west leg is a one-way operation going westbound and consists of two (2) left-turn lanes leading to US 29 southbound and one right-turn leading to US 29 northbound. At this intersection there is a driveway on the east connecting to a small parking lot of Dow Jones Wallstreet Journal building. However, there were no observed vehicles leaving or entering the lot during the field visit. There is no overhead intersection lighting, however there is overhead lighting for the sidewalk located near the northeast corner of the intersection. Study intersection 1b is approximately 145 feet east of the signal-controlled access point of US 29.

Photo 2 – Study Intersection 1b: Old Columbia Pike at Dow Jones Parking Lot (Looking North)

Study intersection 2, Old Columbia Pike at Industrial Parkway is a four-legged intersection with stop-control on the north- and southbound approaches as seen in **Photo 3**. The northbound approach has right turn only lane with “ONE-WAY” and “DO NOT ENTER” signs, along with raised medians to prevent through and left turn maneuvers. The southbound approach has a shared left/through/right turn lane, with a gap between the two raised medians where one vehicle can queue before continuing their southbound maneuver. The westbound approach has “STOP HERE ON RED” and “DO NOT BLOCK INTERSECTION” signs with shared through/right turn lane (with a channelized right turn), two through lanes, and a left turn storage bay. The eastbound approach has a shared through/right lane and a raised median with a “No Left-Turn” sign to prevent vehicles from turning left. Study intersection 2 is located approximately 150 feet east of the signalized intersection of US 29 at Industrial Parkway.

Photo 3 – Study Intersection 2: Old Columbia Pike at Industrial Parkway (Looking North)

Study intersection 3, Old Columbia Pike / Prosperity Drive at Tech Road is a four-legged intersection with stop-control on the north- and southbound approaches as seen in **Photo 4**. There are existing crosswalks across the north and east legs of the intersection, with no existing APD/CPS systems in place. The north- and southbound approaches have a right turn only lane with bollards along the centerline of Tech Road to prevent through and left-turn movements. The westbound approach has a “STOP HERE ON RED” sign with two through lanes and shared through/right turn lane and no left-turn due to the bollards. The eastbound approach has a shared through/right lane and no left-turn due to the bollards. Study intersection 3 is located approximately 160 feet east of the signalized intersection of US 29 at Tech Road.

Photo 4 – Study Intersection 3: Old Columbia Pike/Prosperity Drive at Tech Road (Looking West)

Study intersection 4, Prosperity Drive at Whitethorn Court is a three-legged intersection with stop-control on the westbound approach as seen in **Photo 5**. A private, bank parking lot driveway intersects with the T-intersection from west and serves as the fourth leg of the intersection. The north- and southbound approaches have a shared left/though/right turn lane. The westbound approach has no pavement markings and appears shared left/though/right turn lane. On-street parking is allowed on both sides of all three approaches. Study intersection 4 is located approximately 325 feet east of US 29.

Photo 5 – Study Intersection 4: Prosperity Drive at Whitethorn Court (Looking West)

Study intersection 5, Prosperity Drive at Prosperity Terrace is a three-legged intersection with stop-control on the westbound approach as seen in **Photo 6**. A medical building parking lot driveway intersects with the T-intersection from west and serves as the fourth leg. The southbound approach has a shared left/through lane and a shared through/right lane. The northbound has a shared left/through/right turn lane. The westbound approach has no pavement markings and appears a shared left/though/right turn lane. On-street parking is allowed on both sides of all three approaches. Study intersection 5 is located approximately 715 feet east of US 29.

Photo 6 – Study Intersection 5: Prosperity Drive at Prosperity Terrace (Looking West)

Study intersection 6, Prosperity Drive at Cherry Hill Road is three-legged signalized intersection as seen in **Photo 7**. There are existing crosswalks across the northbound and westbound approaches of the intersection. The northbound approach has a left turn only lane and a shared left/right turn lane. The westbound approach has a left turn lane and two (2) through lanes. The eastbound approach has a right turn storage lane and two (2) through lanes. Study intersection 6 is located approximately 685 feet east of US 29.

Photo 7 – Study Intersection 6: Prosperity Drive at Cherry Hill Road (Looking North)

2.3. Field Observations

The field observations, measurements and data collections were conducted by RJM Engineering Inc, on April 20 – April 25, 2021 for the following studies: Spot Speed Studies (Section 2.5), Sight Distance Studies (Section 2.6), Delay & Queue Studies (Section 2.7), and Signal Timing Studies (Section 2.8), which are performed and can be seen in the sections below with the findings summarized in their designated sections of this report.

2.3.1. Old Columbia Pike at Stewart Lane (including Old Columbia Pike at Dow Jones Parking Lot)

- Southbound Old Columbia Pike queue from the Old Columbia Pike at Dow Jones intersection will occasionally overlap with the northbound queue from Old Columbia Pike at Stewart Lane intersection **(see Photo 8)**.
- Midblock U-Turns were observed for northbound Old Columbia Pike traffic at the end of the concrete median located along the north leg of the Stewart Lane intersection when the storage queue for the “North Turning-Lanes” intersection is full**.**
- Illegal turns were observed at the Old Columbia Pike at Down Jones Parking Lot intersection for a few Old Columbia Pike southbound traffic that are supposed to make right to access US 29 at Stewart Lane intersection but make illegal Right Turns or U-Turns to northbound and access US 29 at Down Jones Parking Lot intersection, when there is an opportunity getting to the westbound approach of intersection of US 29 **(see Photo 9, which is captured from camera video)**
- During the AM peak hours, when school buses would stop to pick up children along eastbound Stewart Lane, just east of Old Columbia Pike, near the apartment complex, eastbound queues would backfill occasionally to US 29.
- The on-street parking along northbound Old Columbia Pike, just north of the intersection is in proximity of the school buses turning right and thus buses would make large turns and cross over the median lane markings.

Photo 8 – Overlapping Queue between Stewart Lane and Dow Jones Parking Lot

Photo 9 – Illegal Turns at Old Columbia Pike and Down Jones Parking Lot Intersection

2.3.2. Old Columbia Pike at Industrial Parkway

- The westbound Industrial Parkway queue frequently blocks the intersection during both AM and PM peak hours although there are “DO NOT BLOCK INTERSECTION” and “STOP HERE ON RED” signs along with a stop bar. No queuing issues were observed along the other approaches.
- Northbound Old Columbia Pike traffic occasionally violates the “RIGHT TURN ONLY” and “DO NOT ENTER” signs and will cross the median area when no westbound vehicles are in the vicinity. This could lead to safety issues as the median area operates for southbound traffic only **(see Photo 10)**.
- Because left turns and through movements are not permitted at the intersection for Old Columbia Pike northbound traffic, the drivers will make right turns and frequently commit U-Turns at the east end of the concrete median located along the westbound approach. However, there are no existing U-Turn signs at this location, so the U-Turns could cause additional delay on the single eastbound lane.
- Stop bar is missing on the northbound approach to the intersection **(see Photo 11)**.

Photo 10 – Northbound Left-Turning Vehicle Ignoring “DO NOT ENTER” and “ONE-WAY” Signage

Photo 11 – Missing Stop Bar on South Approach

2.3.3. Old Columbia Pike / Prosperity Drive at Tech Road

- The westbound Tech Road queue frequently blocks the intersection although there is a "STOP HERE ON RED" sign during both the AM and PM peak hours.
- During both the AM and PM peak hours, the westbound queue is large and heavily interferes with the ingress and egress traffic at entrance of shopping center **(see Photo 12**), which has Chick-fil-a, Panera Bread, and TGI Fridays restaurants, etc.
- There is a large queue for Tech Road eastbound traffic during both AM and PM peak hours due to high volume of traffic must stop to proceed at the downstream stop-controlled intersection of Tech Road and Broadbirch Drive **(see Photo 13)**.
- Due to the restriction of no through northbound traffic and no left-turn eastbound traffic, it was observed multiple times the vehicles would conduct a U-Turn onto the westbound after the bollards **(see Photo 14)**, and even a three-point-turn when there is only space in the inner lane.
- Due to the restriction of no southbound through and left-turn traffic, it was observed multiple times the southbound vehicles would U-Turn near the intersection when traffic was light and continue on northbound.
- This intersection's PM peak hour occurs during midday hours likely due to the proximity of the nearby restaurants and shopping center. However, when balancing the study corridor, a consistent peak hour was used, which varies from this midday peak hour. The midday PM peak hour volume was recorded at 1,317 vehicles, while the corridor's PM peak hour was recorded at a volume of 1,289 vehicles.

Photo 12 – Large Westbound Queue

Photo 13 – Large Eastbound Queue, Taken Approximately 100’ East of Intersection

Photo 14 – Eastbound U-Turn after Traffic Bollards

2.3.4. Prosperity Drive at Whitethorn Court

- The sight distance for westbound right-turns is partially obstructed (see Section 2.6 Sight Distance Study).
- Pavement markings are absent for the east Whitethorn Court approach **(see Photo 15**).
- No observed delay or queue issues during the field visit for either peak hour.

Photo 15 – Absent Lane Markings on East Approach

2.3.5. Prosperity Drive at Prosperity Terrace

- The sight distance for eastbound right-turns is partially obstructed (see Section 2.6 Sight Distance Study).
- Pavement markings are absent at Prosperity Terrace **(see Photo 16).**
- Lane reduction markings are missing or faded on the north approach.
- No observed delay or queue issues during the field visit for either peak hour.

Photo 16 – Absent Lane Markings on East Approach

2.3.6. Prosperity Drive at Cherry Hill Road

- Cycle failure was observed for the large northbound queues along Prosperity Drive during the PM peak hour, during the 30-minute time frame when employees were leaving the adjacent businesses, around 5:00 – 5:30 PM. The queue was observed to go back approximately 400 feet, in-between Prosperity Terrace and Whitethorn Court. **(see Photo 17)**.
- The queue for the eastbound Cherry Hill Road occasionally backfilled to the upstream US 29 intersection when the pedestrian signal phase on the east leg of the intersection was activated **(see Photo 18)**. It observed that the pedestrian signal was activated twice during the field visit. The overall pedestrian counts can be seen in Section 4.1 Existing Volume Summary.

Photo 17 – Northbound Queue Cycle Failure

Photo 18 – Eastbound Queue Backfill to Upstream US 29 Intersection

2.4. Existing Transit Routes and Stops

Following existing public transit routes are serving the adjacent area of the study corridor of Old Columbia Pike / Prosperity Drive:

- Montgomery County Ride-On bus route: 10, 27
- Montgomery County FLASH route: Blue, Orange
- Metro bus route: K6, Z6, Z7, Z8

The existing bus routes, stops and maps are exhibited in **Figure 2**. Except bus route 27, all other bus routes are not travelling along the study corridor. Bus route 27 travels the Prosperity Drive northbound from Tech Road to Cherry Hill Road as shown in **Figure 2**.

2.5. Spot Speed Study

Vehicle speed data was recorded on Friday, April 22, 2022, at three locations along the study corridor. Spot speed data was recorded for 75 minutes during off peak hours for each direction of each location using a radar gun and is summarized below in **Table 1**. Detailed speed data is included in **Appendix A**.

Table 1– Spot Speed Study Results

Direction	Posted Speed Limit (mph)	85th Percentile Speed (mph)	Average Speed (mph)
Old Columbia Pike, between Stewart Lane and Bridge			
NB	30	40	35
SB		37	33
Old Columbia Pike, 425' South of Industrial Parkway			
NB	35	34	30
SB		32	28
Prosperity Drive, between Prosperity Terrace and Whitethorn Court			
NB	30	29	25
SB		30	26

The first speed location is located at Old Columbia Pike between Stewart Lane and the south end of P-30 bridge. The 85th percentile speed along Old Columbia Pike at this location is 10 mph and 7 mph over the posted speed limit for the north- and southbound directions, respectively.

The second speed location is located at Old Columbia Pike, 425' south of Industrial Parkway. The 85th percentile speed along Old Columbia Pike at this location is minimally below the posted speed limit for the north- and southbound directions. The posted speed limit in this area of the study corridor presents a speed increase compared to that of the rest of the corridor.

The third speed location is located at Prosperity Drive between Prosperity Terrace and Whitethorn Court. The 85th percentile speed along Old Columbia Pike at this location is 1 mph below the posted speed limit for the northbound direction and is at the posted speed limit for the southbound direction.

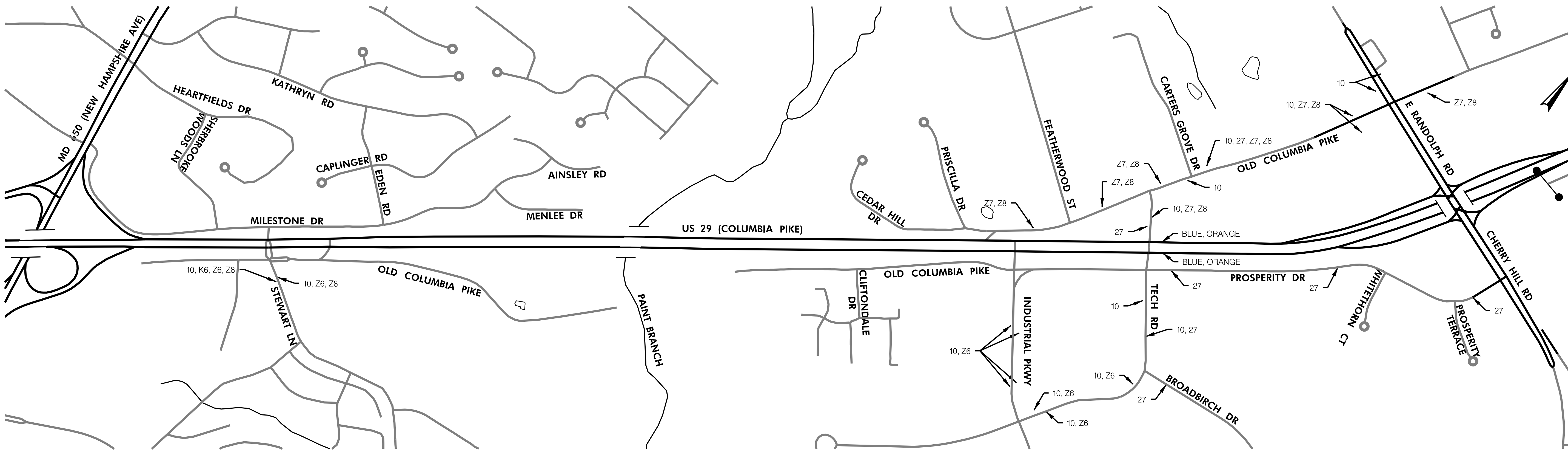
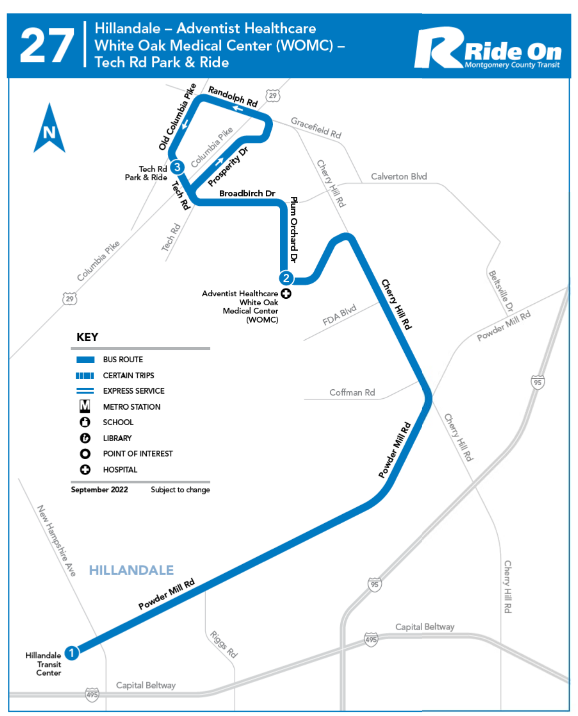
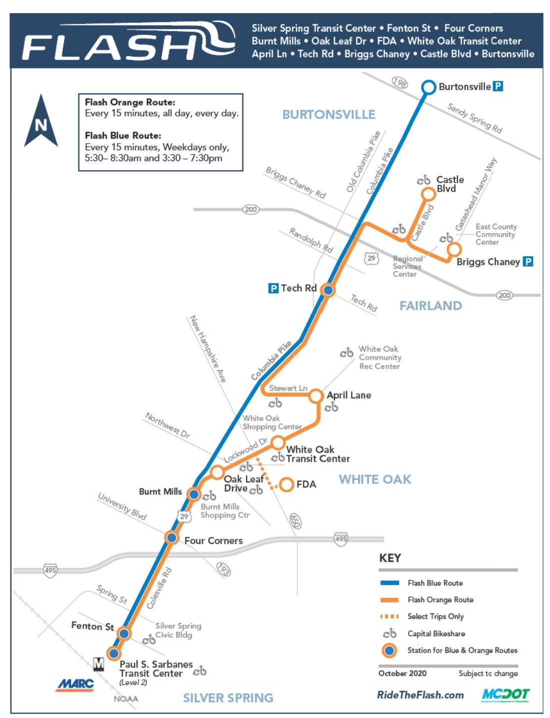


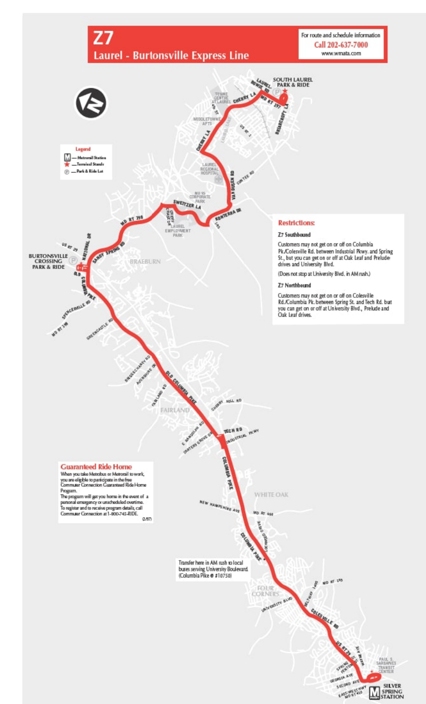
FIGURE 2: EXISTING PUBLIC TRANSIT ROUTES AND STOPS

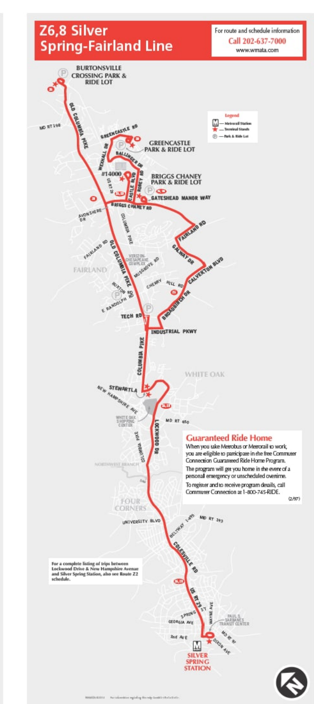
SCALE : N.T.S.

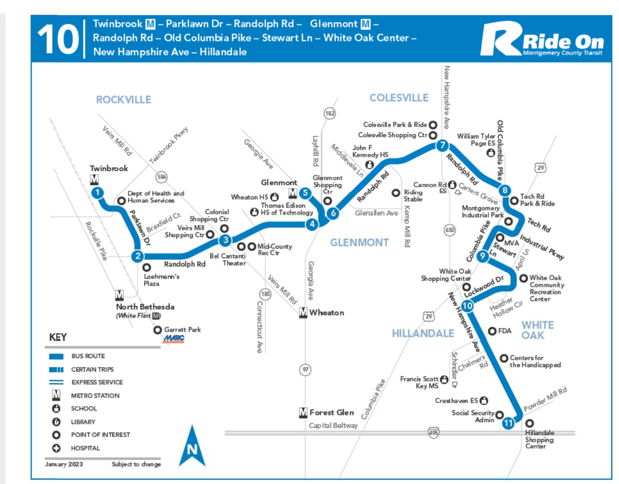
LEGEND:
MONTGOMERY COUNTY RIDE-ON BUS ROUTE: 10, 27
MONTGOMERY COUNTY FLASH ROUTE: BLUE, ORANGE
METRO BUS ROUTE: K6, Z6, Z7, Z8











TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 2 EXISTING PUBLIC TRANSIT ROUTES AND STOPS

SCALE N.T.S.	ADVERTISED DATE	CONTRACT NO. 1111496
DESIGNED BY		COUNTY MONTGOMERY
DRAWN BY		LOGMILE
CHECKED BY		
MDE/PRD		
DRAWING NO. – OF		SHEET NO. OF

BY: Wengang –

PLOTTED: 11/16/2023
FILE: T:\Traffic\Reports\2022\WRA\MCDOT_111149 Task 6_Old Columbia Pike Corridor\3 Designs\pTD-P002_Existing Transit Route.dgn

2.6. Sight Distance Study

Sight distance is the length of a roadway visible to a driver and there are three (3) common types of sight distance per the *AASHTO (A Policy on Geometric Design of Highways and Streets)* manual. These include intersections with stop control on the minor road, Case B1 Left turn from the minor road (*AASHTO Table 9.6*), intersections with stop control on the minor road, Case B2 Right turn from the minor road (*AASHTO Table 9.8*), and Case F Left turns from the major road (*AASHTO Table 9.14*).

The speeds used for the sight distance criteria were from the 85th percentile speeds recorded during the speed study or 5 mph above the posted speed limit (whichever was higher). The summary of the measured sight distances during the field visit are compared to the AASHTO sight distance criteria and are summarized below in **Table 2**.

Table 2 – Sight Distance Results

Sight Distance Type	Movement/Approach	Criteria*	Speed Used	Criteria Met?
Old Columbia Pike at Stewart Lane				
Stopping Sight Distance	NB Old Columbia Pike	305 ft	40 MPH	Yes
	SB Old Columbia Pike	305 ft	40 MPH	Yes
	WB Stewart Lane	250 ft	35 MPH	Yes
Old Columbia Pike at Industrial Parkway				
Stopping Sight Distance	NB Old Columbia Pike	250 ft	35 MPH	Yes
	SB Old Columbia Pike	250 ft	35 MPH	Yes
	WB Industrial Parkway	250 ft	35 MPH	Yes
Intersection Sight Distance SB LT Maneuver	Looking Left (at stop line)	390 ft	35 MPH	Yes
Old Columbia Pike / Prosperity Drive at Tech Road				
Stopping Sight Distance	NB Old Columbia Pike	250 ft	35 MPH	Yes
	SB Prosperity Drive	200 ft	30 MPH	Yes
	WB Tech Road	250 ft	35 MPH	Yes
Intersection Sight Distance SB RT Maneuver	Looking Left (at stop line)	335 ft	35 MPH	Yes
Prosperity Drive at Whitethorn Court				
Stopping Sight Distance	NB Prosperity Drive	200 ft	30 MPH	Yes
	SB Prosperity Drive	200 ft	30 MPH	Yes
	WB Whitethorn Court	200 ft	30 MPH	Yes
Intersection Sight Distance EB RT/LT Maneuver	Looking Left (at stop line)	290 ft	30 MPH	Yes
	Looking Right (at stop line)	335 ft	30 MPH	Yes
Intersection Sight Distance WB RT/LT Maneuver	Looking Left (at stop line)	290 ft	30 MPH	**No***
	Looking Left (beyond stop line)	290 ft	30 MPH	**No***
	Looking Right (at stop line)	335 ft	30 MPH	Yes
Prosperity Drive at Prosperity Terrace				
Stopping Sight Distance	NB Prosperity Drive	200 ft	30 MPH	Yes
	SB Prosperity Drive	200 ft	30 MPH	Yes
	WB Prosperity Terrace	200 ft	30 MPH	Yes
Intersection Sight Distance EB RT/LT Maneuver	Looking Left (at stop line)	290 ft	30 MPH	**No***
	Looking Left (beyond stop line)	290 ft	30 MPH	**Yes**

	Looking Right (at stop line)	335 ft	30 MPH	Yes
Intersection Sight Distance WB RT/LT Maneuver	Looking Left (at stop line)	290 ft	30 MPH	Yes
	Looking Right (at stop line)	335 ft	30 MPH	Yes
Prosperity Drive at Cherry Hill Road				
Stopping Sight Distance	NB Prosperity Drive	200 ft	30 MPH	Yes
	EB Cherry Hill Road	425 ft	50 MPH	Yes
	WB Cherry Hill Road	425 ft	50 MPH	Yes
Intersection Sight Distance NB RT Maneuver	Looking Left (at stop line)	480 ft	50 MPH	Yes

The stopping sight distance for all approaches of all six (6) study intersections met the AASHTO criteria. At Study Intersection 4 (Prosperity Drive at Whitethorn Court) the intersection sight distance for the westbound right-turn maneuvers did not meet the AASHTO criteria and was measured as 220 feet during the site visit **(see Photo 19)**. At this location, both at the stop bar and beyond the stop bar, Whitethorn motorists were obstructed and could not meet the AASHTO criteria due to the curvature of the roadway and the foliage and embankment along the road. At Study Intersection 5 (Prosperity Drive at Prosperity Terrace) the intersection sight distance for the eastbound right-turn maneuvers did not meet the AASHTO criteria and was measured as 165 feet during the site visit. At this location, at the stop bar, Prosperity Terrance motorists were obstructed and could not meet AASHTO criteria due to the curvature of roadway and the foliage along the road, however, when motorist pulled past the stop bar the site distance was no longer an issue.

Photo 19 – Eastbound Whitethorn Court Right-Turn Maneuver at Prosperity Drive

2.7. Delay and Queue Study

Queues at the study intersections were collected during the AM and PM peak hours. Due to the adjacent intersections along US 29 (Columbia Pike) the queue lengths along the Old Columbia Pike / Prosperity Drive corridor act as a storage bay for the US 29 intersections. All traffic turning left or through from the study intersection are controlled by the signal timings of the US 29 intersections. The max queues are measured in the number of vehicles sitting along approaches and is summarized below in **Table 3**. The eastbound queues were not measured for the study intersections at Stewart Lane, Industrial Parkway and Tech Road, as eastbound traffic is considered free and does not stop when they come from US 29 to the study corridor.

Table 3 – Max Queue Observations

	AM (# of Vehicles)	PM (# of Vehicles)
Old Columbia Pike at Stewart Lane		
NB	2	10[1]
SB	10	6
WB	4	6
Old Columbia Pike at Industrial Parkway		
NB	5	3
SB	3	3
WB	6	5
Old Columbia Pike / Prosperity Drive at Tech Road		
NB	2	1
SB	2	4
WB[2]	11	8
Prosperity Drive at Whitethorn Court		
EB	1	1
WB	6	5
Prosperity Drive at Prosperity Terrace		
EB	1	2
WB	3	3
Prosperity Drive at Cherry Hill Road		
NB	7	26[3], 9[4]
EB (Right-Turn)	4	1
EB (Through)	10	15[5]
WB (Left-Turn)	6	8
WB (Through)	6	23[6], 11[7]

1 – These long queues only occurred when school buses stopped to drop/pickup kids from school
2 – Largest queues across 3 lanes is shown
3 – Very large queues and cycle failures during the PM peak when employees leave vehicle dealerships (5:00 -5:30)
4 – Typical PM peak number, after or before employees leaving work
5 – Eastbound queue increases when east approach pedestrian phase is activated (twice during the field visit)
6 – Observed once, only observed cycle failure for this approach
7 – Normal PM queue

A stop sign delay study was performed for the AM and PM peak periods for all stop-controlled approaches to study intersections and is summarized below in **Table 4**. The study records the amount of time a vehicle sits at a stop sign before having the opportunity to continue along the corridor. The time waiting at stop signs for all stop controlled westbound approaches of Study Intersections 1 – 3 appears to be controlled by the adjacent US 29 phase timings. All time recordings of the stop sign delays were taken during the AM and PM peak hours, consistent with the times in Section 4.1 Existing Volume Summary.

Table 4 – Stop Sign Delay Results

Approach	AM Peak		PM Peak	
	Avg. Time (s)	Max Time (s)	Avg. Time (s)	Max Time (s)
Old Columbia Pike at Stewart Lane				
NB	46	13	25	75
SB	10	24	18	35
WB	5	19	16	46
Old Columbia Pike at Industrial Parkway				
NB	11	31	6	13
SB	7	14	3	4
WB	53	96	51	125
Old Columbia Pike / Prosperity Drive at Tech Road				
NB	4	10	13	19
SB	22	112	24	74
WB	62	125	52	95
Prosperity Drive at Whitethorn Court				
EB	14	35	8	14
WB	9	29	9	39
Prosperity Drive at Prosperity Terrace				
EB	11	20	7	14
WB	8	29	12	56

2.8. Signal Timing Study

In the study corridor only one (1) intersection has an existing signal and that is Prosperity Drive and Cherry Hill Road which is part of an interconnect system. The signal timing plan requested from Montgomery County can be seen in **Appendix C** and is compared with the field collected signal timing below in **Table 5 & 6**. The intersection operates in a fully actuated mode and uses four (4) NEMA phases. The typical phasing sequence operation is: (1) westbound left turn and westbound through, (2) eastbound through and westbound through, and is followed by northbound.

Table 5 – Cycle Length Comparison

Cycle Length	AM Peak		PM Peak	
	Field	Signal Plan	Field	Signal Plan
	150, 140, 144	150	150, 150	150

Table 6 – Signal Timing Comparison

Phase	AM Peak (Field)		Signal Plan		PM Peak (Field)		Signal Plan	
	Green	Yellow	GT	YT	Green	Yellow	GT	YT
WB LT Φ5	9, 5, 11	4, 4	15	4	14.5, 5, 9	4, 4, 4	21	4
WB Thru Φ2	121, 110, 111	4, 4, 4	123	4.5	102, 107, 106	4, 4.5, 4.5	114	4.5
EB Thru Φ6	104, 102, 110	4.5, 4.5, 4.3	108	4.5	76, 106, 96	4.5, 4.5, 4.5	93	4.5
NB LT Φ4	18, 21, 20	4, 4, 4	27	4	30, 30, 30	4.5, 4.5, 4.5	36	4
Phase	**Walk**	**FDW**	**Walk**	**FDW**	**Walk**	**FDW**	**Walk**	**FDW**
Pedestrian	6	22	5	22	6	22	5	22

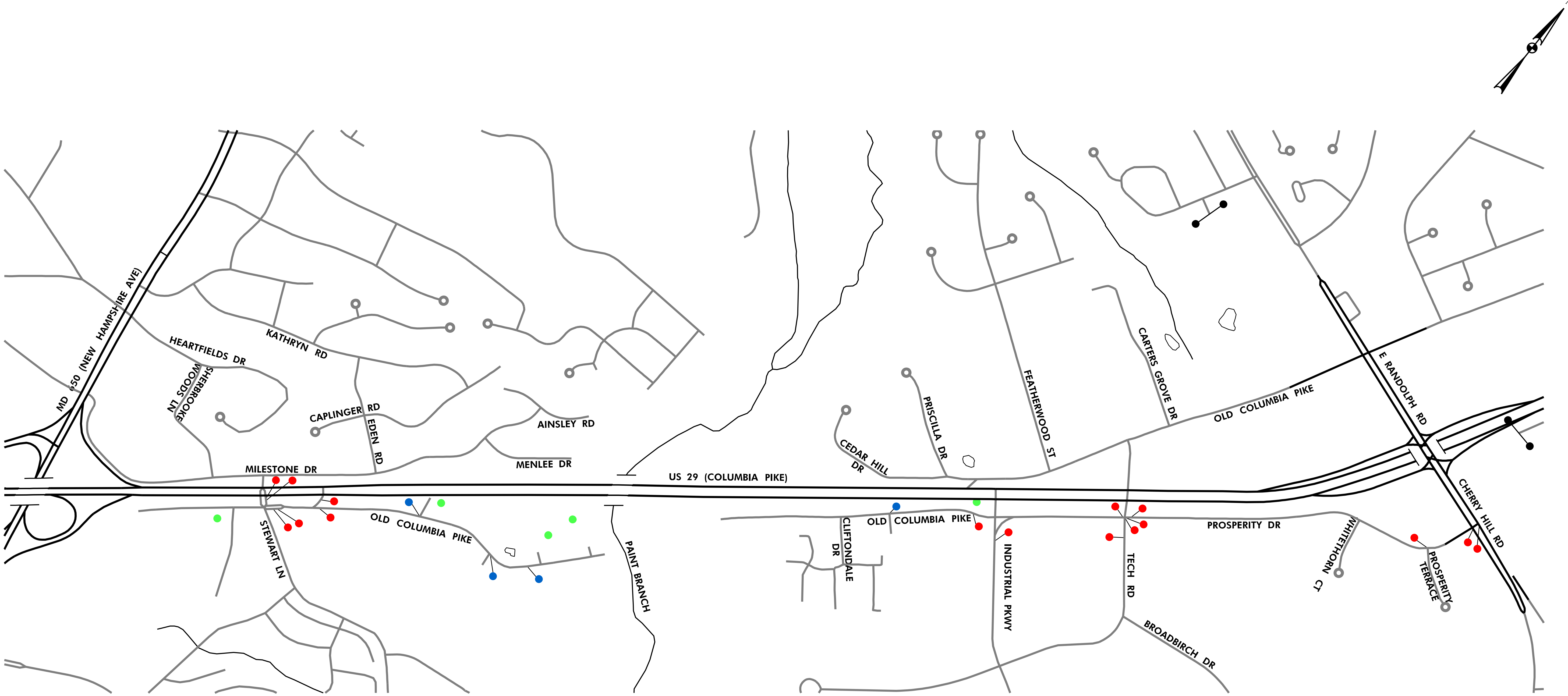
Overall, the cycle length, pedestrian timing, and yellow times are consistent with the SHA timing plan, while the green times slightly vary. This is likely due to whether the left turn phasing and pedestrian phasing are called. However, there is variance in collecting field measurements, as a stopwatch was used.

3. CRASH ANALSIS

Corridor crash history was provided by MDOT SHA and MCDOT (Montgomery County Department of Transportation) for the nearly five-year study period of February 16, 2017 to December 22, 2021 for the Old Columbia Pike roadway and just over 4 years from April 7, 2017 to July 15, 2021 for the Prosperity Drive roadway. Both sets of data were used, however there are only 2 accidents from the MDOT SHA crash data within the study area and both are also reported in the MCDOT crash data as well. Detailed crash data is provided in **Appendix B**.

A total of 25 crashes occurred within the study corridor, with 19 along Old Columbia Road and 6 along Prosperity Drive, as shown in **Figure 3**. Five (5) of the 25 total crashes occurred nearby but outside of the corridor (ie. parking lot) and the rest 20 occurred within the study corridor. Among the 20 crashes, four (4) crashes occurred at non-study intersections, and 16 crashes occurred at study intersections along the corridor. During the AM peak hour of 8:00 – 9:00 there were zero reported crashes, while during the PM peak hour of 5:00 – 6:00 there were three (3) reported crashes. There was one (1) crash involving pedestrian at the non-study intersection at Amerstone Court. The crashes occurred at study intersections are summarized as below:

- Study Intersection 1a (Old Columbia Pike at Stewart Lane) – 4 crashes
  - 2 injury related crashes
  - 2 property damage related crash
  - 1 crash occurred during the day and 3 crashes occurred at night.
  - Movement of crashes:
    - 2 straight movement angle crashes (northbound and westbound to US 29)
    - 1 single vehicle crash (westbound to US 29)
    - 1 same direction sideswipe crash (northbound)
- Study Intersection 1b (Old Columbia Pike at Dow Jones Lot) – 2 crashes
  - 2 property damage related crash
  - 2 crashes occurred during the day
  - Movement of crashes:
    - 2 same direction rear end crashes (west lane to US 29 and northbound)
- Study Intersection 2 (Old Columbia Pike at Industrial Parkway) – 2 crashes
  - 2 injury related crashes
  - 1 crash occurred during the day and 1 crash occurred at night
  - Movement of crashes:
    - 1 opposite direction sideswipe (southbound)



LEGEND:

- =ALONG COORIDOR (AT STUDY INTERSECTION)
- =ALONG COORIDOR (AT NON-STUDY INTERSECTION)
- =PARKING LOT CRASH NOT ON ROADWAY (NEAR STUDY COORIDOR)

FIGURE 3: CRASH MAP

SCALE : N.T.S.

TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 3

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BY: kyle –

        - 1 unknown movement crash (westbound)
- Study Intersection 3 (Old Columbia Pike / Prosperity Drive at Tech Rd) – 5 crashes
    - 2 injury related crashes
    - 3 property damage related crashes
    - 5 crashes occurred during the day
    - Movement of crashes:
        - 2 straight movement angle crash (both eastbound)
        - 1 same direction sideswipe crash (westbound)
        - 1 same direction right turn crash (southbound)
        - 1 unknown type of crash (westbound)
- Study Intersection 4 (Prosperity Drive at Whitethorn Court) – 0 Crashes
    - No reported crashes
- Study Intersection 5 (Prosperity Drive at Prosperity Terrace) – 1 Crash
    - 1 property damage related crash
    - 1 crash occurred during the day
    - Movement of crash
        - 1 straight movement angle crash (southbound)
- Study Intersection 6 (Prosperity Drive at Cherry Hill Road) – 2 Crashes
    - 1 injury related crash
    - 1 property damage related crash
    - 2 crashes occurred during the day
    - Movement of crashes:
        - 1 same direction sideswipe crash (eastbound)
        - 1 straight movement angle crash (westbound)

4. Traffic Volumes

4.1. Existing Volume Summary

13-hour turning movement counts were performed on the following dates and to be consistent and to properly balance the traffic volumes an overall corridor peak hour was chosen and can be seen in **Figure 4**:

- Tuesday, March 8, 2022
    - Old Columbia Pike at Stewart Lane
    - Old Columbia Pike at Industrial Parkway
    - Old Columbia Pike / Prosperity Drive at Tech Road
    - Prosperity Drive at Whitethorn Court
    - Prosperity Drive at Cherry Hill Road
- Tuesday, March 15, 2022
    - Prosperity Drive at Prosperity Terrace
- Study Intersection 1b, Old Columbia Pike at Dow Jones Lot was not originally scoped in the project with a TMC count, however a camera was set up during the AM and PM hours to get approximate movements percentages, and the percentages of the movements was applied to the incoming/outgoing traffic volumes from the adjacent intersection of Old Columbia Pike at Stewart Lane.

Through the 13-hour volume counts, the peak hours were determined for each intersection in order to find the corridor peak hour and can be seen below in **Table 7**, with the full turning movement counts provided in **Appendix D**. During the peak hours the pedestrian counts and truck percentages can be seen below in **Table 8 – Table 9**. It should be noted that the PM peak period of Old Columbia Pike / Prosperity Drive at Tech Road occurs during midday hours, which is likely due to the close proximity of the nearby restaurants and shopping center.

Table 7 – Intersection Peak Hours

Intersections	AM	PM	Overall Corridor Peak Hour
(1) Old Columbia Pike at Stewart Lane	8:15 – 9:15	5:15 – 6:15	AM: 8:00-9:00 + PM: 5:00-6:00
(1b) Old Columbia Pike at Dow Jones Lot	N/A	N/A	
(2) Old Columbia Pike at Industrial Parkway	8:45 – 9:45	5:15 – 6:15	
(3) Old Columbia Pike / Prosperity Drive at Tech Road	9: 15 – 10:15	12:15 – 1:15	
(4) Prosperity Drive at Whitethorn Court	11:00 – 12:00	12: 15 – 1:15	
(5) Prosperity Drive at Prosperity Terrace	11:00 – 12:00	3:30 – 4:30	
(6) Prosperity Drive at Cherry Hill Road	7:30 – 8:30	5:00 – 6:00	

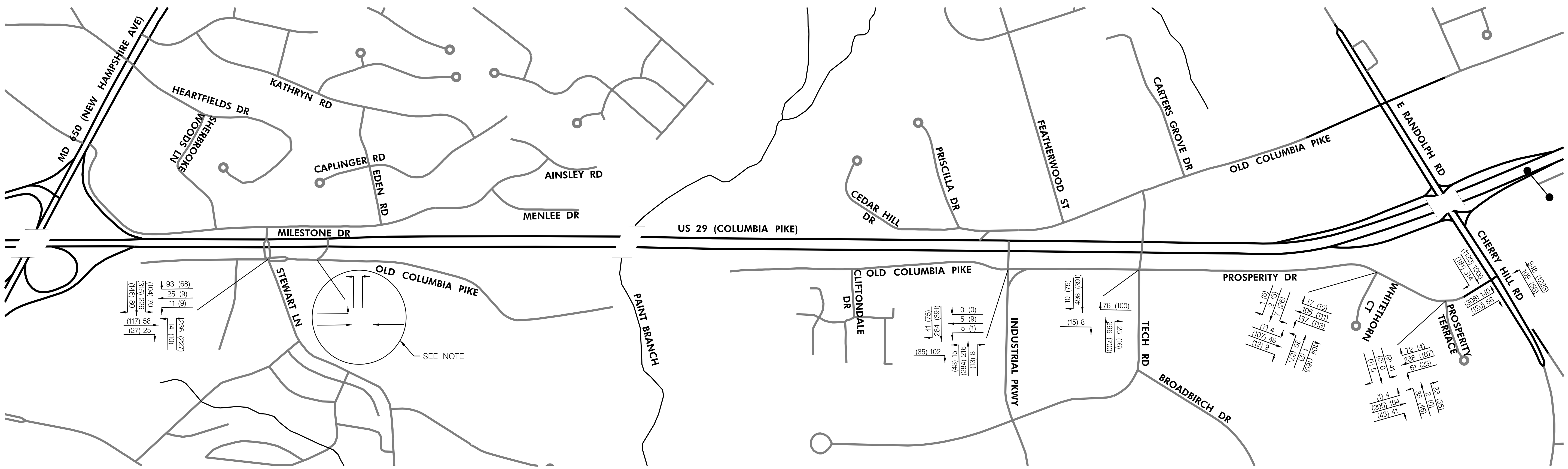

FIGURE 4: VOLUME MAP – 2022 UNBALANCED EXISTING CONDITION

SCALE : N.T.S.

NOTE:
NO TMC WAS CONDUCTED AT THIS LOCATION. VOLUMES WERE CALCULATED BASED ON THE TRAFFIC COUNT AT STEWART LANE AND APPROXIMATE MOVEMENT PERCENTAGES GENERATED FROM A CAMERA USED ONLY DURING PEAK HOURS AT THIS LOCATION.

LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

BY: kyle –

TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 4

SCALE N.T.S. ADVERTISED DATE ______ CONTRACT NO. 1111496

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Table 8 – Peak Hour Pedestrian Counts

	Southbound		Westbound		Northbound		Eastbound	
Intersections	AM	PM	AM	PM	AM	PM	AM	PM
(1a) Old Columbia Pike at Stewart Lane	0	0	1	0	10	9	1	0
(1b) Old Columbia Pike at Dow Jones Lot	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(2) Old Columbia Pike at Industrial Parkway	0	0	0	2	2	8	0	0
(3) Old Columbia Pike / Prosperity Drive at Tech Road	1	0	5	27	1	5	0	1
(4) Prosperity Drive at Whitethorn Court	4	1	2	1	3	3	1	0
(5) Prosperity Drive at Prosperity Terrace	0	4	0	0	3	7	0	0
(6) Prosperity Drive at Cherry Hill Road	N/A	N/A	2	0	2	1	0	0

Table 9 – Peak Hour Truck Percentages

		Southbound			Westbound			Northbound			Eastbound		
Intersections		RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
(1a) Old Columbia Pike at Stewart Lane	AM	0.0%	1.6%	6.8%	1.1%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%
	PM	1.4%	0.0%	0.9%	3.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
(1b) Old Columbia Pike at Dow Jones Lot		N/A											
(2) Old Columbia Pike at Industrial Parkway	AM	3.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	1.1%	0.0%	0.0%
	PM	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.4%	2.4%	0.0%	0.0%
(3) Old Columbia Pike / Prosperity Drive at Tech Road	AM	0.0%	2.5%	0.0%	1.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%
	PM	0.0%	1.2%	0.0%	0.8%	0.0%	0.0%	4.3%	1.3%	0.0%	0.0%	0.0%	0.0%
(4) Prosperity Drive at Whitethorn Court	AM	0.0%	0.0%	3.8%	5.3%	3.3%	4.0%	3.2%	0.0%	9.8%	0.0%	3.3%	0.0%
	PM	0.0%	0.0%	0.0%	0.0%	3.5%	0.7%	3.9%	0.0%	0.0%	0.0%	2.0%	0.0%
(5) Prosperity Drive at Prosperity Terrace	AM	0.0%	0.0%	2.1%	7.5%	0.9%	2.9%	5.6%	0.0%	0.0%	4.1%	1.6%	0.0%
	PM	0.0%	50.0 %	1.5%	0.0%	1.6%	0.0%	3.1%	0.0%	0.0%	2.9%	0.3%	0.0%
(6) Prosperity Drive at Cherry Hill Road	AM	0.0%	0.0%	0.0%	0.0%	2.3%	1.7%	2.3%	0.0%	4.3%	2.6%	1.2%	0.0%
	PM	0.0%	0.0%	0.0%	0.0%	0.6%	1.7%	1.7%	0.0%	1.3%	1.7%	0.3%	0.0%

4.2. Balanced Traffic Volumes

Due to traffic data being collected on different days and there being midblock entrances within the study area, traffic volumes of overall corridor peak hour are balanced and can be seen in **Figure 5**. In the study corridor all traffic volumes were balanced, with the exception of the traffic of northbound Prosperity Drive, between Tech Road and Whitethorn Court. This area of the corridor was left unbalanced because no TMC was conducted between the two study intersections, and the midblock volume imbalance is likely due to the shopping plaza entrance located approximately 300 feet north of Prosperity Drive at Tech Road.

While balancing the traffic volumes for the northern portion of the study corridor, it was assumed a higher number of vehicles would be entering the area during AM (driving

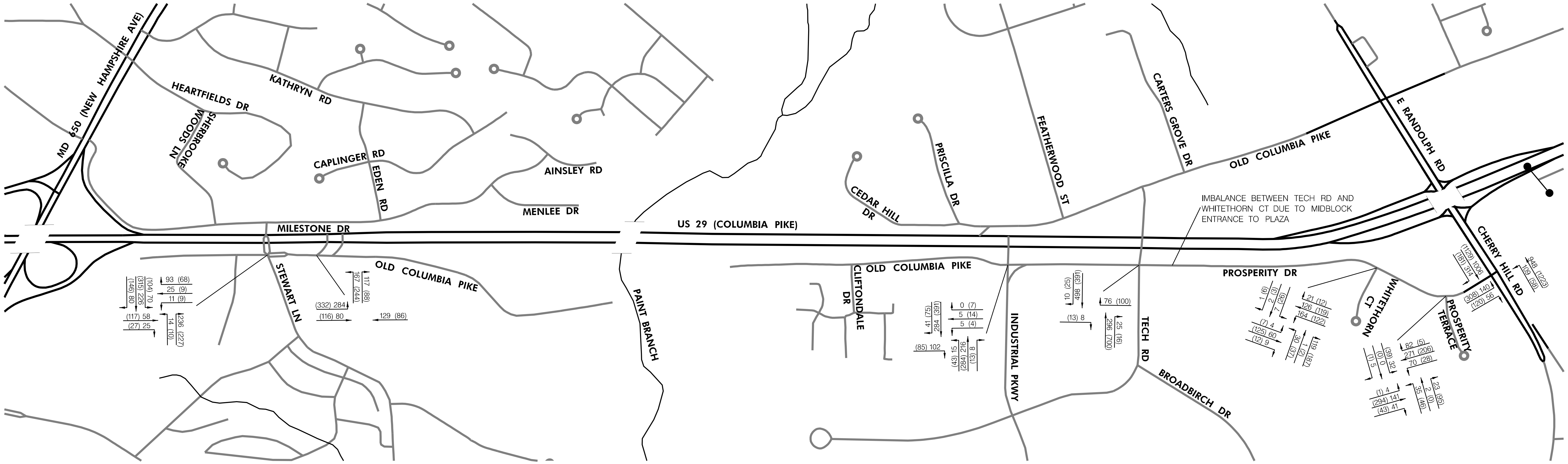

FIGURE 5: VOLUME MAP – 2022 BALANCED EXISTING CONDITION

SCALE : N.T.S.

LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

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FIGURE 5

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southbound on Prosperity Drive) with the purpose of going to work/businesses, and a higher number of vehicles would be leaving the area in the PM to return home (driving northbound on Prosperity Drive).

4.3. Future Traffic

4.3.1. Growth Rate

2045 Design year traffic volumes were developed to determine the future impact along the study corridor. Growth rates from MWCOG travel demand volumes were used and are summarized below in **Table 10** and the 2045 design year (background condition) traffic volumes are provided in **Figure 6**.

Table 10 – Roadway Growth Rates

Intersections	Annual Yearly Growth Rate
Old Columbia Pike (NB+SB)	0.6 %
Prosperity Drive (NB+SB)	0.6 %
Stewart Lane (EB+WB)	1.0 %
Industrial Parkway (EB+WB)	1.0 %
Tech Road (EB+WB)	1.0 %
Whitethorn Court (WB)	0.2 %
Prosperity Terrace (WB)	0.2 %
Cherry Hill Road (EB+WB)	1.0 %

4.3.2. Planned Developments and Roadway Improvement Projects (Appendix E)

From memorandums obtained from Montgomery County Planning Board there are two proposals for future developments and one approved roadway improvement project. The two development proposals include a proposal for the White Oak Town Center and one for the future White Oak Apartments building. The approved roadway improvement project is for Stewart Lane at Old Columbia Pike intersection and the adjacent intersection (Old Columbia Pike at Dow Jones Lot) located to the north. The proposed developments were assumed to be built in 2045, while the approved roadway improvement project is expected to be completed before 2045, and those volumes are distributed to the adjacent intersections.

4.3.2.1. Stewart Lane Roadway Improvement (Contract #MO8445176)

The most recent SHA design files from contract # MO8445176 show the roadway improvements for the Old Columbia Pike at Stewart Lane intersection, along with the improvements for the adjacent intersection, located just north of Stewart Lane. The roadway improvements includes increasing the roadway widths, extending the storage lanes for the turn lanes to US 29, and removing the turn lanes from southbound Old Columbia Pike at Stewart Lane. These improvement s can be seen in **Figure 7**.

4.3.2.2. White Oak Town Center Future Development

From the memorandum obtained from Montgomery County Planning Board there is a proposal for the White Oak Town Center, which will be located at the northeast corner of the Old Columbia Pike at Industrial Parkway intersection as seen in **Figure 8**. The proposed development will consist of up to 105,000 square feet of commercial space

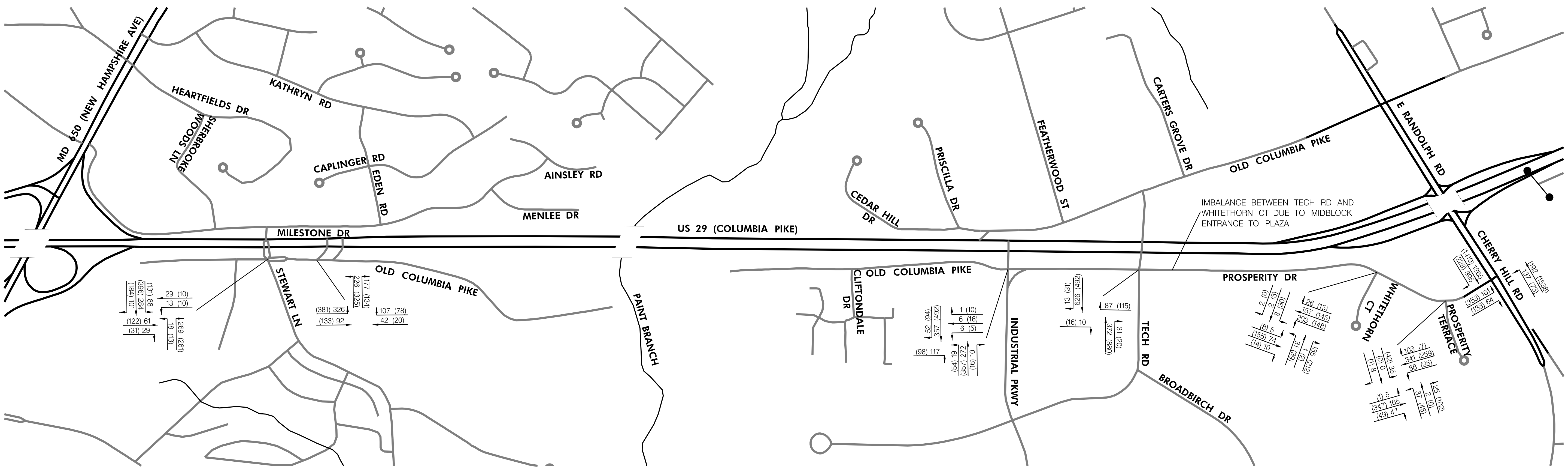

FIGURE 6: VOLUME MAP – 2045 BACKGROUND CONDITION

SCALE : N.T.S.

LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

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FIGURE 6

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Suggested scope of work for MDOT SHA District Project to Achieve Project Objectives and be Compatible with Future MCDOT Project to Improve Old Columbia Pike

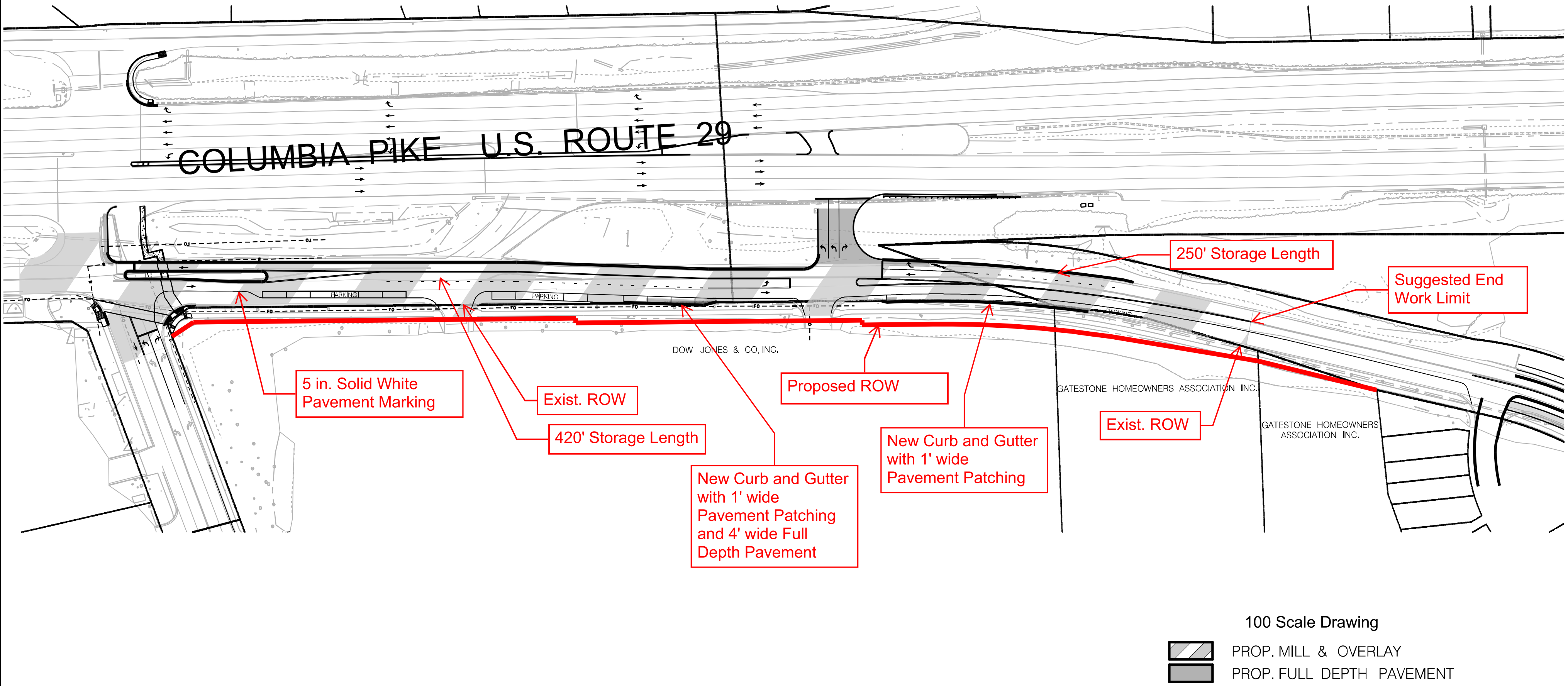


FIGURE 7: ROADWAY IMPROVEMENT PROJECT (CONTRACT # MO8445176)

and will include 85,000 square feet of retail space and 20,000 square feet of office space.

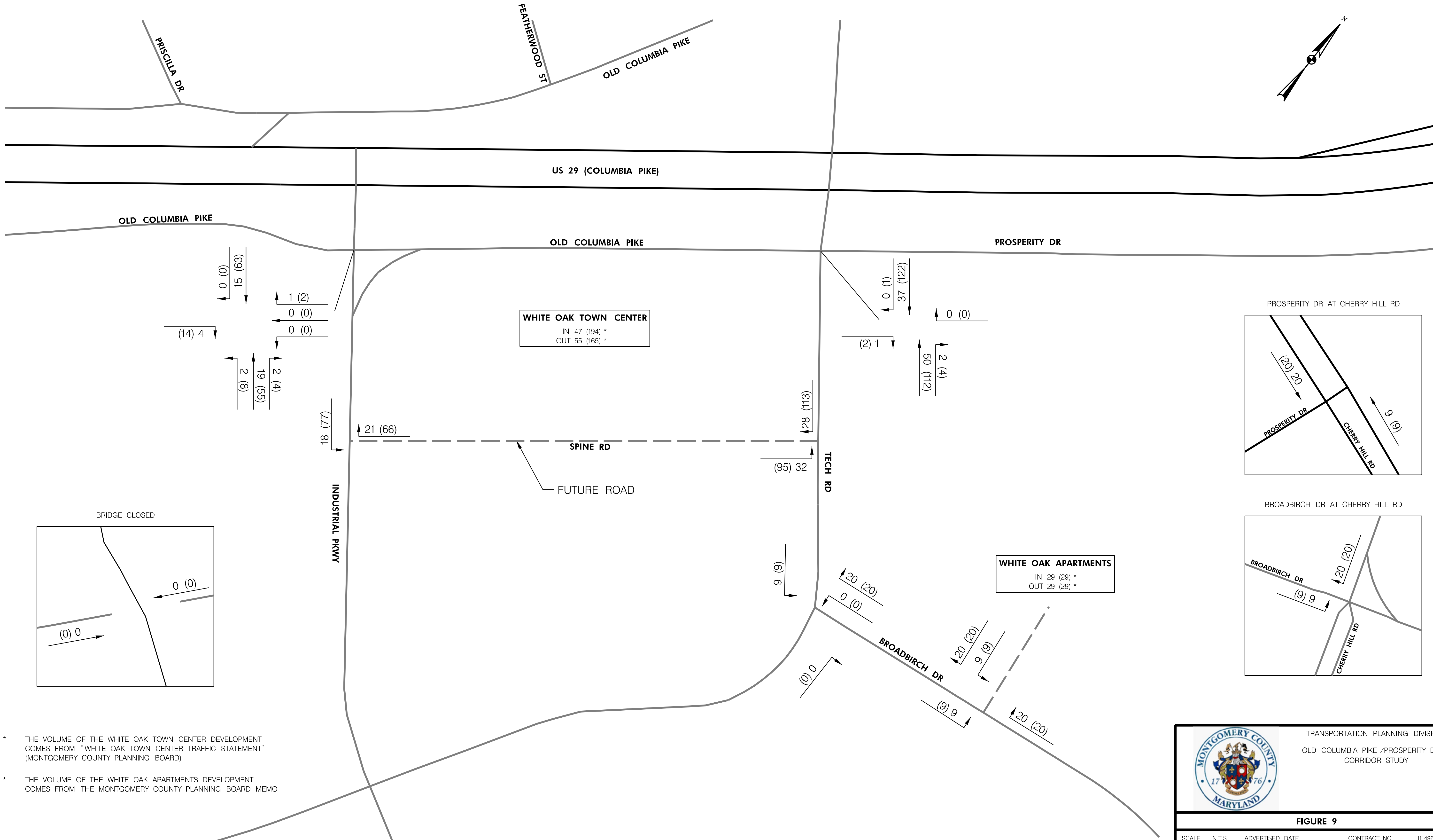
According to the memorandum there will be 102 and 359 new generated trips, respectively, in the AM and PM peak periods. During the AM peak period, of the 102 new generated trips, 47 vehicles will be coming in and 55 will be going out. During the PM peak period, of the 359 new generated trips, 194 vehicles will be coming in and 165 will be going out. These new trips are to be distributed to the adjacent intersection volumes to analyze the impacts of the new vehicle trips and can be seen in **Figure 9.**

4.3.2.3. Future White Oak Apartments

From the memorandum obtained from Montgomery County Planning Board there is a proposal for the Future White Oak Apartments which will be located at 2220 Broadbirch Drive as seen in **Figure 8**. The proposed development will consist of 387 residential units, 359 high rise units, and 28 low rise units. This development will replace the existing office building of 66,150 SF.

According to the memorandum there will be 138 new generated peak hour trips and there are 80 existing peak hour trips from the existing office building. The resultant of 58 peak hour trips will be distributed equally between in and out traffic to the Future White Oak Apartments. These new trips are to be distributed to the adjacent intersection volumes to analyze the impacts of the new vehicle trips and can be seen in **Figure 9.**

FIGURE 8:PLANNED DEVELOPMENT LOCATION MAP



* THE VOLUME OF THE WHITE OAK TOWN CENTER DEVELOPMENT COMES FROM "WHITE OAK TOWN CENTER TRAFFIC STATEMENT" (MONTGOMERY COUNTY PLANNING BOARD)

* THE VOLUME OF THE WHITE OAK APARTMENTS DEVELOPMENT COMES FROM THE MONTGOMERY COUNTY PLANNING BOARD MEMO

FIGURE 9: VOLUME MAP – 2045 NEW DEVELOPMENTS TRIPS
SCALE : N.T.S.

LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

BY: kyle –

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FIGURE 9

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5. Signal Warrant Analysis

Signal warrant analysis were conducted at the intersections of Study Intersection 1 (Old Columbia Pike at Stewart Lane), Study Intersection 2 (Old Columbia Pike at Industrial Parkway), Study Intersection 3 (Old Columbia Pike / Prosperity Drive at Tech Road), Study Intersection 4 (Prosperity Drive at Whitethorn Court), and Study Intersection 5 (Prosperity Drive at Prosperity Terrace). Study Intersection 6 (Prosperity Drive at Cherry Hill Road) was not analyzed as it is already a signalized intersection.

Signal warrant analysis follows the nationally accepted *Manual of Uniform Traffic Control Devices (MUTCD)* as the guideline for the installation of traffic signals. In signal warrant analysis, numerous factors are evaluated including traffic volumes, delay, accident history, vehicle speed (85th percentile), and pedestrian volumes.

The below tables summarize the signal warrants while the full detailed signal warrants can be seen in **Appendix F.**

5.1. Old Columbia Pike at Stewart Lane

The signal warrant analysis at Old Columbia Pike at Stewart Lane was performed using the 13-hour traffic count collected on Tuesday, March 8, 2022. As shown in **Table 11**, zero (0) of the nine (9) signal warrants provided in the MUTCD are met.

Table 11 – Study Intersection 1 Signal Warrant Analysis

MUTCD Warrant	Criteria			No. of Hours Meets Criteria (Warrants 1, 2, 4) Actual Condition (Warrant 3)	Warrant Criteria Met?
	Major Street Volume (VPH)	Minor Street Volume (VPH)	No. of Hours Required		
1-Eight Hour Vehicular Volume (Any of the three conditions must be met)					
Cond. A–Min. Vehicular Volume	500	150	8 hours	0 hours	No
Cond. B-Interruption of Cont. Traffic	750	75	8 hours	3 hours	No
Cond C-Combination of Conditions 80% of Condition A 80% of Condition B	400 600	120 60	8 hours	5 hours	No
2-Four-Hour Vehicular Volume (see Figure 4C-1)			4 hours	0 hours	No
3-Peak Hour (**Either** of the two conditions must be met) (*this intersection is not considered unusual*)					
Condition A	Delay >4 Veh.-Hrs Approach Vol. >4 100 vph Entering Volume >4 800 vph		1 hour	N/A	N/A
Condition B	(see Figure 4C-3)		1 hour	N/A	N/A
4-Pedestrian Volume (**Both** of the two conditions must be met)					
Condition A	(See Figure 4C-5)		1 hour	0 hours	No
Condition B	(See Figure 4C-7)		1 hour	0 hours	No
5-School Crossing	# Adequate Gaps During x-Minute Time Periods < x Minutes			-	No
6- Coordinated Signal System	(Refer to MUTCD Section 4C.07)			-	No

7-Crash Experience	(Refer to MUTCD Section 4C.08)	-	No
8-Roadway Network	(Refer to MUTCD Section 4C.09)	-	No
9-Intersection Near a Grade Crossing	(Refer to MUTCD Section 4C.10)	-	No

5.2. Old Columbia Pike at Industrial Parkway

The signal warrant analysis at Old Columbia Pike at Industrial Parkway was performed using the 13-hour traffic count collected on Tuesday, March 8, 2022. As shown in **Table 12**, zero (0) of the nine (9) signal warrants provided in the MUTCD are met.

Table 12 – Study Intersection 2 Signal Warrant Analysis

MUTCD Warrant	Criteria			No. of Hours Meets Criteria (Warrants 1, 2, 4) Actual Condition (Warrant 3)	Warrant Criteria Met?
	Major Street Volume (VPH)	Minor Street Volume (VPH)	No. of Hours Required		
1-Eight Hour Vehicular Volume (Any of the three conditions must be met)					
Cond. A–Min. Vehicular Volume	600	150	8 hours	0 hours	No
Cond. B-Interruption of Cont. Traffic	900	75	8 hours	0 hours	No
Cond C-Combination of Conditions 80% of Condition A 80% of Condition B	480 720	120 60	8 hours	0 hours	No
2-Four-Hour Vehicular Volume (see Figure 4C-1)			4 hours	0 hours	No
3-Peak Hour (**Either** of the two conditions must be met) (*this intersection is not considered unusual*)					
Condition A	Delay >4 Veh.-Hrs Approach Vol. >4 100 vph Entering Volume >4 800 vph		1 hour	N/A	N/A
Condition B	(see Figure 4C-3)		1 hour	N/A	N/A
4-Pedestrian Volume (**Both** of the two conditions must be met)					
Condition A	(See Figure 4C-5)		1 hour	0 hours	No
Condition B	(See Figure 4C-7)		1 hour	0 hours	No
5-School Crossing	# Adequate Gaps During x-Minute Time Periods < x Minutes			-	No
6- Coordinated Signal System	(Refer to MUTCD Section 4C.07)			-	No
7-Crash Experience	(Refer to MUTCD Section 4C.08)			-	No
8-Roadway Network	(Refer to MUTCD Section 4C.09)			-	No
9-Intersection Near a Grade Crossing	(Refer to MUTCD Section 4C.10)			-	No

5.3. Old Columbia Pike at Tech Road

The signal warrant analysis at Old Columbia Pike / Prosperity Drive at Tech Road was performed using the 13-hour traffic count collected on Tuesday, March 8, 2022. As shown in **Table 13**, one (1) of the nine (9) signal warrants provided in the MUTCD are met.

Table 13 –Study Intersection 3 Signal Warrant Analysis

MUTCD Warrant	Criteria: Major Street Volume (VPH)	Criteria: Minor Street Volume (VPH)	Criteria: No. of Hours Required	No. of Hours Meets Criteria (Warrants 1, 2, 4) Actual Condition (Warrant 3)	Warrant Criteria Met?
1-Eight Hour Vehicular Volume (Any of the three conditions must be met)					
Cond. A–Min. Vehicular Volume	600	150	8 hours	0 hours	No
Cond. B-Interruption of Cont. Traffic	900	75	8 hours	10 hours	Yes
Cond C-Combination of Conditions 80% of Condition A 80% of Condition B	N/A (Do no need to do since Cond. B was met)				N/A
2-Four-Hour Vehicular Volume (see Figure 4C-1)			4 hours	1 hours	No
3-Peak Hour (**Either** of the two conditions must be met) (*this intersection is considered unusual*)					
Condition A	Delay >4 Veh.-Hrs Approach Vol. >4 100 vph Entering Volume >4 800 vph		1 hour	N/A	No
Condition B	(see Figure 4C-3)		1 hour	N/A	No
4-Pedestrian Volume (**Both** of the two conditions must be met)					
Condition A	(See Figure 4C-5)		1 hour	0 hours	No
Condition B	(See Figure 4C-7)		1 hour	0 hours	No
5-School Crossing	# Adequate Gaps During x-Minute Time Periods < x Minutes			-	No
6- Coordinated Signal System	(Refer to MUTCD Section 4C.07)			-	No
7-Crash Experience	(Refer to MUTCD Section 4C.08)			-	No
8-Roadway Network	(Refer to MUTCD Section 4C.09)			-	No
9-Intersection Near a Grade Crossing	(Refer to MUTCD Section 4C.10)			-	No

5.4. Prosperity Drive at Whitethorn Ct

The signal warrant analysis at Prosperity Drive at Whitethorn Court was performed using the 13-hour traffic count collected on Tuesday, March 8, 2022. As shown in **Table 14**, zero (0) of the nine (9) signal warrants provided in the MUTCD are met.

Table 14 – Study Intersection 4 Signal Warrant Analysis

MUTCD Warrant	Criteria: Major Street Volume (VPH)	Criteria: Minor Street Volume (VPH)	Criteria: No. of Hours Required	No. of Hours Meets Criteria (Warrants 1, 2, 4) Actual Condition (Warrant 3)	Warrant Criteria Met?
1-Eight Hour Vehicular Volume (Any of the three conditions must be met)					
Cond. A–Min. Vehicular Volume	500	150	8 hours	0 hours	No
Cond. B-Interruption of Cont. Traffic	750	75	8 hours	0 Hours	No
Cond C-Combination of Conditions 80% of Condition A	400 600	120 60	8 hours	0 hours	No

80% of Condition B					
2-Four-Hour Vehicular Volume (see Figure 4C-1)			4 hours	0 hours	No
3-Peak Hour (**Either** of the two conditions must be met) (*this intersection is not considered unusual*)					
Condition A	Delay >4 Veh.-Hrs Approach Vol. >4 100 vph Entering Volume >4 800 vph		1 hour	N/A	N/A
Condition B	(see Figure 4C-3)		1 hour	N/A	N/A
4-Pedestrian Volume (**Both** of the two conditions must be met)					
Condition A	(See Figure 4C-5)		1 hour	0 hours	No
Condition B	(See Figure 4C-7)		1 hour	0 hours	No
5-School Crossing	# Adequate Gaps During x-Minute Time Periods < x Minutes			-	No
6- Coordinated Signal System	(Refer to MUTCD Section 4C.07)			-	No
7-Crash Experience	(Refer to MUTCD Section 4C.08)			-	No
8-Roadway Network	(Refer to MUTCD Section 4C.09)			-	No
9-Intersection Near a Grade Crossing	(Refer to MUTCD Section 4C.10)			-	No

5.5. Prosperity Drive at Prosperity Terrace

The signal warrant analysis at Prosperity Drive at Prosperity Terrace was performed using the 13-hour traffic count collected on Tuesday, March 15, 2022. As shown in **Table 15**, zero (0) of the nine (9) signal warrants provided in the MUTCD are met.

Table 15 – Study Intersection 5 Signal Warrant Analysis

MUTCD Warrant	Criteria			No. of Hours Meets Criteria (Warrants 1, 2, 4) Actual Condition (Warrant 3)	Warrant Criteria Met?
	Major Street Volume (VPH)	Minor Street Volume (VPH)	No. of Hours Required		
1-Eight Hour Vehicular Volume (Any of the three conditions must be met)					
Cond. A–Min. Vehicular Volume	600	150	8 hours	0 hours	No
Cond. B-Interruption of Cont. Traffic	900	75	8 hours	0 hours	No
Cond C-Combination of Conditions 80% of Condition A 80% of Condition B	480 720	120 60	8 hours	0 hours	No
2-Four-Hour Vehicular Volume (see Figure 4C-1)			4 hours	0 hours	No
3-Peak Hour (**Either** of the two conditions must be met) (*this intersection is not considered unusual*)					
Condition A	Delay >4 Veh.-Hrs Approach Vol. >4 100 vph Entering Volume >4 800 vph		1 hour	N/A	N/A
Condition B	(see Figure 4C-3)		1 hour	N/A	N/A
4-Pedestrian Volume (**Both** of the two conditions must be met)					
Condition A	(See Figure 4C-5)		1 hour	0 hours	No
Condition B	(See Figure 4C-7)		1 hour	0 hours	No
5-School Crossing	# Adequate Gaps During x-Minute Time Periods < x Minutes			-	No
6- Coordinated Signal System	(Refer to MUTCD Section 4C.07)			-	No

7-Crash Experience	(Refer to MUTCD Section 4C.08)	-	No
8-Roadway Network	(Refer to MUTCD Section 4C.09)	-	No
9-Intersection Near a Grade Crossing	(Refer to MUTCD Section 4C.10)	-	No

5.6. Summary of Signal Warrants

Of the five (5) study intersections the signal warrant analysis was performed on, only one (1) intersection met the warrant. As Study Intersection 3 (Old Columbia Pike / Prosperity Drive at Tech Road) only Warrant 1 (Eight-Hour Vehicular Volume), Condition B was met. This is likely due to the high number of vehicles traveling on Tech Road to either continue to Broadbirch Drive or the high number of restaurants / shopping center in the area.

Although, at Study Intersection 3 (Old Columbia Pike / Prosperity Drive at Tech Road), Warrant 1 is met, the installation of a traffic control signal is not suggested. According to section *4C.01 in the MUTCD* "the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal". A traffic control signal is not suggested due to the close proximity of the existing intersection of US 29 (Columbia Pike at Tech Road), unless the intersection is clustered into the signalized intersection of US 29 at Tech Road. Old Columbia Pike / Prosperity Terrance essentially acts as an extended storage lane of the existing US 29 (Columbia Pike) intersection.

Table 16 –Signal Warrant Analysis Summary

Intersection	Warrant Number								
	1	2	3	4	5	6	7	8	9
Old Columbia Pike at Stewart Lane (1)	No	No	No	No	No	No	No	No	No
Old Columbia Pike at Industrial Parkway (2)	No	No	No	No	No	No	No	No	No
Old Columbia Pike at Tech Road (3)	Yes	No	No	No	No	No	No	No	No
Prosperity Drive at Whitethorn Court (4)	No	No	No	No	No	No	No	No	No
Prosperity Drive at Prosperity Terrace (5)	No	No	No	No	No	No	No	No	No

6. Concept Alternatives

Four (4) concept alternatives are analyzed in this study and are described below. One-way southbound across the bridge P-30 was considered, however this alternative was ultimately dropped as the existing bridge has previously been rated as a poor condition, and a new bridge would be needed in order to carry any vehicular traffic. If a new bridge is to be constructed it would be more beneficial to allow two-way multiple lanes of traffic, as seen in Alternative 3 and Alternative 4 below.

6.1. Alternative 1: 2045 No-Build (with Developments)

Alternative 1 will keep the existing two-way two-lane operation along the study corridor and keep adjacent crossing roads as is, except for the Stewart Lane intersection area, which will be changed by the Stewart Lane roadway improvement project (Contract # MO8445176) and is expected to be completed prior to 2045. The White Oak Town Center and White Oak Apartments are also considered completed.

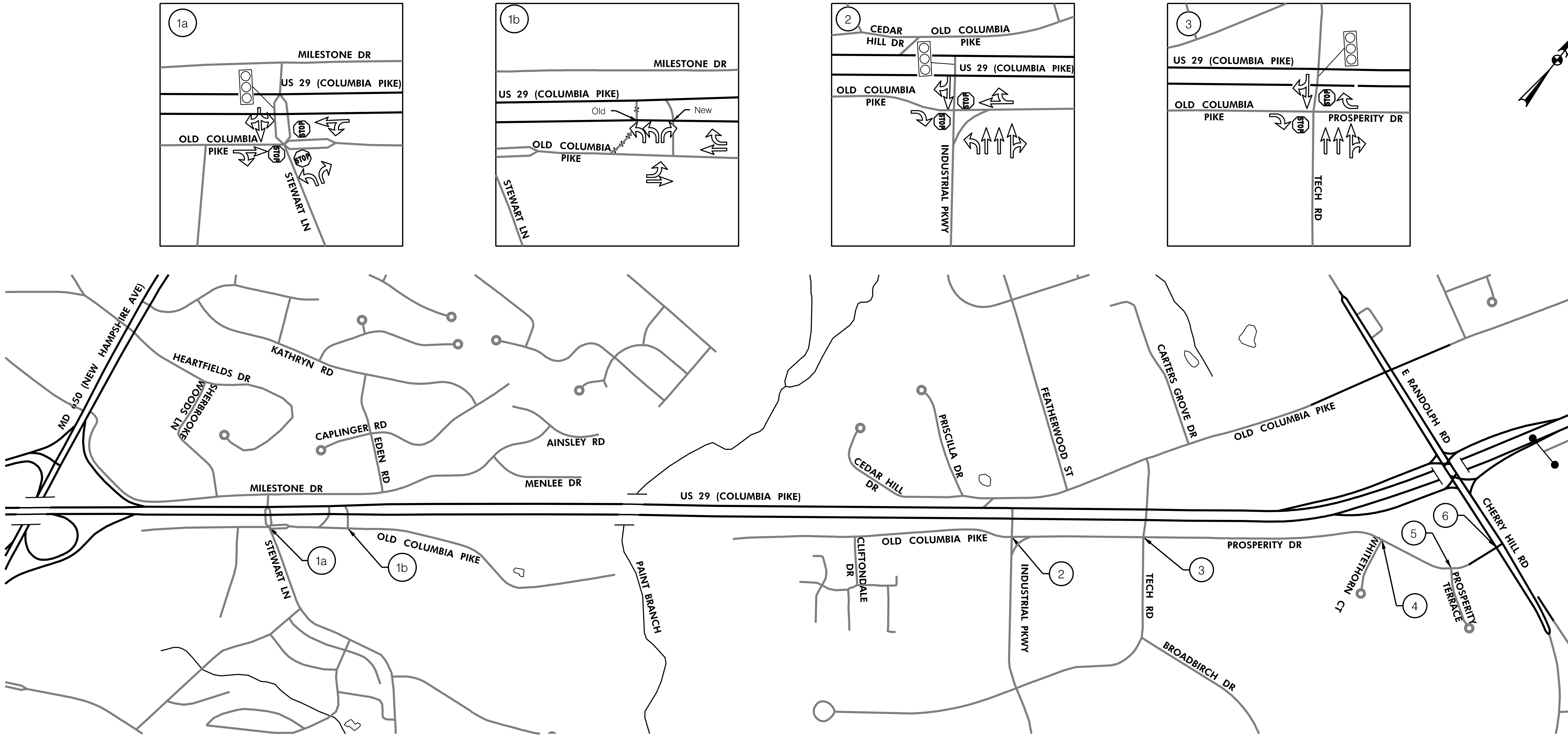
Bridge No. P-30 over Paint Branch will remain closed in this alternative. The lane configurations can be seen in **Figure 10**.

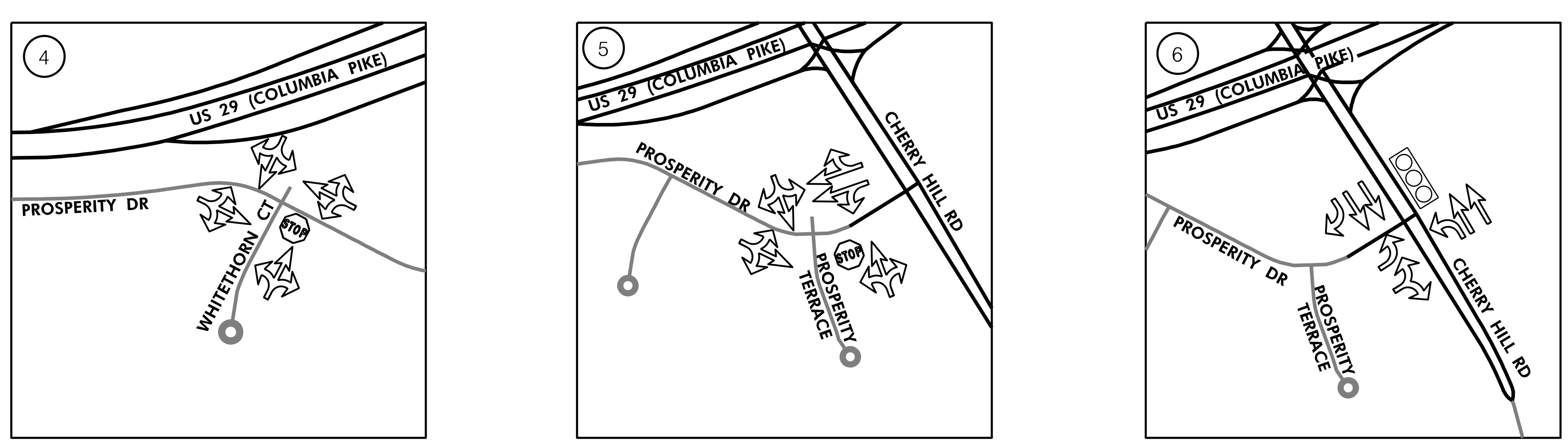
The volumes for 2045 Alternative 1 are predicted from the existing 2022 volumes with MWCOG growth rates and include the traffic generated from the new developments of White Oak Town Center and White Oak Apartment (See Section 4.3 Future Traffic Summary). The volumes for Alternative 1 can be seen in **Figure 11**.

6.2. Alternative 2: 2045 (Intersection Improvements with Added Sidewalk and Side Path)

Compared to Alternative 1 which has no proposal for roadway changes between Industrial Parkway and Cherry Hill Road, Alternative 2 proposes following modifications at study intersections to improve overall safety and operations:

1. The intersections of US 29 and Old Columbia Pike at Industrial Parkway will be clustered together to act as one signalized intersection with the modifications:
    - Moves westbound stop line at US 29 east approximately 120 feet to effectively “include” Old Columbia Pike within the larger signalized intersection.
    - Reduces right turn lanes from northbound US 29 to eastbound Industrial Parkway from two lanes to one lane, remains signalized.
    - Provides raised median along Industrial Parkway from Old Columbia Pike to the proposed Spine Road with an opening at the VEIP station.
    - Removes the existing channelized right turn from Industrial Parkway westbound to Old Columbia Pike northbound.
    - Proposes a new barrier/channelizing island between Old Columbia Pike and US 29 to separate the westbound left and right turn lanes and provide the waiting





LEGEND

= SIGNALIZED INTERSECTION

STOP = UNSIGNALIZED INTERSECTION

FIGURE 10: LANE CONFIGURATION – 2045 ALTERNATIVE 1
SCALE : N.T.S.

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OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 10

SCALE N.T.S. ADVERTISED DATE ____ CONTRACT NO. 1111496

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MDE/PRD ____

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BY: kyle –

PLOTTED: 3/10/2023
FILE: T:\Traffic\Reports\2022\WRA\MCDOT_111149 Task 6_Old Columbia Pike Corridor\3 Designs\pTD-P010_Ln Configuration 2045 Alt 1.dgn

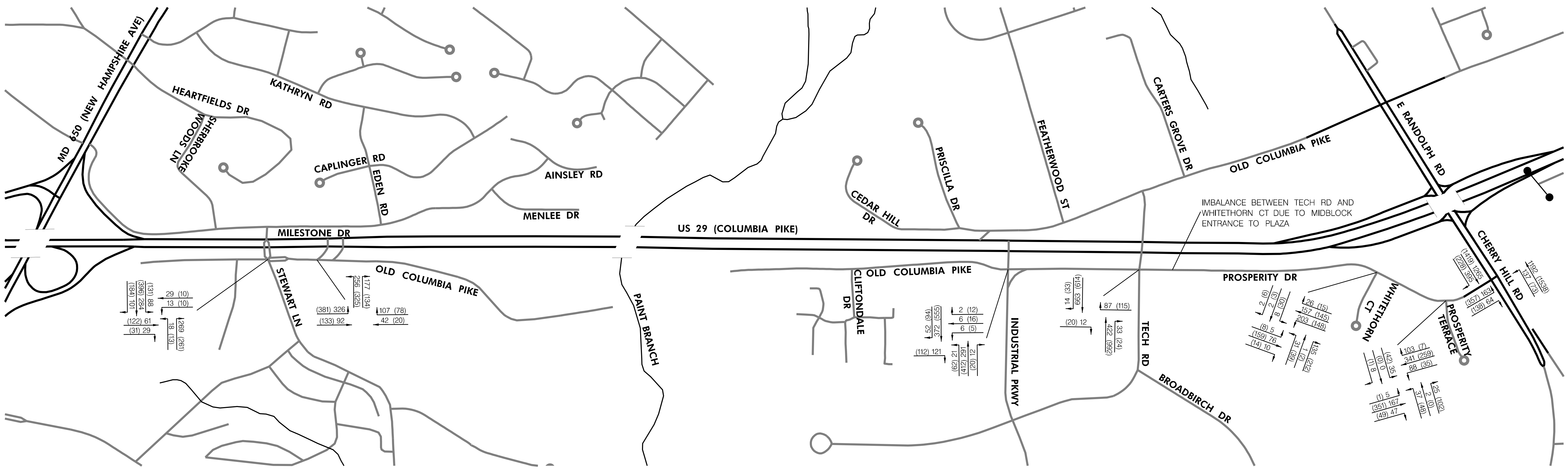

FIGURE 11: VOLUME MAP – 2045 ALTERNATIVE 1

SCALE : N.T.S.

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OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 11

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LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

BY: kyle –

PLOTTED: 7/12/2023

FILE: T:\Traffic\Reports\2022\WRA\MCDOT_111149 Task 6_Old Columbia Pike Corridor\3 Designs\pTD-P011_Volume 2045 Alt 1.dgn area for pedestrian before crossing US 29 northbound lanes or the Industrial Parkway westbound right-turn lane.

- Applies mountable truck apron at southeast and northeast corners of Old Columbia Pike and Industrial Parkway intersection to comply with Montgomery County protected intersection design.
- Provides protected right turns from Old Columbia Pike to Industrial Parkway.
- Improve the pedestrian connections and provides signalized pedestrian crossing across east and north legs of intersection of Industrial Parkway at Old Columbia Pike.

2. The intersections of US 29 and Old Columbia Pike/Prosperity Drive at Tech Road will be clustered together to act as one signalized intersection with the modifications:
    - Moves westbound stop line at US 29 east approximately 110 feet to effectively "include" Old Columbia Pike/Prosperity Drive within the larger signalized intersection.
    - Reduces eastbound approach of Tech Road and Old Columbia Pike/Prosperity Drive intersection from two lanes to one lane.
    - Proposes a new barrier/channelizing island between Old Columbia Pike and US 29 to separate the westbound thru/left and right turn lanes and provide the waiting area for pedestrian before crossing US 29 northbound lanes or the Tech Road westbound right-turn lane.
    - Provides raised median for southbound approach of Tech Road and Old Columbia Pike intersection from the intersection to the shopping center entrance.
    - Applies mountable truck apron at southeast and northeast corners of Old Columbia Pike/Prosperity Drive and Tech Road intersection to comply with Montgomery County protected intersection design.
    - Improve the pedestrian connections and signalize the pedestrian crosswalks across east and north legs of Tech Road and Old Columbia Pike/ Prosperity Drive intersection.
    - Install flex tubulars along the centerline from US 29 to the existing entrance of M&T Bank.
    - Provides protected right turns from Old Columbia Pike/ Prosperity Drive to Tech Rd.
    - Signalizes the US 29 northbound right turn movement.
3. Add both northbound and southbound left turn bays for the intersections along Prosperity Drive at Whitethorn Court and Prosperity Terrace.

4. Reconfigure the south leg into three northbound lanes and one southbound receiving lane to add a northbound left turn bay at the intersection of Cherry Hill Road and Prosperity Drive.

In addition to the proposed modifications of roadways and installation of sidewalks, Alternative 2 incorporates enhancements for pedestrians and cyclists, installing complete connections for providing thorough pedestrian path at the specific locations:

1. Industrial Parkway at Old Columbia Pike Intersection
   - Introduce signalized pedestrian crossing and connections across the east leg.
   - Install a signalized crosswalk across the north leg and connection path to US 29.
   - Install the curb bump-out to shorten the crossing distance of north leg.
   - Establish a crosswalk across the westbound right turn lane at the intersection of Industrial Parkway at US 29.
   - Feature a refuge area in the proposed channelization island to facilitate a safe continuous pedestrian movement to the crosswalk across the US 29 northbound.
2. Tech Road at Old Columbia Pike intersection
   - Signalize the crosswalks across the east leg and north leg.
   - Install the curb bump-out and median along Prosperity Drive to shorten the crossing distance of north leg.
   - Establish a crosswalk across the westbound right turn lane at the intersection of Tech Road at US 29.
   - Feature a refuge area in the proposed channelization island to facilitate a safe continuous pedestrian movement to the crosswalk across the US 29 northbound.

Bridge No. P-30 over Paint Branch will remain closed in this alternative. The lane configurations can be seen in **Figure 12**. The volumes of Alternative 2 and the concept roadway geometry and traffic operation between the Industrial Parkway and Tech Road are shown in **Figure 13**.

6.3. Alternative 3: 2045 (Alternative 2 with Bridge Open to Traffic)

Alternative 3 is similar to that of Alternative 2, except the bridge over Paint Branch will be opened to allow for two-way two-lane configuration. The lane configurations at the intersections are the same as Alternative 2 and can be seen in **Figure 12**.

With the opening of the bridge over Paint Branch to motorized traffic, it’s discussed and agreed that 30% traffic increase is assumed for both directions along Old Columbia Pike between Stewart Lane and Industrial Parkway. The volumes of Alternative 3 will have slight changes from the new traffic configurations compared to that of Alternative 2, which can be seen in **Figure 14**.

LEGEND

= SIGNALIZED INTERSECTION

STOP = UNSIGNALIZED INTERSECTION

FIGURE 12: LANE CONFIGURATION – 2045 ALTERNATIVES 2 AND 3

SCALE : N.T.S.

MONTGOMERY COUNTY MARYLAND 1776

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FIGURE 12

SCALE N.T.S. ADVERTISED DATE ________ CONTRACT NO. 1111496

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PLOTTED: 1/12/2024

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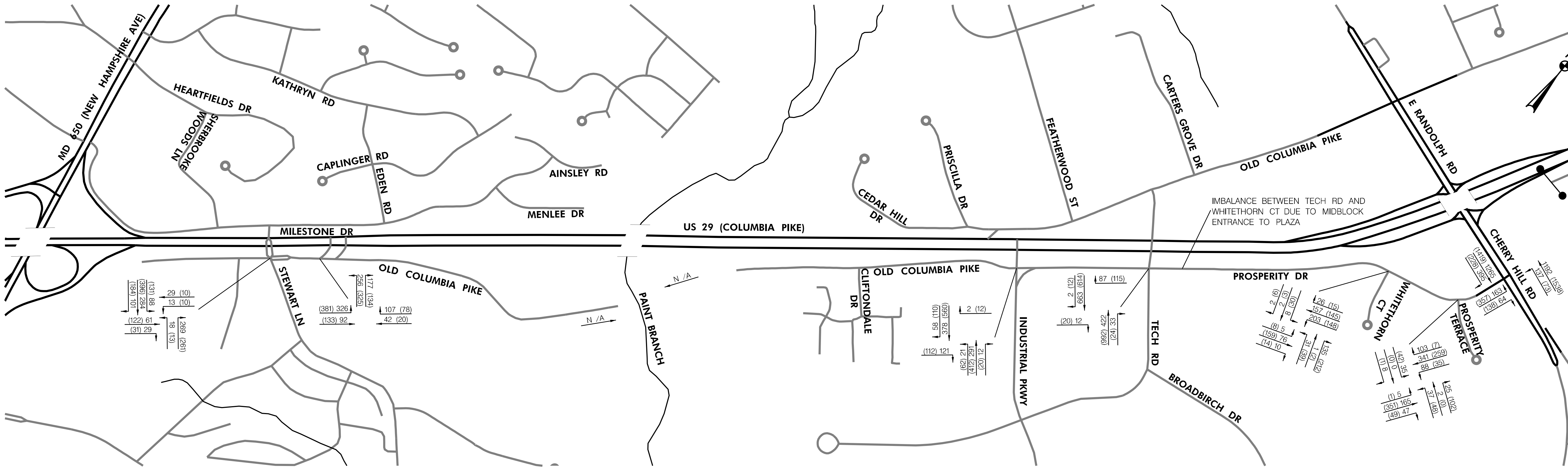
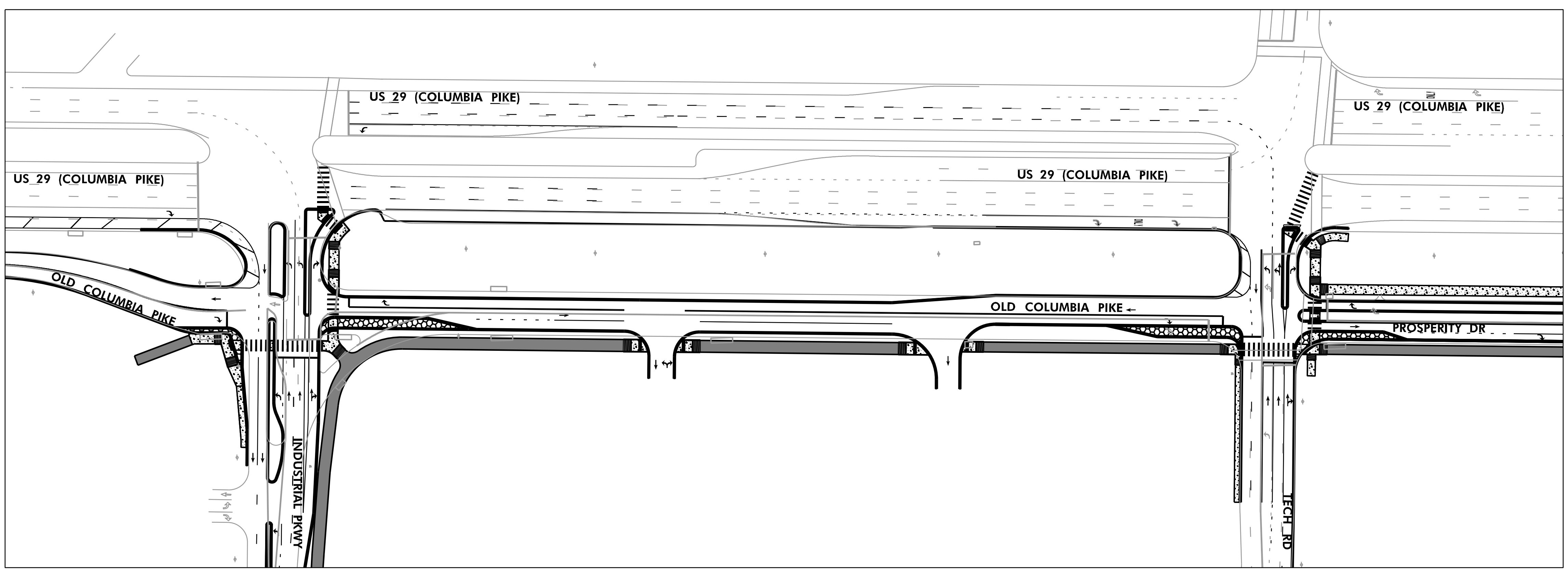


FIGURE 13: VOLUME MAP – 2045 ALTERNATIVE 2

SCALE : N.T.S.



PROPOSED MODIFICATIONS AND OPERATION
BETWEEN INDUSTRIAL PARKWAY AND TECH ROAD

LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

MONTGOMERY COUNTY 1776 MARYLAND

FIGURE 13

SCALE N.T.S. ADVERTISED DATE ______ CONTRACT NO. 1111496

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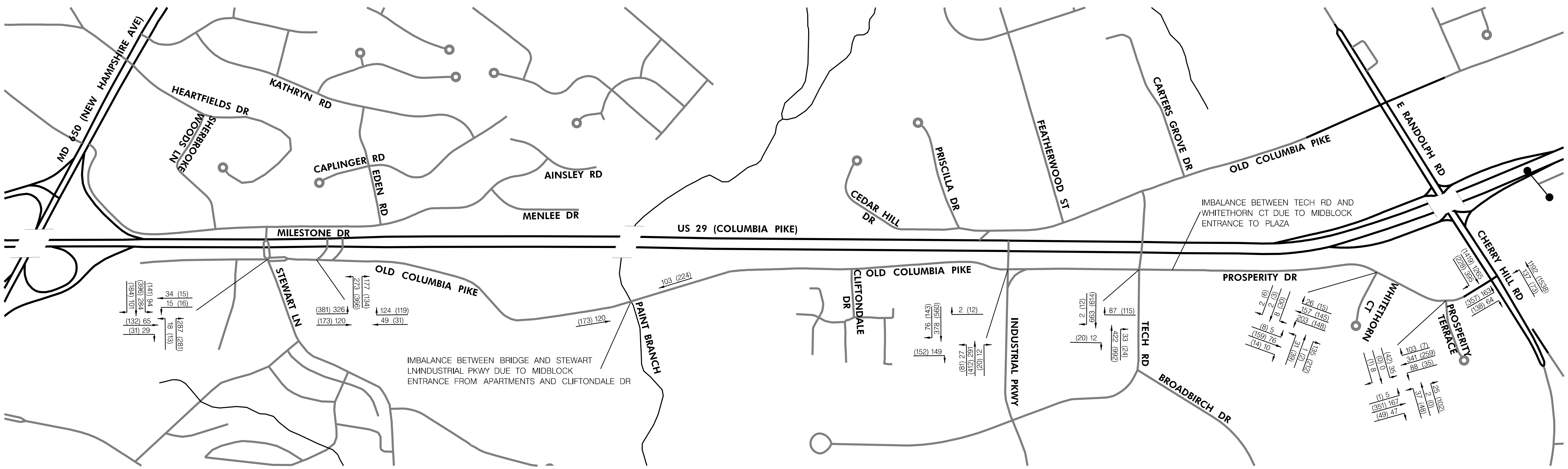

FIGURE 14: VOLUME MAP – 2045 ALTERNATIVES 3 AND 4

SCALE : N.T.S.

TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 14

SCALE N.T.S. ADVERTISED DATE ________ CONTRACT NO. 1111496

DESIGNED BY ________ COUNTY MONTGOMERY

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LEGEND

XXX (XXX) PEAK VOLUME AM (PM)

BY: kyle –

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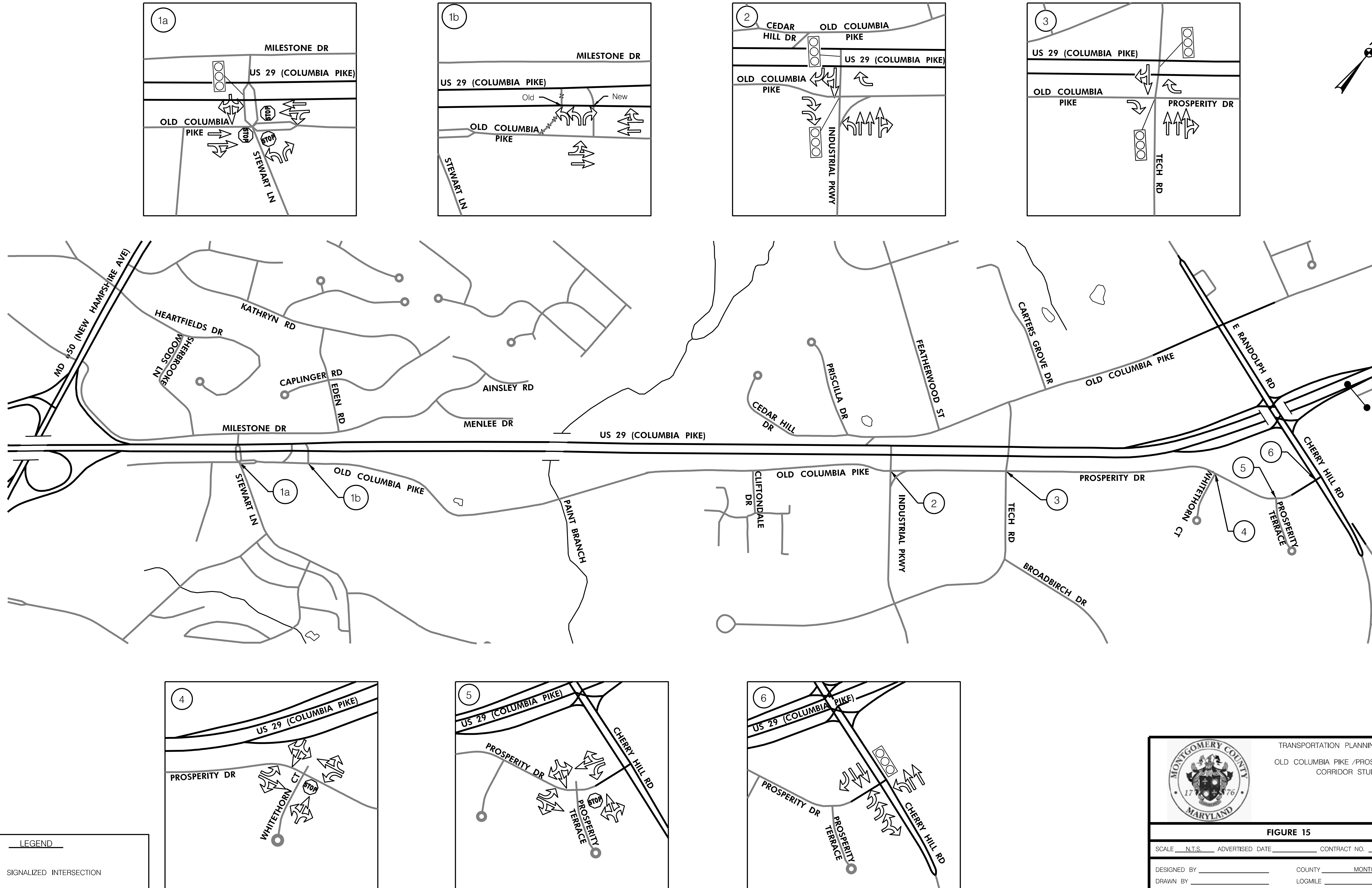
6.4. Alternative 4: 2045 (Four-Lanes with Bridge Open to Traffic)

Alternative 4 will expand Old Columbia Pike into two-way four-lane between Stewart Lane and Industrial Parkway. In addition, the bridge over Paint Branch will be opened to allow for two-way four-lane configuration in this alternative. The lane configurations have minor changes compared to Alternatives 3, with only an additional lane in both the northbound and southbound directions but no change at the study intersections, which can be seen in **Figure 15**.

The volumes for Alternative 4 are the same as Alternative 3 as shown in **Figure 14**.

The volume analysis and development of alternatives can be seen in **Appendix G**.



LEGEND

= SIGNALIZED INTERSECTION

= UNSIGNALIZED INTERSECTION

FIGURE 15: LANE CONFIGURATION – 2045 ALTERNATIVE 4

SCALE : N.T.S.

BY: kyle –

TRANSPORTATION PLANNING DIVISION

OLD COLUMBIA PIKE /PROSPERITY DRIVE CORRIDOR STUDY

FIGURE 15

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7. Capacity and Queuing Analysis

In this study, Level of Service (LOS) is evaluated using Synchro 11 software. The queue lengths are evaluated from SimTraffic 11 software. LOS measures the operating conditions occurring at an intersection under different volumes of traffic. It is defined in the "Highway Capacity Manual" by six levels, "A" through "F." Depending on the time of day and year, an intersection may operate at varying levels. LOS "A" represents the best operating conditions from traveler's perspective and LOS "F" represents the worst. All SimTraffic results are based on five 60-minute runs and 15-minute seed intervals.

Study intersection 1a (Old Columbia Pike at Stewart Lane) and Study intersection 1b (Old Columbia Pike at Dow Jones Lot) are unable to use typical HCM 2000, HCM 6, or HCM 2010 methodologies because they are not two-way, or four-way stop controlled but abnormal three-way stop controlled. Instead, ICU methodology, defined as "takes a sum of the critical movements' volume to saturation flow rates" in Synchro 11 manual, will be used for evaluating these intersections for the 2022 existing condition and 2045 future conditions. Study intersections 2 (Old Columbia Pike at Industrial Parkway) and 3 (Old Columbia Pike / Prosperity Drive at Tech Road) are two-way controlled in 2022 existing condition and 2045 no-build condition (Alternative 1) and will be evaluated with HCM 2010 Methodologies. However, they are both signalized and clustered to the adjacent US 29 intersections in 2045 build conditions (Alternatives 2 - 4) so HCM 2000 methodology will be used.

In summary, HCM 2000 methodologies will be used for signalized intersections and HCM 2010 methodologies will be used for unsignalized intersections, with the exception of study Intersections 1a and 1b, which will be using ICU methodology.

7.1. Existing Condition Analysis

Table 17 shows a summary of the capacity analysis from Synchro outputs. Detailed outputs can be seen in **Appendix H**. From the results, all study intersections operate at LOS C or better for the AM and PM peak period. The LOS C of study intersections 5 and 6 is consistent with the field observations, where motorists are leaving nearby business to go home from work. LOS of other intersections match with the field observations as well.

Table 17 – 2022 Existing Capacity Analysis Results from Synchro

Study Intersection	Existing Condition LOS	
	AM	PM
(1a) Old Columbia Pike at Stewart Lane	A	B
(1b) Old Columbia Pike at Dow Jones Lot	A	A
(2) Old Columbia Pike at Industrial Parkway	A	A
(3) Old Columbia Pike / Prosperity Drive at Tech Road	A	A
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	C
(6) Prosperity Drive at Cherry Hill Road	B	C

Table 18 shows a summary of the queueing analysis from SimTraffic outputs. Detailed outputs can be seen in **Appendix I**. From the results, the 95th percentile queue during the PM peak period exceeds the available storage length for the westbound left-turn at the Old Columbia Pike at Industrial Parkway intersection, which is due to the small left turn storage bay. This is not considered an issue because the backfill will wait in the adjacent through

lane queue. Additionally, the 95th percentile queue during the PM peak period for northbound Prosperity Drive traffic extends close to the adjacent Prosperity Terrance intersection, which is approximately 325 feet south of the Cherry Hill Road intersection. This matches the field observation of the long queue and cycle failure during the PM peak, see section 2.3.

Table 18 – 2022 Existing Queue Analysis Results from SimTraffic

Approach Turns	Storage Bay Length (ft)	Avg. Queue Length (ft)		Max Queue Length (ft)		95th Percentile Queue Length (ft)	
		AM	PM	AM	PM	AM	PM
Old Columbia Pike at Stewart Lane							
EB (Left+Thru)	-	< 20	< 20	59	36	40	36
EB (Right)	-	< 20	< 20	25	< 20	< 20	< 20
WB (Left)	-	< 20	< 20	339	26	29	22
WB (Right)	250 feet	42	45	93	108	73	80
NB (Thru+Right)	-	< 20	31	49	87	34	68
SB (Left+Thru+Right)	-	74	46	218	140	168	105
Old Columbia Pike at Dow Jones Lot							
NB (Left)	150 feet	< 20	< 20	86	77	54	57
NB (Thru)	-	-	-	-	-	-	-
SB (Thru)	-	30	28	67	75	59	60
Old Columbia Pike at Industrial Parkway							
EB (Thru+Right)	-	< 20	< 20	29	59	20	31
WB (Left)	50 feet	< 20	< 20	65	66	28	63
WB (Thru)	-	76	149	198	281	167	270
WB (Thru+Right)	150 feet	< 20	< 20	50	123	27	94
NB (Right)	-	25	23	64	54	44	40
SB (Left+Thru+Right)	-	< 20	< 20	29	50	29	42
Old Columbia Pike / Prosperity Drive at Tech Road							
EB (Thru+Right)	-	< 20	< 20	35	36	< 20	< 20
WB (Thru)	-	159	471	293	498	258	487
WB (Thru+Right)	-	87	467	243	484	216	480
NB (Right)	-	< 20	< 20	26	30	23	29
SB (Right)	-	33	90	84	263	60	227
Prosperity Drive at Whitethorn Court							
EB (Left+Thru+Right)	-	< 20	22	30	45	30	47
WB (Left+Thru+Right)	-	42	51	84	88	69	80
NB (Left+Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left+Thru+Right)	-	< 20	< 20	47	43	34	40
Prosperity Drive at Prosperity Terrace							
EB (Left+Thru+Right)	-	< 20	< 20	51	45	38	38
WB (Left+Thru+Right)	-	29	39	70	72	56	63
NB (Left+Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left+Thru)	-	< 20	< 20	49	35	39	33
SB (Thru+Right)	-	< 20	< 20	< 20	21	< 20	< 20
Prosperity Drive at Cherry Hill Road							
EB (Thru)	-	109	152	247	296	218	248
EB (Right)	250 feet	32	23	84	73	70	57
WB (Left)	400 feet	48	35	99	87	85	72
WB (Thru)	-	71	110	157	198	143	173
NB (Left)	-	69	148	171	264	137	243
NB (Left+Thru)	-	81	174	170	282	154	269

Red=95th Percentile Queue Exceeds the Available Storge Lane

7.2. Alternative 1: 2045 No-Build Analysis

Table 19 shows a summary of the capacity analysis from Synchro outputs. Detailed outputs can be seen in **Appendix H**. From the results, the LOS of some of the study intersections worsened, likely due to fact of the volume growth from 2022 to 2045 while the geometry and capacity of the study intersections remained the same.

Table 19 – 2045 Alternative 1 Capacity Analysis Results from Synchro

Study Intersection	Alt. 1 Condition LOS	
	AM	PM
(1a) Old Columbia Pike at Stewart Lane	A	C
(1b) Old Columbia Pike at Dow Jones Lot	A	A
(2) Old Columbia Pike at Industrial Parkway	A	A
(3) Old Columbia Pike / Prosperity Drive at Tech Road	A	A
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	E
(6) Prosperity Drive at Cherry Hill Road	B	D

Table 20 shows a summary of the queueing analysis from SimTraffic outputs. Detailed outputs can be seen in **Appendix I**. From the results, the 95th percentile queue during the PM peak period exceeds the available storage length for the westbound left-turn and right-turn at the Old Columbia Pike at Industrial Parkway intersection, which is due to the small left turn storage bay and the 20 plus year traffic growth increase. This is not considered an issue because the backfill will wait in the adjacent through lane queue. Additionally, the 95th percentile queue during the PM peak period for northbound Prosperity Drive traffic extends beyond the adjacent Prosperity Terrance intersection.

Table 20 – 2045 Alternative 1 Queue Analysis Results from SimTraffic

Approach Turns	Storage Bay Length (ft)	Avg. Queue Length (ft)		Max Queue Length (ft)		95th Percentile Queue Length (ft)	
		AM	PM	AM	PM	AM	PM
Old Columbia Pike at Stewart Lane							
EB (Left+Thru)	-	< 20	< 20	58	35	39	41
EB (Right)	-	< 20	< 20	21	< 20	< 20	< 20
WB (Left)	-	< 20	< 20	26	35	27	23
WB (Right)	250 feet	45	55	100	121	78	94
NB (Thru+Right)	-	18	39	66	100	41	79
SB (Left+Thru+Right)	-	< 20	< 20	32	27	25	21
Old Columbia Pike at Dow Jones Lot							
NB (Left)	450 feet	49	103	184	251	134	216
SB (Thru)	-	25	< 20	57	48	51	44
SB (Right)	275 feet	50	48	121	132	94	97
Old Columbia Pike at Industrial Parkway							
EB (Thru+Right)	-	< 20	< 20	40	69	20	57
WB (Left)	50 feet	< 20	30	65	75	39	82
WB (Thru)	-	138	362	295	684	258	639
WB (Thru+Right)	150 feet	21	58	186	188	105	178
NB (Right)	-	29	31	61	82	54	61

SB (Left+Thru+Right)	-	< 20	24	33	63	34	54
Old Columbia Pike / Prosperity Drive at Tech Road							
EB (Thru+Right)	-	< 20	< 20	31	52	< 20	26
WB (Thru)	-	280	469	436	493	446	481
WB (Thru+Right)	-	215	468	406	486	361	481
NB (Right)	-	< 20	< 20	26	31	25	34
SB (Right)	-	41	99	106	244	83	213
Prosperity Drive at Whitethorn Court							
EB (Left+Thru+Right)	-	< 20	25	30	62	30	50
WB (Left+Thru+Right)	-	44	54	104	109	76	90
NB (Left+Thru+Right)	-	< 20	< 20	< 20	32	< 20	< 20
SB (Left+Thru+Right)	-	16	21	73	57	51	52
Prosperity Drive at Prosperity Terrace							
EB (Left+Thru+Right)	-	< 20	20	63	54	42	42
WB (Left+Thru+Right)	-	33	49	64	140	59	99
NB (Left+Thru+Right)	-	< 20	< 20	27	70	< 20	42
SB (Left+Thru)	-	15	< 20	53	40	44	38
SB (Thru+Right)	-	< 20	< 20	< 20	32	< 20	< 20
Prosperity Drive at Cherry Hill Road							
EB (Thru)	-	154	195	380	358	306	311
EB (Right)	250 feet	43	30	143	63	95	62
WB (Left)	400 feet	77	48	172	117	142	98
WB (Thru)	-	91	122	200	239	182	208
NB (Left)	-	83	211	201	318	158	314
NB (Left+Right)	-	94	230	221	331	171	331*

Red=95th Percentile Queue Exceeds the Available Storge Lane

*= 95th Percentile Queue Extends beyond the Adjacent Prosperity Terrance Intersection

7.3. Alternative 2: 2045 (Intersection Improvements with added Sidewalk and Side Path) Analysis

It is acknowledged that the modifications, signalization and clustering the intersections of Industrial Parkway and Tech Road at Old Columbia Pike and US 29 will enlarge the intersections and incorporate signalized pedestrian crossings, and therefore will need additional red clearance time and increase lost time in signal timing. Further checking on the yellow and red time and pedestrian walking time are performed and the results in **Appendix J** are incorporated into the synchro modelling and analysis of the capacity and queue for Alternative 2 through Alternative 4.

Table 21 shows a summary of the capacity analysis from Synchro outputs. Detailed outputs can be seen in **Appendix H**. From the results, all study intersections, except for the Industrial Parkway and Tech Road intersections, operate at equal or better LOS levels compared to the No-Build condition (Alternative 1) with the proposed improvements. The intersection of Industrial Parkway at Old Columbia Pike will operate at a LOS of D for both AM and PM peak hours, while the intersection of Tech Road at Old Columbia Pike/ Prosperity Drive will operate at a LOS E for both AM and PM peak hours.

However, the traffic conditions and operations are significantly changed with the proposed roadway modifications near the intersections (see Section 6.2 and Figure 13 for the proposed modification on roadway and traffic operation). Essentially, both intersections are now signalized and clustered with the adjacent intersections of US 29 at Industrial

Parkway and US 29 at Tech Road. Their LOS will be fundamentally impacted by the adjacent two intersections at US 29.

Table 21 – 2045 Alternative 2 Capacity Analysis Results from Synchro

Study Intersection	Alt. 2 Condition LOS	
	AM	PM
(1a) Old Columbia Pike at Stewart Lane	A	C
(1b) Old Columbia Pike at Dow Jones Lot	A	A
(2) Old Columbia Pike at Industrial Parkway	D	D
(3) Old Columbia Pike / Prosperity Drive at Tech Road	E	E
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	A
(6) Prosperity Drive at Cherry Hill Road	B	C

Table 22 shows a summary of the queueing analysis from SimTraffic outputs. Detailed outputs can be seen in **Appendix I**. From the results, the 95th percentile queue during the AM and PM peak period exceeds the available storage length for the westbound left storage lane at the Old Columbia Pike at Industrial Parkway intersection. This is not considered an issue because the queue is minimally over the storage lane and any overflow could sit in the westbound through lane and move with thru traffic in same signal phase.

Additionally, the 95th percentile queue during the AM and PM peak period for northbound Prosperity Drive at Cherry Hill Road traffic exceeds the new left turn bay but the overall northbound queue length has decreased significantly compared to that of Alternative 1 due to the additional left turn lane that was added for northbound traffic. The queue is not an issue since any overflow could sit in the adjacent lanes and move in the same signal phase. Furthermore, the proposed northbound left turn bay at Chery Hill Road could be extended longer to 200 ft since the queue length of southbound left turn is less than 50 feet but left turn bay length is proposed as 150 feet at the adjacent intersection of Prosperity Drive at Prosperity Terrace.

Table 22 – 2045 Alternative 2 Queue Analysis Results from SimTraffic

Approach Turns	Storage Bay Length (ft)	Avg. Queue Length (ft)		Max Queue Length (ft)		95th Percentile Queue Length (ft)	
		AM	PM	AM	PM	AM	PM
Old Columbia Pike at Stewart Lane							
EB (Left+Thru)	-	< 20	< 20	55	64	40	50
EB (Right)	-	< 20	< 20	31	47	< 20	< 20
WB (Left)	-	< 20	79	30	130	28	370
WB (Right)	250 feet	46	76	109	146	81	165
NB (Thru+Right)	-	< 20	93	58	170	41	321
SB (Left+Thru)	-	< 20	< 20	32	32	26	24
Old Columbia Pike at Dow Jones Lot							
NB (Left)	450 feet	49	203	175	355	131	448
SB (Thru)	-	25	97	56	281	51	386
SB (Right)	275 feet	46	85	95	212	85	215
Old Columbia Pike at Industrial Parkway							
EB (Thru+Right)	-	< 20	< 20	34	40	< 20	26
WB (Left)	50 feet	< 20	29	70	74	50	77

WB (Thru)	-	132	209	210	319	197	303
WB (Thru+Right)	-	273	135	353	274	422	233
NB (Right)	-	110	118	207	219	188	195
SB (Right)	-	< 20	< 20	33	48	35	38
Old Columbia Pike / Prosperity Drive at Tech Road							
EB (Thru+Right)	-	< 20	57	79	90	58	90
WB (Thru)	-	415	588	572	606	628	598
WB (Thru+Right)	-	293	587	505	602	504	595
NB (Right)	-	< 20	< 20	35	41	24	37
SB (Right)	-	78	115	161	241	151	200
Prosperity Drive at Whitethorn Court							
EB (Left+Thru+Right)	-	< 20	22	29	59	29	48
WB (Left+Thru+Right)	-	41	58	79	118	66	97
NB (Left)	60 feet	< 20	< 20	18	23	< 20	< 20
SB (Left)	100 feet	< 20	< 20	68	< 20	48	< 20
SB (Thru+Right)	-	< 20	< 20	< 20	64	< 20	48
Prosperity Drive at Prosperity Terrace							
EB (Left+Thru+Right)	-	24	22	58	64	48	48
WB (Left+Thru+Right)	-	34	50	79	119	62	90
NB (Left)	100 feet	< 20	< 20	< 20	< 20	< 20	< 20
NB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left)	150 feet	< 20	< 20	61	39	48	36
SB (Thru+Right)	-	< 20	< 20	28	< 20	< 20	< 20
Prosperity Drive at Cherry Hill Road							
EB (Thru)	-	203	248	360	451	335	404
EB (Right)	250 feet	54	38	133	132	99	91
WB (Left)	400 feet	63	41	167	108	126	85
WB (Thru)	-	99	153	191	302	176	270
NB (Left)	100 feet	72	133	153	254	123	209
NB (Left+Right)	-	89	172	185	309	157	268

Red=95th Percentile Queue Exceeds the Available Storge Lane

7.4. Alternative 3: 2045 (Alternative 2 with Bridge Open to Traffic) Analysis

Table 23 shows a summary of the capacity analysis from Synchro outputs. Detailed outputs can be seen in **Appendix H**. From the results, all study intersections operate at same or slightly varied LOS as Alternative 2 since roadway condition and traffic operation are similar to that of Alternative 2, with the exception of the slight increase of traffic volume between Stewart Lane and Industrial Parkway due to the opening of the bridge. Roadway modifications are summarized in Section 6 – Concept Alternatives.

Table 23 – 2045 Alternative 3 Capacity Analysis Results from Synchro

Study Intersection	Alt. 3 Condition LOS	
	AM	PM
(1a) Old Columbia Pike at Stewart Lane	B	C
(1b) Old Columbia Pike at Dow Jones Lot	A	A
(2) Old Columbia Pike at Industrial Parkway	D	D
(3) Old Columbia Pike / Prosperity Drive at Tech Road	E	E
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	A
(6) Prosperity Drive at Cherry Hill Road	B	C

Table 24 shows a summary of the queueing analysis from SimTraffic outputs. Detailed outputs can be seen in **Appendix I**. From the results, the 95th percentile queue exceeding the available storage length is similar to that of Alternative 2 and is not considered as issues as stated in Alternative 2.

Table 24 – 2045 Alternative 3 Queue Analysis Results from SimTraffic

Approach Turns	Storage Bay Length (ft)	Avg. Queue Length (ft)		Max Queue Length (ft)		95th Percentile Queue Length (ft)	
		AM	PM	AM	PM	AM	PM
Old Columbia Pike at Stewart Lane							
EB (Left+Thru)	-	< 20	22	74	73	46	58
EB (Right)	-	< 20	< 20	40	56	20	26
WB (Left)	-	< 20	< 20	26	137	28	98
WB (Right)	250 feet	52	66	123	159	92	125
NB (Thru+Right)	-	21	42	58	164	43	101
SB (Left+Thru)	-	< 20	< 20	49	39	33	27
Old Columbia Pike at Dow Jones Lot							
NB (Left)	450 feet	41	151	153	372	114	354
SB (Thru)	-	28	105	74	411	56	519
SB (Right)	275 feet	49	111	106	242	89	276
Old Columbia Pike at Industrial Parkway							
EB (Thru+Right)	-	< 20	< 20	35	96	< 20	52
WB (Left)	50 feet	18	39	74	75	63	87
WB (Thru)	-	132	215	216	310	204	295
WB (Thru+Right)	-	283	141	361	309	419	259
NB (Right)	-	144	157	263	270	239	250
SB (Right)	-	< 20	< 20	24	52	< 20	37
Old Columbia Pike / Prosperity Drive at Tech Road							
EB (Thru+Right)	-	21	57	63	99	58	98
WB (Thru)	-	428	588	577	606	648	596
WB (Thru+Right)	-	293	588	439	608	493	598
NB (Right)	-	< 20	< 20	36	45	24	33
SB (Right)	-	76	108	164	210	141	187
Prosperity Drive at Whitethorn Court							
EB (Left+Thru+Right)	-	< 20	22	34	52	33	47
WB (Left+Thru+Right)	-	44	58	111	113	79	96
NB (Left)	60 feet	< 20	< 20	23	< 20	< 20	< 20
NB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left)	100 feet	< 20	< 20	56	59	48	47
SB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
Prosperity Drive at Prosperity Terrace							
EB (Left+Thru+Right)	-	25	23	54	49	48	47
WB (Left+Thru+Right)	-	31	47	68	96	59	78
NB (Left)	100 feet	< 20	< 20	< 20	< 20	< 20	< 20
NB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left)	150 feet	< 20	< 20	48	44	42	38
SB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
Prosperity Drive at Cherry Hill Road							
EB (Thru)	-	228	261	438	471	373	426
EB (Right)	250 feet	58	43	148	143	112	97
WB (Left)	400 feet	79	43	191	112	144	88

WB (Thru)	-	98	171	215	294	182	270
NB (Left)	100 feet	75	137	148	257	126	213
NB (Left+Right)	-	89	170	179	289	156	255

Red=95th Percentile Queue Exceeds the Available Storge Lane

7.5. Alternative 4: 2045 (Four-Lanes with Bridge Open to Traffic) Analysis

Table 25 shows a summary of the capacity analysis from Synchro outputs. Detailed outputs can be seen in **Appendix H**. From the results, all study intersections LOS levels stay the same or slightly vary compared to that of Alternatives 2 and 3. This is due to the additional travel lane from Stewart Lane to Industrial Parkway as seen in Section 6 – Concept Alternatives.

Table 25 – 2045 Alternative 4 Capacity Analysis Results from Synchro

Study Intersection	Alt. 4 Condition LOS	
	AM	PM
(1a) Old Columbia Pike at Stewart Lane	A	B
(1b) Old Columbia Pike at Dow Jones Lot	A	A
(2) Old Columbia Pike at Industrial Parkway	D	D
(3) Old Columbia Pike / Prosperity Drive at Tech Road	E	E
(4) Prosperity Drive at Whitethorn Court	A	A
(5) Prosperity Drive at Prosperity Terrace	A	A
(6) Prosperity Drive at Cherry Hill Road	B	C

Table 26 shows a summary of the queueing analysis from SimTraffic outputs. Detailed outputs can be seen in **Appendix I**. From the results, the 95th percentile queue that exceeds the available storage length is similar to that of Alternative 2 and Alternative 3.

Table 26 – 2045 Alternative 4 Queue Analysis Results from SimTraffic

Approach Turns	Storage Bay Length (ft)	Avg. Queue Length (ft)		Max Queue Length (ft)		95th Percentile Queue Length (ft)	
		AM	PM	AM	PM	AM	PM
Old Columbia Pike at Stewart Lane							
EB (Left+Thru)	-	< 20	< 20	59	56	44	50
EB (Right)	-	< 20	< 20	34	53	< 20	20
WB (Left)	-	< 20	< 20	30	29	26	22
WB (Right)	250 feet	42	44	86	99	70	73
NB (Thru)	-	< 20	32	46	84	34	63
NB (Thru+Right)	-	< 20	< 20	27	< 20	< 20	14
SB (Left+Thru)	-	< 20	< 20	32	28	26	24
SB (Thru)	-	< 20	< 20	< 20	< 20	< 20	< 20
Old Columbia Pike at Dow Jones Lot							
NB (Left+Thru)	-	51	152	182	342	140	343
NB (Thru)	-	< 20	21	24	230	< 20	147
SB (Thru)	-	25	< 20	49	48	50	46
SB (Right)	-	50	100	124	298	94	253
Old Columbia Pike at Industrial Parkway							
EB (Thru+Right)	-	< 20	< 20	28	53	< 20	34
WB (Left)	50 feet	21	48	74	74	66	96
WB (Thru)	-	128	199	289	614	195	285

WB (Thru+Right)	-	245	121	241	605	399	207
NB (Right)	-	69	78	145	49	123	126
SB (Right)	-	< 20	< 20	52	217	< 20	35
Old Columbia Pike / Prosperity Drive at Tech Road							
EB (Thru+Right)	-	< 20	56	64	95	54	91
WB (Thru)	-	514	588	590	614	685	600
WB (Thru+Right)	-	420	588	594	605	662	599
NB (Right)	-	< 20	< 20	30	49	23	38
SB (Right)	-	78	114	158	217	142	196
Prosperity Drive at Whitethorn Court							
EB (Left+Thru+Right)	-	< 20	26	34	64	36	53
WB (Left+Thru+Right)	-	43	62	93	159	73	118
NB (Left)	60 feet	< 20	< 20	< 20	< 20	< 20	< 20
NB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left)	100 feet	< 20	< 20	57	60	43	51
SB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
Prosperity Drive at Prosperity Terrace							
EB (Left+Thru+Right)	-	24	24	52	54	47	48
WB (Left+Thru+Right)	-	29	48	70	120	55	86
NB (Left)	-	< 20	< 20	< 20	< 20	< 20	< 20
NB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
SB (Left)	150 feet	< 20	< 20	39	35	39	36
SB (Thru+Right)	-	< 20	< 20	< 20	< 20	< 20	< 20
Prosperity Drive at Cherry Hill Road							
EB (Thru)	-	209	273	465	488	374	439
EB (Right)	250 feet	53	45	124	242	102	135
WB (Left)	400 feet	63	43	159	103	118	82
WB (Thru)	-	106	180	192	322	179	292
NB (Left)	100 feet	70	138	136	275	116	218
NB (Left+Right)	-	81	178	154	303	137	268

Red=95th Percentile Queue Exceeds the Available Storge Lane

8. Summary and Recommendation

8.1. Summary

The study corridor of Old Columbia Pike / Prosperity Drive from Stewart Lane to Cherry Hill Road in Montgomery County, Maryland, are analyzed with four (4) alternatives, which are projected for construction in 2045 and described in Section 6.

Alternative 1 - No-Build Condition:

Maintains the existing roadway geometry and traffic operation except the segment from Stewart Lane to the bridge, where roadway improvements from the project (Contract # MO8445176) are anticipated prior to 2045.

Alternative 2 through Alternative 4:

In addition to Alternative 1, similar improvements are proposed for Alternative 2 through Alternative 4, including:

- Installation of new pedestrian crosswalks, sidewalks, and side paths to enhance pedestrian safety and connectivity throughout the study corridor.
- Modification of Industrial Parkway at US 29 intersection with reducing the northbound right turn lane from two lanes to one lane, installing a new channelizing island between Old Columbia Pike and US 29 to separate westbound left and right turns and moving the westbound stop line 120 ft east from US 29 to Old Columbia Pike.
- Modification of Industrial Parkway at Old Columbia Pike intersection with removing the westbound channelization island, reducing the eastbound approach to one lane, installing crosswalks across east and north leg and mountable truck aprons at the southeast and northeast corner.
- Signalization of Industrial Parkway at Old Columbia Pike intersection and clustering it with the intersection of Industrial Parkway at US 29 intersection to provide signalized pedestrian crossing and protected northbound and southbound right turn.
- Modification of Tech Road at US 29 intersection with installing a new channelizing island between Prosperity Drive and US 29 to separate westbound left and right turns and moving the westbound stop line 110 ft east from US 29 to Old Columbia Pike.
- Modification of Tech Road at Old Columbia Pike intersection with installing flex tubular along centerline of east leg and median for north leg and installing curb bump-outs with mountable trucks aprons at the southeast and northeast corner.
- Signalization of Tech Road at Old Columbia Pike intersection and clustering it with the intersection of Tech Road at US 29 intersection to provide signalized pedestrian crossing and protected northbound and southbound right turn.
- Addition of left turn bays for both northbound and southbound along Prosperity Drive at Whitethorn Court and Prosperity Terrace.
- Reconfiguration of south leg into three northbound lanes and one southbound receiving lane to add a northbound left turn bay at the intersection of Cherry Hill Road at Prosperity Drive.

Except the bridge between Stewart Lane and Industrial Parkway that remains closed in Alternative 2 but is proposed to open for two-way two-lane traffic in Alternative 3 and two-way four-lane traffic accommodated with roadway widening between Stewart Lane and Industrial Parkway in Alternative 4.

The lane configurations and traffic volumes of the study intersections for the four alternatives are shown in Figure 10 to 15.

Table 27 shows a capacity summary from Synchro outputs for all alternatives at the study intersections. Detailed outputs can be seen in **Appendix H**.

Table 27 – Overall Capacity Analysis Results of Study Intersections

Study Intersection	Peak Time	2022 Existing Conditions	2045 Alt. 1 No Build	2045 Alt. 2 Build (BR Closed)	2045 Alt. 3 Build (BR Open)	2045 Alt. 4 Build (BR Open)
(1a) Old Columbia Pike at Stewart Lane	AM	A	A	A	B	A
	PM	B	C	C	C	B
(1b) Old Columbia Pike at Dow Jones Lot	AM	A	A	A	A	A
	PM	A	A	A	A	A
(2) Old Columbia Pike at Industrial Parkway	AM	A	A	D	D	D
	PM	A	A	D	D	D
(3) Old Columbia Pike / Prosperity Drive at Tech Road	AM	A	A	E	E	E
	PM	A	A	E	E	E
(4) Prosperity Drive at Whitethorn Court	AM	A	A	A	A	A
	PM	A	A	A	A	A
(5) Prosperity Drive at Prosperity Terrace	AM	A	A	A	A	A
	PM	C	E	A	A	A
(6) Prosperity Drive at Cherry Hill Road	AM	B	B	B	B	B
	PM	C	D	C	C	C

As shown in the table, Alternative 2, 3 and 4 have same or slightly varied LOS levels because they have the same proposed modifications at the study intersections with minor variations due to minor changes of traffic volumes and lane configurations depending on whether to open the bridge and whether to carry two-lanes or four-lanes of traffic. The results show that whether to open the bridge to traffic won't impact the traffic operation of corridor but improve the connectivity of corridor. Also, the comparison of the proposed alternatives can be simplified and summarized by comparing 2045 Alternative 1 (No-Build Condition) and Alternative 2 (Build with bridge closed) as listed below:

- Traffic operates with similar LOS at the study intersections of Stewart Lane, Dow Jones Lot, and Whitethorn Court.
- There are significant LOS drops, from A to D for both the AM and PM peak at the intersection of Industrial Parkway at Old Columbia Pike and from A to E for both the AM and PM peak at the intersection of Tech Road at Old Columbia Pike/ Prosperity Drive. This likely results from the signalization and clustering with the intersections of US 29 at Industrial Parkway and Tech Road. The worse LOS is expected due to the signalization

but must be weighted with the advantage of a safe signalized crossing for pedestrians and bicyclists. Additionally, capacity impacts associated with the clustering of the Tech Road and Industrial Parkway intersections are limited by the US 29 intersections.

- Traffic operation is improved with LOS from D to C at the intersection of Prosperity Drive at Cherry Hill Road and from LOS E to A at the intersection of Prosperity Drive at Prosperity Terrace during the PM peak hour. Both improvements are likely the result of the addition of left turn bay at the Cherry Hill Road intersection which alleviates the long northbound queue, which was observed to frequently past the Prosperity Terrace in PM during the field visit.

Although there are a few long queues exceeding the storage length in the Alternatives, they are not issues as discussed in Section 7.

8.2. Recommendation

Alternative 1 is the no build alternative. Except whether to open the bridge for vehicles, Alternative 2 has the same proposed improvements with Alternatives 3 and 4, which differ by the number of lanes across the bridge. Alternative 2 is compared with Alternative 1 then compared with Alternatives 3 and 4.

When compared to Alternative 1, Alternatives 2 is recommended because:

- Alternative 2 will vastly improve pedestrian and bicyclist safety with the proposed sidewalk, side path, signalized pedestrian crossings and overall connectivity along the corridor.
- Alternative 2 will maintain or improve the LOS of all study intersections, except the newly signalized intersections at Industrial Parkway and Tech Road, which are clustered with and impacted by the adjacent US 29 intersections. The stakeholders and public should further consider the value of having safe signalized pedestrian crossings versus acceptance of lower LOS.
- Alternative 2 will improve the traffic operation and safety along Prosperity Drive by adding turning bays for both southbound and northbound traffic at Whitethorn Court and Prosperity Terrace.
- Alternative 2 will improve the traffic operation at the intersection of Prosperity Drive at Cherry Hill Road by adding a turning bay for northbound traffic.
- Alternative 2 will improve the safety and connectivity of the corridor.

When compared to Alternatives 3 and 4, Alternative 2 is recommended because:

- Alternative 2 will provide similar improvements on traffic operation but have lower construction cost and shorter construction duration without reconstructing the bridge to open it for vehicle traffic. This will provide flexibility for schedule and funding.
- Although Alternatives 3 and 4 could potentially provide a positive impact on connectivity and transit with an open roadway between Stewart Lane and Industrial Parkway, as some of the high US 29 volumes may now use the open bridge, it would introduce a

negative impact on pedestrians and safety to community as there are now more vehicles within their proximity.

The decision to open the bridge for vehicle traffic will primarily hinge on the availability of funding and the schedule of bridge reconstruction but consider the need of improving traffic operation. Other proposed modifications in the build alternatives aim to enhance the pedestrian connection and safety along the corridor and are expected to improve the traffic operation and safety for most parts of corridor, except couple intersections experience compromised capacity due to the provision of safer signalized pedestrian crossings. The creation of a more pedestrian-friendly environment is anticipated to foster community integration and stimulate local economic development.

Overall, Alternative 2 is a preferable option among all alternatives.

8.3. Further Investigation and Consideration

1. Adjacent US 29 intersections

Given the roadway modifications, signalization, signal clustering and notable LOS drops at certain study intersections, it was deemed necessary to investigate the capacity of adjacent US 29 intersections in the four alternatives due to their proximity and further coordination with the study intersections. The additional analyses were briefly performed and the LOS results with the controlled delays (in brackets) from Synchro analysis are summarized in **Table 28**. Detailed outputs can be seen in **Appendix H**.

Table 28 – Capacity Analysis Results of Additional US 29 Intersections

Study Intersection	Peak Time	2045 Alt. 1 No Build	2045 Alt. 2 Build (BR Closed)	2045 Alt. 3 Build (BR Open)	2045 Alt. 4 Build (BR Open)
US 29 at Stewart Ln	AM	C [22.2]	C [22.2]	C [22.2]	C [22.2]
	PM	D [54.3]	E [61.6]	E [61.2]	E [61.2]
US 29 at Dow Jones Lot	AM	B [18.4]	B [18.4]	B [18.8]	B [18.8]
	PM	B [14.9]	B [13.5]	B [14.2]	B [14.2]
US 29 at Industrial Pkwy	AM	B [13.7]	B [15.1]	B [16.3]	B [16.3]
	PM	B [16.3]	C [24.1]	C [28.0]	C [28.0]
US 29 at Tech Road	AM	E [57.3]	E [68.5]	E [69.7]	E [69.7]
	PM	F [120.4]	F [109.1]	F [107.5]	F [107.8]

The summary indicates that the effects of the proposed modifications on roadway and traffic conditions with Alternatives 2-4 bring slight variations on control delays but do not significantly alter the Level of Service (LOS) at the adjacent US 29 intersections, except for the intersection of US 29 at Stewart Lane, where the several seconds increase in control delay leads to a lower LOS from D to E. This change is likely attributed to the traffic operation near the critical point.

2. US 29 and Old Columbia Pike at Industrial Parkway and Tech Road.

Due to significant operational issues and the presence of unbalanced left-turn lanes for US 29 northbound and southbound at Tech Road, an investigation was conducted on the intersections of US 29 and Old Columbia Pike at Industrial Parkway and Tech Road, given their proximity, to propose the implementation of double left-turn lanes for US 29 southbound. The LOS results with the controlled delays (in brackets) from Synchro analysis are summarized in **Table 28**. Detailed outputs can be seen in **Appendix H**.

Table 29 –Capacity Results with Two SB Left-Turn Lanes at US 29 and Tech Road

Study Intersection	Peak Time	2022 Existing	2045 Alt. 1 No-Build (BR Closed)	2045 Alt. 2 Build (BR Closed)	2045 Alt. 2 Build (w/ 2 SB LT at Tech Rd)
Old Columbia Pike at Industrial Parkway	AM	A*	A*	D [40.1]	D [40.2]
	PM	A*	A*	D [38.9]	D [39.0]
Old Columbia Pike / Prosperity Drive at Tech Road	AM	A*	A*	E [57.6]	D [49.3]
	PM	A*	A*	E [63.1]	E [60.1]
US 29 at Industrial Pkwy	AM	B [11.8]	B [13.7]	B [15.1]	B [15.1]
	PM	B [12.4]	B [16.3]	C [24.1]	C [24.0]
US 29 at Tech Road	AM	D [44.7]	E [57.3]	E [68.5]	E [70.1]
	PM	E [71.8]	F [120.4]	F [109.1]	F [83.3]

* = Existing Condition and Alternative 1 are unsignalized at these intersections, and control delay cannot be derived from Synchro outputs.

In comparison of Alternative 2 with the new Alternative 2 that incorporates double left-turn lanes for the US 29 southbound at Tech Road intersection, it's recognized that the 2022 Existing Condition US 29 at Tech Road intersection is approaching the HCM threshold for LOS F during the critical PM peak period, which is stated as delays greater than 80 seconds (per the Highway Capacity Manual). In addition, the 2045 No-Build Condition is already above the threshold for LOS F classification. Furthermore, the new Alternative 2 results indicate that adding a southbound left-turn lane does improve the capacity and traffic operation at the intersections of Tech Road at Old Columbia Pike and US 29 by nearly 30 seconds of delay during the critical PM peak period. However, these enhancements do not elevate the Level of Service (LOS), except at the intersection of Tech Road with Old Columbia Pike during the morning peak. While the operational issue in the area stems from a situation where the traffic demand substantially exceeds the capacity of the signalized intersection of Tech Road and US 29, and minor improvements are insufficient to address this capacity deficiency, the additional southbound left-turn lane is recommended to be included in the proposed changes at US 29 and Tech Road. Despite the intersection remaining at LOS F, there is a substantial reduction in average intersection delay during the critical PM peak period.

Appendix A

Spot Speed Data

MARYLAND STATE HIGHWAY ADMINISTRATION

VEHICLE SPOT SPEED STUDY

RECORDER: WZ/KF

LOCATION: Old Columbia Pike, 1100' N of Stewart Ln

APPROACH: NB

SURFACE: Asphalt

WEATHER: Sunny

DATE: 4/22/22

TIME: 1:30 - 2:45

SPEED RANGES	NUMBER OF VEHICLES	PERCENT OF TOTAL	PERCENT ACCUMULATION
10	0	0.0%	0.0%
11	0	0.0%	0.0%
12	0	0.0%	0.0%
13	0	0.0%	0.0%
14	0	0.0%	0.0%
15	0	0.0%	0.0%
16	0	0.0%	0.0%
17	0	0.0%	0.0%
18	0	0.0%	0.0%
19	0	0.0%	0.0%
20	0	0.0%	0.0%
21	0	0.0%	0.0%
22	0	0.0%	0.0%
23	0	0.0%	0.0%
24	2	2.0%	2.0%
25	0	0.0%	2.0%
26	0	0.0%	2.0%
27	2	2.0%	4.1%
28	4	4.1%	8.2%
29	5	5.1%	13.3%
POSTED SPEED **30**	9	9.2%	22.4%
31	5	5.1%	27.6%
32	6	6.1%	33.7%
33	10	10.2%	43.9%
34	6	6.1%	50.0%
35	6	6.1%	56.1%
36	6	6.1%	62.2%
37	13	13.3%	75.5%
38	5	5.1%	80.6%
39	2	2.0%	82.7%
40	3	3.1%	85.7%
41	2	2.0%	87.8%
42	2	2.0%	89.8%
43	2	2.0%	91.8%
44	1	1.0%	92.9%
45	3	3.1%	95.9%
46	1	1.0%	96.9%
47	1	1.0%	98.0%
48	0	0.0%	98.0%
49	0	0.0%	98.0%
50	0	0.0%	98.0%
51	1	1.0%	99.0%
52	1	1.0%	100.0%
53	0	0.0%	100.0%
54	0	0.0%	100.0%
55	0	0.0%	100.0%
56	0	0.0%	100.0%
57	0	0.0%	100.0%
58	0	0.0%	100.0%
59	0	0.0%	100.0%
60	0	0.0%	100.0%
61	0	0.0%	100.0%
62	0	0.0%	100.0%
63	0	0.0%	100.0%
64	0	0.0%	100.0%
65	0	0.0%	100.0%
TOTAL VEHICLES:	***98***		

SURVEY STATISTICS

POSTED SPEED:	*30*	MPH
AVERAGE SPEED:	*35*	MPH
MEDIAN SPEED:	*34*	MPH
MODAL SPEED:	*37*	MPH
85TH PERCENTILE SPEED:	*40*	MPH
10 MPH PACE:	*29 - 38*	MPH
PERCENT IN PACE:	*72%*	
PERCENT ENFORCEABLE:	*14%*	

COMMENTS:

MARYLAND STATE HIGHWAY ADMINISTRATION

VEHICLE SPOT SPEED STUDY

RECORDER: WZ/KF

LOCATION: Old Columbia Pike, 1100' N of Stewart Ln

APPROACH: SB

SURFACE: Asphalt

WEATHER: Sunny

DATE: 4/22/22

TIME: 1:30 - 2:45

SPEED RANGES	NUMBER OF VEHICLES	PERCENT OF TOTAL	PERCENT ACCUMULATION
10	0	0.0%	0.0%
11	0	0.0%	0.0%
12	0	0.0%	0.0%
13	0	0.0%	0.0%
14	0	0.0%	0.0%
15	0	0.0%	0.0%
16	0	0.0%	0.0%
17	0	0.0%	0.0%
18	0	0.0%	0.0%
19	0	0.0%	0.0%
20	0	0.0%	0.0%
21	0	0.0%	0.0%
22	0	0.0%	0.0%
23	2	2.1%	2.1%
24	3	3.2%	5.3%
25	3	3.2%	8.4%
26	5	5.3%	13.7%
27	3	3.2%	16.8%
28	2	2.1%	18.9%
29	7	7.4%	26.3%
POSTED SPEED **30**	6	6.3%	32.6%
31	4	4.2%	36.8%
32	7	7.4%	44.2%
33	13	13.7%	57.9%
34	6	6.3%	64.2%
35	7	7.4%	71.6%
36	4	4.2%	75.8%
37	6	6.3%	82.1%
38	5	5.3%	87.4%
39	1	1.1%	88.4%
40	2	2.1%	90.5%
41	5	5.3%	95.8%
42	1	1.1%	96.8%
43	1	1.1%	97.9%
44	1	1.1%	98.9%
45	1	1.1%	100.0%
46	0	0.0%	100.0%
47	0	0.0%	100.0%
48	0	0.0%	100.0%
49	0	0.0%	100.0%
50	0	0.0%	100.0%
51	0	0.0%	100.0%
52	0	0.0%	100.0%
53	0	0.0%	100.0%
54	0	0.0%	100.0%
55	0	0.0%	100.0%
56	0	0.0%	100.0%
57	0	0.0%	100.0%
58	0	0.0%	100.0%
59	0	0.0%	100.0%
60	0	0.0%	100.0%
61	0	0.0%	100.0%
62	0	0.0%	100.0%
63	0	0.0%	100.0%
64	0	0.0%	100.0%
65	0	0.0%	100.0%
TOTAL VEHICLES: ***95***			

SURVEY STATISTICS

POSTED SPEED:	*30*	MPH
AVERAGE SPEED:	*33*	MPH
MEDIAN SPEED:	*32*	MPH
MODAL SPEED:	*33*	MPH
85TH PERCENTILE SPEED:	*37*	MPH
10 MPH PACE:	*29 - 38*	MPH
PERCENT IN PACE:	*68%*	
PERCENT ENFORCEABLE:	*9%*	

COMMENTS:

MARYLAND STATE HIGHWAY ADMINISTRATION

VEHICLE SPOT SPEED STUDY

SPEED RANGES	NUMBER OF VEHICLES	PERCENT OF TOTAL	PERCENT ACCUMULATION
10	0	0.0%	0.0%
11	0	0.0%	0.0%
12	0	0.0%	0.0%
13	1	1.0%	1.0%
14	0	0.0%	1.0%
15	3	3.0%	4.0%
16	1	1.0%	5.1%
17	0	0.0%	5.1%
18	1	1.0%	6.1%
19	5	5.1%	11.1%
20	8	8.1%	19.2%
21	5	5.1%	24.2%
22	9	9.1%	33.3%
23	5	5.1%	38.4%
24	4	4.0%	42.4%
25	10	10.1%	52.5%
26	5	5.1%	57.6%
27	13	13.1%	70.7%
28	9	9.1%	79.8%
29	3	3.0%	82.8%
POSTED SPEED **30**	4	4.0%	86.9%
31	3	3.0%	89.9%
32	2	2.0%	91.9%
33	3	3.0%	94.9%
34	2	2.0%	97.0%
35	0	0.0%	97.0%
36	0	0.0%	97.0%
37	2	2.0%	99.0%
38	0	0.0%	99.0%
39	0	0.0%	99.0%
40	1	1.0%	100.0%
41	0	0.0%	100.0%
42	0	0.0%	100.0%
43	0	0.0%	100.0%
44	0	0.0%	100.0%
45	0	0.0%	100.0%
46	0	0.0%	100.0%
47	0	0.0%	100.0%
48	0	0.0%	100.0%
49	0	0.0%	100.0%
50	0	0.0%	100.0%
51	0	0.0%	100.0%
52	0	0.0%	100.0%
53	0	0.0%	100.0%
54	0	0.0%	100.0%
55	0	0.0%	100.0%
56	0	0.0%	100.0%
57	0	0.0%	100.0%
58	0	0.0%	100.0%
59	0	0.0%	100.0%
60	0	0.0%	100.0%
61	0	0.0%	100.0%
62	0	0.0%	100.0%
63	0	0.0%	100.0%
64	0	0.0%	100.0%
65	0	0.0%	100.0%

TOTAL VEHICLES: ***99***

RECORDER: **WZ/KF**

LOCATION:
Old Columbia Pike, 425' S of Industrial Pkwy

APPROACH: **NB**

SURFACE: **Asphalt**

WEATHER: **Sunny**

DATE: **4/22/22**

TIME: **11:45 - 1:00**

SURVEY STATISTICS

POSTED SPEED:	*30*	MPH
AVERAGE SPEED:	*25*	MPH
MEDIAN SPEED:	*24*	MPH
MODAL SPEED:	*27*	MPH
85TH PERCENTILE SPEED:	*29*	MPH
10 MPH PACE:	*19 - 28*	MPH
PERCENT IN PACE:	*74%*	
PERCENT ENFORCEABLE:	*0%*	

COMMENTS:

MARYLAND STATE HIGHWAY ADMINISTRATION

VEHICLE SPOT SPEED STUDY

SPEED RANGES	NUMBER OF VEHICLES	PERCENT OF TOTAL	PERCENT ACCUMULATION
10	0	0.0%	0.0%
11	1	1.3%	1.3%
12	0	0.0%	1.3%
13	1	1.3%	2.5%
14	1	1.3%	3.8%
15	1	1.3%	5.1%
16	4	5.1%	10.1%
17	3	3.8%	13.9%
18	5	6.3%	20.3%
19	3	3.8%	24.1%
20	5	6.3%	30.4%
21	5	6.3%	36.7%
22	7	8.9%	45.6%
23	5	6.3%	51.9%
24	10	12.7%	64.6%
25	5	6.3%	70.9%
26	7	8.9%	79.7%
27	3	3.8%	83.5%
28	5	6.3%	89.9%
29	2	2.5%	92.4%
POSTED SPEED **30**	1	1.3%	93.7%
31	3	3.8%	97.5%
32	0	0.0%	97.5%
33	2	2.5%	100.0%
34	0	0.0%	100.0%
35	0	0.0%	100.0%
36	0	0.0%	100.0%
37	0	0.0%	100.0%
38	0	0.0%	100.0%
39	0	0.0%	100.0%
40	0	0.0%	100.0%
41	0	0.0%	100.0%
42	0	0.0%	100.0%
43	0	0.0%	100.0%
44	0	0.0%	100.0%
45	0	0.0%	100.0%
46	0	0.0%	100.0%
47	0	0.0%	100.0%
48	0	0.0%	100.0%
49	0	0.0%	100.0%
50	0	0.0%	100.0%
51	0	0.0%	100.0%
52	0	0.0%	100.0%
53	0	0.0%	100.0%
54	0	0.0%	100.0%
55	0	0.0%	100.0%
56	0	0.0%	100.0%
57	0	0.0%	100.0%
58	0	0.0%	100.0%
59	0	0.0%	100.0%
60	0	0.0%	100.0%
61	0	0.0%	100.0%
62	0	0.0%	100.0%
63	0	0.0%	100.0%
64	0	0.0%	100.0%
65	0	0.0%	100.0%
TOTAL VEHICLES:	*79*		

RECORDER: **WZ/KF**

LOCATION:
Old Columbia Pike, 425' S of Industrial Pkwy

APPROACH: **SB**

SURFACE: **Asphalt**

WEATHER: **Sunny**

DATE: **4/22/22**

TIME: **11:45 - 1:00**

SURVEY STATISTICS

POSTED SPEED:	*30*	MPH
AVERAGE SPEED:	*23*	MPH
MEDIAN SPEED:	*22*	MPH
MODAL SPEED:	*24*	MPH
85TH PERCENTILE SPEED:	*27*	MPH
10 MPH PACE:	*17 - 26*	MPH
PERCENT IN PACE:	*70%*	
PERCENT ENFORCEABLE:	*0%*	

COMMENTS:

MARYLAND STATE HIGHWAY ADMINISTRATION

VEHICLE SPOT SPEED STUDY

RECORDER: WZ/KF

LOCATION: Prosperity Dr, 150' N of Whitehorn Ct

APPROACH: NB

SURFACE: Asphalt

WEATHER: Sunny

DATE: 4/22/22

TIME: 10:45 - 11:20

SPEED RANGES	NUMBER OF VEHICLES	PERCENT OF TOTAL	PERCENT ACCUMULATION
10	0	0.0%	0.0%
11	0	0.0%	0.0%
12	0	0.0%	0.0%
13	0	0.0%	0.0%
14	1	0.8%	0.8%
15	2	1.6%	2.4%
16	1	0.8%	3.2%
17	2	1.6%	4.8%
18	3	2.4%	7.2%
19	6	4.8%	12.0%
20	9	7.2%	19.2%
21	7	5.6%	24.8%
22	17	13.6%	38.4%
23	8	6.4%	44.8%
24	12	9.6%	54.4%
25	6	4.8%	59.2%
26	8	6.4%	65.6%
27	13	10.4%	76.0%
28	4	3.2%	79.2%
29	8	6.4%	85.6%
POSTED SPEED **30**	7	5.6%	91.2%
31	0	0.0%	91.2%
32	1	0.8%	92.0%
33	4	3.2%	95.2%
34	3	2.4%	97.6%
35	1	0.8%	98.4%
36	0	0.0%	98.4%
37	1	0.8%	99.2%
38	1	0.8%	100.0%
39	0	0.0%	100.0%
40	0	0.0%	100.0%
41	0	0.0%	100.0%
42	0	0.0%	100.0%
43	0	0.0%	100.0%
44	0	0.0%	100.0%
45	0	0.0%	100.0%
46	0	0.0%	100.0%
47	0	0.0%	100.0%
48	0	0.0%	100.0%
49	0	0.0%	100.0%
50	0	0.0%	100.0%
51	0	0.0%	100.0%
52	0	0.0%	100.0%
53	0	0.0%	100.0%
54	0	0.0%	100.0%
55	0	0.0%	100.0%
56	0	0.0%	100.0%
57	0	0.0%	100.0%
58	0	0.0%	100.0%
59	0	0.0%	100.0%
60	0	0.0%	100.0%
61	0	0.0%	100.0%
62	0	0.0%	100.0%
63	0	0.0%	100.0%
64	0	0.0%	100.0%
65	0	0.0%	100.0%
TOTAL VEHICLES: ***125***			

SURVEY STATISTICS

POSTED SPEED:	*30*	MPH
AVERAGE SPEED:	*25*	MPH
MEDIAN SPEED:	*23*	MPH
MODAL SPEED:	*22*	MPH
85TH PERCENTILE SPEED:	*29*	MPH
10 MPH PACE:	*20 - 29*	MPH
PERCENT IN PACE:	*74%*	
PERCENT ENFORCEABLE:	*0%*	

COMMENTS:

MARYLAND STATE HIGHWAY ADMINISTRATION

VEHICLE SPOT SPEED STUDY

RECORDER: **WZ/KF**

LOCATION: **Prosperity Dr, 150' N of Whitehorn Ct**

APPROACH: **SB**

SURFACE: **Asphalt**

WEATHER: **Sunny**

DATE: **4/22/22**

TIME: **10:45 - 11:20**

SPEED RANGES	NUMBER OF VEHICLES	PERCENT OF TOTAL	PERCENT ACCUMULATION
10	0	0.0%	0.0%
11	0	0.0%	0.0%
12	0	0.0%	0.0%
13	0	0.0%	0.0%
14	0	0.0%	0.0%
15	0	0.0%	0.0%
16	2	1.6%	1.6%
17	0	0.0%	1.6%
18	3	2.3%	3.9%
19	0	0.0%	3.9%
20	4	3.1%	7.0%
21	4	3.1%	10.2%
22	7	5.5%	15.6%
23	6	4.7%	20.3%
24	19	14.8%	35.2%
25	8	6.3%	41.4%
26	14	10.9%	52.3%
27	12	9.4%	61.7%
28	9	7.0%	68.8%
29	10	7.8%	76.6%
POSTED SPEED **30**	8	6.3%	82.8%
31	7	5.5%	88.3%
32	6	4.7%	93.0%
33	4	3.1%	96.1%
34	1	0.8%	96.9%
35	1	0.8%	97.7%
36	1	0.8%	98.4%
37	1	0.8%	99.2%
38	0	0.0%	99.2%
39	1	0.8%	100.0%
40	0	0.0%	100.0%
41	0	0.0%	100.0%
42	0	0.0%	100.0%
43	0	0.0%	100.0%
44	0	0.0%	100.0%
45	0	0.0%	100.0%
46	0	0.0%	100.0%
47	0	0.0%	100.0%
48	0	0.0%	100.0%
49	0	0.0%	100.0%
50	0	0.0%	100.0%
51	0	0.0%	100.0%
52	0	0.0%	100.0%
53	0	0.0%	100.0%
54	0	0.0%	100.0%
55	0	0.0%	100.0%
56	0	0.0%	100.0%
57	0	0.0%	100.0%
58	0	0.0%	100.0%
59	0	0.0%	100.0%
60	0	0.0%	100.0%
61	0	0.0%	100.0%
62	0	0.0%	100.0%
63	0	0.0%	100.0%
64	0	0.0%	100.0%
65	0	0.0%	100.0%
TOTAL VEHICLES:	***128***		

SURVEY STATISTICS

POSTED SPEED:	*30*	MPH
AVERAGE SPEED:	*26*	MPH
MEDIAN SPEED:	*25*	MPH
MODAL SPEED:	*24*	MPH
85TH PERCENTILE SPEED:	*30*	MPH
10 MPH PACE:	*22 - 31*	MPH
PERCENT IN PACE:	*78%*	
PERCENT ENFORCEABLE:	*0%*	

COMMENTS:

Appendix B

Crash Data

ACRS Report Type	Crash Date/Time	Mile Point	Lane Direction	Road Name	Cross-Street Name	Off-Road Description	Collision Type	Weather	Surface Condition	Light	First Harmful Event
Property Damage Crash	5/19/2020 6:00	0.27	South	OLD COLUMBIA PIKE	NO NAME		SINGLE VEHICLE	CLEAR	DRY	DAWN	FIXED OBJECT
Injury Crash	11/9/2019 19:40	0.2	North	OLD COLUMBIA PIKE	STEWART LA		STRAIGHT MOVEMENT A	CLEAR	DRY	DARK LIGHTS ON	OTHER VEHICLE
Injury Crash	4/22/2020 20:28	0.23	East	OLD COLUMBIA PIKE	AMBERSTONE CT		HEAD ON LEFT TURN	CLEAR	DRY	DARK LIGHTS ON	PEDESTRIAN
Property Damage Crash	8/19/2020 17:44	0.2	South	OLD COLUMBIA PIKE	STEWART LA		STRAIGHT MOVEMENT A	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	7/29/2019 14:06	0.27	North	OLD COLUMBIA PIKE	NO NAME		SAME DIR REAR END	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Injury Crash	8/6/2019 22:36	0.41	North	OLD COLUMBIA PIKE	INDUSTRIAL PKWY		SAME DIR REAR END	RAINING	WET	DARK LIGHTS ON	OTHER VEHICLE
Property Damage Crash	12/2/2018 17:48	0.2	South	OLD COLUMBIA PIKE	STEWART LA		SINGLE VEHICLE	CLEAR	DRY	DUSK	N/A
Property Damage Crash	3/26/2017 16:40	0.27	Unknown	OLD COLUMBIA PIKE	NO NAME		OTHER	N/A	DRY	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	2/12/2019 7:20	0	North	OLD COLUMBIA PIKE	TREE TOP VIEW TERRACE		STRAIGHT MOVEMENT A	RAINING	WET	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	2/16/2017 14:30	0.6	South	OLD COLUMBIA PIKE	TECH RD		STRAIGHT MOVEMENT A	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Injury Crash	10/15/2018 7:04	0.2	North	OLD COLUMBIA PIKE	STEWART LA		SAME DIRECTION SIDESV	RAINING	WET	DARK LIGHTS ON	OTHER VEHICLE
Property Damage Crash	1/7/2019 11:30	0.04	North	OLD COLUMBIA PIKE	SPUR TO US 29		SAME DIR REAR END	CLOUDY	DRY	DAYLIGHT	OTHER VEHICLE
Injury Crash	6/16/2018 14:40	0.6	South	OLD COLUMBIA PIKE	TECH RD		SAME DIRECTION SIDESV	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Injury Crash	10/14/2017 1:22	0.41	North	OLD COLUMBIA PIKE	INDUSTRIAL PKWY		OTHER	N/A	DRY	DARK LIGHTS ON	FIXED OBJECT
Injury Crash	11/9/2018 7:55	0.41	South	OLD COLUMBIA PIKE	INDUSTRIAL PKWY		OPPOSITE DIRECTION SIC	CLEAR	WET	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	12/21/2021 16:21	0.27	North	OLD COLUMBIA PIKE	NO NAME		SAME DIR REAR END	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Injury Crash	8/5/2020 9:50	0.19	South	OLD COLUMBIA PIKE	TREE TOP DR		SINGLE VEHICLE	CLEAR	SLUSH	DAYLIGHT	FIXED OBJECT
Property Damage Crash	5/9/2021 3:00	0.2	North	OLD COLUMBIA PIKE	STEWART LA		OTHER	CLEAR	UNKNOWN	DARK -- UNKNOWN LIGH	OTHER VEHICLE
Property Damage Crash	12/22/2021 16:21	0.27	North	OLD COLUMBIA PIKE	NO NAME		OTHER	CLOUDY	DRY	DAYLIGHT	OTHER VEHICLE

ACRS Report Type	Crash Date/Time	Mile Point	Lane Direction	Road Name	Cross-Street Name	Off-Road Description	Collision Type	Weather	Surface Condition	Light	First Harmful Event
Injury Crash	10/11/2019 16:00	0	East	PROSPERITY DR	CHERRY HILL RD		SAME DIRECTION SIDESV	CLEAR	N/A	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	6/15/2018 16:45	0.19	South	PROSPERITY DR	WHITETHORN CT		STRAIGHT MOVEMENT A	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Injury Crash	4/7/2017 17:09	0.27	East	PROSPERITY DR	OLD COLUMBIA PIKE (AHEAD)		STRAIGHT MOVEMENT A	CLOUDY	DRY	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	5/10/2017 13:55	0.27	South	PROSPERITY DR	OLD COLUMBIA PIKE (AHEAD)		OTHER	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	7/5/2021 11:51	0.19	West	PROSPERITY DR	WHITETHORN CT		SAME DIRECTION RIGHT	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE
Property Damage Crash	7/15/2021 11:57	0	East	PROSPERITY DR	CHERRY HILL RD		STRAIGHT MOVEMENT A	CLEAR	DRY	DAYLIGHT	OTHER VEHICLE

41065

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

Office of Traffic and Safety
Traffic Development & Support Division

Consultant Crash Data/Analysis Request Form

Request Date: April 6, 2022 Note: date set automatically

Location:
County: Montgomery Town/Place: Silver Spring
Route: Prosperity Dr. MD 929D Log Mile:
☐ at
☐ from 0.000 to 0.047

Purpose Needed:
☐ Signal Study ☐ Surface Evaluation ☐ Pavement Marking Study
☐ Sign Study ☐ Lighting Study ☒ General Traffic Study
☐ Other (Explain)

Originally Requested By:
When Needed: April 15

Work Requested:
☐ Crash Summary ☐ Crash History ☐ Crash Rates
☐ Study Worksheet ☐ Intersection/Line Diagram ☐ Other (Explain in Remarks)
☐ One Year ☐ Two Years
☐ Three Years ☒ Combined Years
☒ Specific Date(s) 2017 to 2021

Additional Instructions or Remarks:
Requested by: WZ Title: project manager
Consultant Firm: RJM Engineering Phone: 410-730-1001
Street Address: 6031 University Blvd Cell Phone: 4433193451
City: Ellicott City State: MD Zip: 21043 Email: Wengang.Zhang@rjmengineering.com
Consultant Subcontractor: Phone:

Please indicate map coordinates of location to be studied.
GIS
Purpose/Need:

Send to: Traffic Development & Support Division,
7491 Connelley Drive Hanover, Maryland 21076
Phone: (410) 787-5844 Fax: (410) 582-9469 Email: wmacleod@sha.state.md.us

Maryland State Highway Administration
Office of Traffic and Safety - Traffic Development and Support
SHA ADC Study Worksheet Output rev. 10/2017-1

Name: Matthew Jagg
Date: 04/13/2022

Location: MD 929D (Prosperity Dr) From: MD 929B (Cherry Hill Rd) To: Prosperity Dr
Logmiles: From 0 To 0.05 Length: 0.05
County: Montgomery, D3 Period: January 01, 2017 To December 31, 2021
Note: Year 2021 data is incomplete and unedited!

YEAR >>	2017	2018	2019	2020	2021	Total
Fatal	0	0	0	0	0	0
No. Killed	0	0	0	0	0	0
Injury	0	0	1	0	0	1
No. Injured	0	0	1	0	0	1
Prop. Damage	0	0	0	0	1	1
Total Crashes	0	0	1	0	1	2
Severity Index	0	0	4	0	1	Avg 1
Opposite Dir.	0	0	0	0	0	0
Rear End	0	0	0	0	0	0
Sideswipe	0	0	0	0	0	0
Left Turn	0	0	0	0	1	1
Angle	0	0	1	0	0	1
Pedestrian	0	0	0	0	0	0
Parked Veh.	0	0	0	0	0	0
Fixed Object	0	0	0	0	0	0
Other	0	0	0	0	0	0
U-Turn	0	0	0	0	0	0
Backing	0	0	0	0	0	0
Animal	0	0	0	0	0	0
Railroad	0	0	0	0	0	0
Fire / Expl.	0	0	0	0	0	0
Overturn	0	0	0	0	0	0
Truck Related	0	0	0	0	0	0
Night Time	0	0	0	0	0	0
Wet Surface	0	0	0	0	0	0
Alcohol	0	0	0	0	0	0
Intersection	0	0	1	0	1	2
Total Vehicles	0	0	2	0	2	4
Total Trucks	0	0	0	0	0	0
Truck %	0.0	0.0	0.0	0.0	0.0	0.0

Comments:

Maryland State Highway Administration
Office of Traffic and Safety - Traffic Development and Support
SHA ADC Summary Output rev. 10/2017-1

Name: Matthew Jagg
Date: 04/13/2022

Location: MD 929D (Prosperity Dr) From: MD 929B (Cherry Hill Rd) To: Prosperity Dr
Logmiles: From 0 To 0.05 Length: 0.05
County: Montgomery, D3 Period: January 1, 2017 To December 31, 2021
Note: Year 2021 data is incomplete and unedited!

SEVERITY	FATAL	INJURY	P-DAMAGE	TOTAL
Accidents		1	1	2
Veh Occ		1		
Pedestrian				

AVG Severity Index: 1

DAY OF THE WEEK

SUN	MON	TUE	WED	THU	FRI	SAT	UNK
				1	1		

MONTH OF THE YEAR

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
						1			1			

CONDITION	DRIVER	PED
Normal:	4	
Alcohol:		
Other:		

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:												1	
PM:					1								

VEHICLES INVOLVED PER ACCIDENT

1	2	3	4	5	6+	UNK	TOTAL
	2						4

VEHICLE TYPE

	Motorcycle/Moped		Tractor Trailer
4	Passenger Vehicle		Passenger Bus
	Sport Utility Veh		School Bus
	Pick-Up Truck		Emergency Veh
	Trucks (2+3 axles)		Other Types

SURFACE

	Wet
1	Dry
	Sno/Ice
	Mud
1	Other

MOVEMENTS

NORTH LF	NORTH ST	NORTH RT	SOUTH LF	SOUTH ST	SOUTH RT	EAST LF	EAST ST	EAST RT	WEST LF	WEST ST	WEST RT
		1					2		1		

OTHER MOVEMENTS

PROBABLE CAUSES

	Influence of Drugs		Improper Lane Change
	Influence of Alcohol		Improper Backing
	Influence of Medication		Improper Passing
	Influence of Combined Subst.		Improper Signal
	Physical/Mental Difficulty		Improper Parking
	Fell Asleep/Fainted, etc.		Passenger Interfere/Obstruct.
2	Fail to give full Attention		Illegally in Roadway
	Lic. Restr. Non-compliance		Bicycle Violation
	Fail to Drive in Single Lane		Clothing Not Visible
	Improper Right Turn on Red		Sleet, Hail, Freezing Rain
	Fail to Yield Right-of-way		Severe Crosswinds
	Fail to Obey Stop Sign		Rain, Snow
	Fail to Obey Traffic Signal		Animal
	Fail to Obey Other Control		Vision Obstruction
	Fail to Keep Right of Center		Vehicle Defect
	Fail to Stop for School Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
	Exceeded Speed Limit		Debris or Obstruction
	Operator Using Cell Phone		Ruts, Holes or Bumps
	Stopping in Lane Roadway		Road Under Construction
	Too Fast for Conditions		Traffic Control Device Inop.
	Followed too Closely		Shoulders Low, Soft or High
	Improper Turn		Other or Unknown

COLLISION TYPES		FATAL	INJURY	PROP	TOTAL
Opposite Dir	Related:				
	UnRelated:				
Rear End	Related:				
	UnRelated:				
Sideswipe	Related:				
	UnRelated:				
Left Turn	Related:			1	1
	UnRelated:				
Angle	Related:		1		1
	UnRelated:				
Pedestrian	Related:				
	UnRelated:				
Parked Vehicle	Related:				
	UnRelated:				
Other Collision	Related:				
	UnRelated:				

FIXED OBJECTS		
F	Bridge	01
I	Building	02
X	Culvert/Ditch	03
E	Curb	04
D	Guardrail/Barrier	05
	Embankment	06
O	Fence	07
B	Light Pole	08
J	Sign Pole	09
E	Other Pole	10
C	Tree/Shrubbery	11
T	Contr. Barrier	12
S	Crash Attenuator	13
	Other Fixed Object	

WEATHER

2	Clear / Cloudy
	Foggy
	Raining
	Snow / Sleet
	Other

ILLUMINATION

2	Day
	Dawn/Dusk
	Dark - Lights On
	Dark - No Lights
	Other

TOTALS

17-21	2

Maryland State Highway Administration

Office of Traffic and Safety - Traffic Development and Support

SHA ADC History Output rev. 10/2017-1 - Combined Year Listing

Name: Matthew Jagg

Date: 04/13/2022

Location: MD 929D (Prosperity Dr) From: MD 929B (Cherry Hill Rd) To: Prosperity Dr

Logmiles: From 0 To 0.05 Length: 0.05

County: Montgomery, D3 Period: January 01, 2017 To December 31, 2021

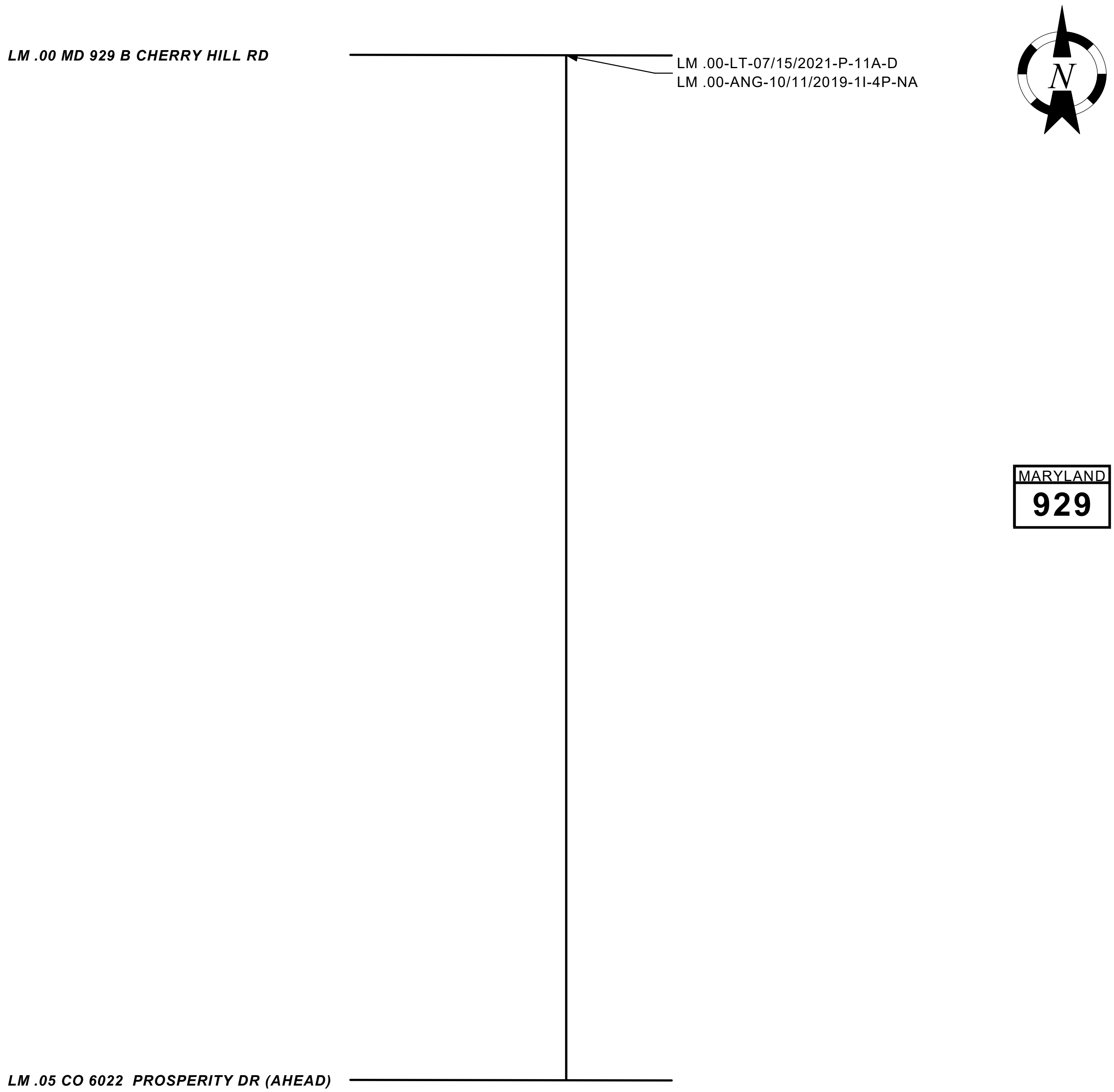
Note: Year 2021 data is incomplete and unedited!

MilePt	Int Rel	Date	Severity	Time	Light	Surface	Alc Rel	FixObj	Collision	Movement V1	Movement V2	Probable Cause
MD929D												
0.000	✓	10112019	1 Injured	04P	Day				ANGLE	NR	ES	Fail to give full attention
0.000	✓	07152021	Property	11A	Day	Dry			LFTRN	WL	ES	Fail to give full attention

Fixed Object: 01 = Bridge 02 = Building 03 = Culvert/Ditch 04 = Curb 05 = Guardrail/Barrier 06 = Embankment 07 = Fence
08 = Light Pole 09 = Sign Post 10 = Other Pole 11 = Tree/Shrubbery 12 = Construction Barrier 13 = Crash Attenuator

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 929D (Prosperity Dr) From: MD 929B (Cherry Hill Rd) To: Prosperity Dr
County: MONTGOMERY
Study Period: 01/01/2017 to 12/31/2021
Analyst: Matthew Jagg Date: 04/13/2022



KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

template 06-27-06

F - Fatalities
I - Injury
P - Property Damage
OD - Opposite Direction
LT - Left Turn
RE - Rear End
ANG - Angle

SS - Sideswipe
PARKD - Parked Vehicle
PED - Pedestrian
BIKE - Bicycle
PEDAL - Other Pedalcycle
CONVY - Other Conveyance
ANIML - Animal

FO - Fixed Object
OOBJ - Other Object
OT - Overturn
SPILL - Spilled Cargo
JCKKNF - Jackknife
SPRTD - Units Separated
NCOLL - Other Non Collision

OFFRD - Off Road
RUNWY - Downhill Runaway
FIRE - Explosion Fire
BCKNG - Backing
UTURN - U-Turn
OTHR - Other
UNK - Unknown

00 - Not Applicable
01 - Bridge or Overpass
02 - Building
03 - Culvert or Ditch
04 - Curb
05 - Guardrail or Barrier
06 - Embankment
07 - Fence

08 - Light Support Pole
09 - Sign Support Pole
10 - Other Pole
11 - Tree Shrubbery
12 - Construction Barrier
13 - Crash Attenuator
88 - Other
99 - Unknown

N - Night
X - Alcohol
D - Dry Surface
W - Wet Surface
I - Icy Surface
S - Snowy Surface

Appendix C

SHA Signal Timing

SIG0686 HubJA

BARRIER CONTROL

BARRIER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BARRIER CONTROL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SEQUENCE 1

RING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
2	5	6	7	8	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHASE COMPATIBILITY

PHASE	PHASE														
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1											X	X			
2											X	X			
3									X	X					
4									X	X					
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

SIMULTANEOUS GAP PHASES

GAP	PHASE																DISABLE
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1																	
2						X											
3																	
4								X									
5																	
6		X															
7																	
8				X													
9																	
10																	
11																	
12																	
13																	
14																	

SIG0686 HubJA

March 31, 2022

SIMULTANEOUS GAP PHASES

GAP	PHASE																DISABLE
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
15																	
16																	

PHASE IN USE/PED

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IN USE		X		X	X	X										
EXCLUSIVE PED																

PLAN 1

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MIN GRN	0	7	0	5	3	7	0	0	0	0	0	0	0	0	0	0
BK MGRN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS MGRN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DLY GRN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WALK	0	7	0	5	0	7	0	0	0	0	0	0	0	0	0	0
WALK2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WLK MAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PED CLR	0	15	0	22	0	15	0	0	0	0	0	0	0	0	0	0
PD CLR2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PC MAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PED CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VEH EXT	0.0	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VH EXT2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAX1	0	60	0	25	25	60	0	0	0	0	0	0	0	0	0	0
MAX2	0	60	0	30	40	60	0	0	0	0	0	0	0	0	0	0
MAX3	0	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0
DYM MAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM STP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YELLOW	3.0	4.5	3.0	4.0	4.0	4.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
RED CLR	0.0	2.0	0.0	2.0	2.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MAX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED RVT	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ACT B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEC/ACT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAX INT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TIME B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CARS WT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDUC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTREDUC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIN GAP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TYPE/TIMES

OVERLAP	A	B	C	D	E	F	G	H
TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL

TYPE/TIMES

OVERLAP	A	B	C	D	E	F	G	H
LAG GRN (DELAY START CLEAR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YEL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADV GRN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROTECTED PHASE	0	0	0	0	0	0	0	0
PERMISSIVE PHASE	0	0	0	0	0	0	0	0
FLASHING ARROW OUTPUT	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP
DELAY START FYA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ACTION PLAN SF BIT DISABLE	0	0	0	0	0	0	0	0

TYPE/TIMES

OVERLAP	I	J	K	L	M	N	O	P
TYPE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
LAG GRN (DELAY START CLEAR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YEL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADV GRN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROTECTED PHASE	0	0	0	0	0	0	0	0
PERMISSIVE PHASE	0	0	0	0	0	0	0	0
FLASHING ARROW OUTPUT	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP	GRN OLP
DELAY START FYA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ACTION PLAN SF BIT DISABLE	0	0	0	0	0	0	0	0

OVERLAP A

PHASE	1	2	3	4	5	6	7	8
INCLUDED								
PROTECT								
MODIFIER								
PED PRTC								
NOT OVLP								
FLSH GRN	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
LAG X PH								
LAG 2 PH								

OVERLAP A

PHASE	9	10	11	12	13	14	15	16
INCLUDED								
PROTECT								
MODIFIER								
PED PRTC								
NOT OVLP								
FLSH GRN	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
LAG X PH								
LAG 2 PH								

SIG0686 HubJA

CONTROLLER OPTIONS

PED CLEAR PROTECT		UNIT RED REVERT	5.0	MUTCD 3 SECONDS DONT WALK	

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FLASHING GRN PH	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
GUAR PASSAGE																
NON-ACT I																
NON-ACT II																
DUAL ENTRY		X				X										
COND SERVICE																
COND RESERVICE																
PED RESERVICE																
REST IN WALK		X				X										
FLASHING WALK																
PED CLR>YELLOW																
PED CLR>RED																
IGRN + VEH EXT																

PLAN 1

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LOCK DET				X												
VE RCALL																
PD RCALL		X				X										
MX RCALL		X				X										
SF RCALL																
NO REST																
AI CALC																

COORDINATOR OPTIONS

MANUAL PATTERN	AUTO
SYSTEM SOURCE	SYS
SPLITS IN	SECONDS
TRANSITION	SMOOTH
DWELL/ADD TIME	255
DLY COORD WK-LZ	
OFFSET REF	LAG
PED RECALL	X
LOCAL ZERO OVRD	
RE-SYNC COUNT	1

ECPI COORD	X
SYSTEM FORMAT	STD
OFFSET IN	SECONDS
MAX SELECT	MAX2
FORCE OFF	FIXED
CAL USE PED TM	X
PED RESERVE	
FO ADD INI GRN	
MULTISYNC	

COORDINATOR PATTERN 1

USE SPLIT PATTERN	1
CYCLE	150
OFFSET VAL	125
ACTUATED COORD	
ACT WALK REST	

PHASE RESERVICE	
MAX SELECT	NONE
STD (COS)	111
DWELL/ADD TIME	0
TIMING PLAN	1

SIG0686 HubJA

COORDINATOR PATTERN 1

SEQUENCE	1
ACTION PLAN	0
FORCE OFF	NONE
VEH PERM 1	0

VEH PERM 2	0
VEH PERM 2 - DISP	0
XART PTRN.	0

RING CONFIG

RING	1	2	3	4
SPLT EXT	0	0	0	0

RING	1	2	3	4
SPLIT DEMAND PTRN.	0	0		

RING	1	2	3	4
RING DISP		0	0	0

SPLIT PREF PHASES

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PREF 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PREF 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHASE MODES

Phase	1	2	3	4	5	6	7	8
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

PHASE MODES

Phase	9	10	11	12	13	14	15	16
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

SF OUT

PHASE	1	2	3	4	5	6	7	8
SF OUT								

COORDINATOR PATTERN 2

USE SPLIT PATTERN	2
CYCLE	120
OFFSET VAL	106
ACTUATED COORD	
ACT WALK REST	
PHASE RESERVICE	
MAX SELECT	NONE
STD (COS)	121
DWELL/ADD TIME	0

TIMING PLAN	1
SEQUENCE	1
ACTION PLAN	0
FORCE OFF	NONE
VEH PERM 1	0
VEH PERM 2	0
VEH PERM 2 - DISP	0
XART PTRN.	0

RING CONFIG

RING	1	2	3	4
SPLT EXT	0	0	0	0

RING	1	2	3	4
SPLIT DEMAND PTRN.	0	0		

RING	1	2	3	4
RING DISP		0	0	0

SPLIT PREF PHASES

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PREF 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PREF 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHASE MODES

Phase	1	2	3	4	5	6	7	8
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

PHASE MODES

Phase	9	10	11	12	13	14	15	16
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

SF OUT

PHASE	1	2	3	4	5	6	7	8
SF OUT								

COORDINATOR PATTERN 3

USE SPLIT PATTERN	3
CYCLE	150
OFFSET VAL	60
ACTUATED COORD	
ACT WALK REST	
PHASE RESERVICE	
MAX SELECT	NONE
STD (COS)	131
DWELL/ADD TIME	0

TIMING PLAN	1
SEQUENCE	1
ACTION PLAN	0
FORCE OFF	NONE
VEH PERM 1	0
VEH PERM 2	0
VEH PERM 2 - DISP	0
XART PTRN.	0

RING CONFIG

RING	1	2	3	4
SPLT EXT	0	0	0	0

RING	1	2	3	4
SPLIT DEMAND PTRN.	0	0		

RING	1	2	3	4
RING DISP		0	0	0

SPLIT PREF PHASES

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PREF 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PREF 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHASE MODES

Phase	1	2	3	4	5	6	7	8
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

PHASE MODES

Phase	9	10	11	12	13	14	15	16
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

SF OUT

PHASE	1	2	3	4	5	6	7	8
SF OUT								

COORDINATOR PATTERN 4

USE SPLIT PATTERN	4
CYCLE	120
OFFSET VAL	84
ACTUATED COORD	
ACT WALK REST	

PHASE RESERVICE	
MAX SELECT	NONE
STD (COS)	141
DWELL/ADD TIME	0
TIMING PLAN	1

COORDINATOR PATTERN 4

SEQUENCE	1
ACTION PLAN	0
FORCE OFF	NONE
VEH PERM 1	0

VEH PERM 2	0
VEH PERM 2 - DISP	0
XART PTRN.	0

RING CONFIG

RING	1	2	3	4
SPLT EXT	0	0	0	0

RING	1	2	3	4
SPLIT DEMAND PTRN.	0	0		

RING	1	2	3	4
RING DISP		0	0	0

SPLIT PREF PHASES

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PREF 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PREF 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHASE MODES

Phase	1	2	3	4	5	6	7	8
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

PHASE MODES

Phase	9	10	11	12	13	14	15	16
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

SF OUT

PHASE	1	2	3	4	5	6	7	8
SF OUT								

COORDINATOR PATTERN 5

USE SPLIT PATTERN	5
CYCLE	0
OFFSET VAL	0
ACTUATED COORD	
ACT WALK REST	
PHASE RESERVICE	
MAX SELECT	NONE
STD (COS)	151
DWELL/ADD TIME	0

TIMING PLAN	1
SEQUENCE	1
ACTION PLAN	0
FORCE OFF	NONE
VEH PERM 1	0
VEH PERM 2	0
VEH PERM 2 - DISP	0
XART PTRN.	0

RING CONFIG

RING	1	2	3	4
SPLT EXT	0	0	0	0

RING	1	2	3	4
SPLIT DEMAND PTRN.	0	0		

RING	1	2	3	4
RING DISP		0	0	0

SPLIT PREF PHASES

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PREF 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PREF 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHASE MODES

Phase	1	2	3	4	5	6	7	8
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

PHASE MODES

Phase	9	10	11	12	13	14	15	16
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

SF OUT

PHASE	1	2	3	4	5	6	7	8
SF OUT								

Split 1

PHASE	1	2	3	4	5	6	7	8
SPLIT	0	123	0	27	15	108	0	0
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 1

PHASE	9	10	11	12	13	14	15	16
SPLIT	0	0	0	0	0	0	0	0
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 2

PHASE	1	2	3	4	5	6	7	8
SPLIT	0	81	0	39	18	63	0	0
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 2

PHASE	9	10	11	12	13	14	15	16
SPLIT	0	0	0	0	0	0	0	0
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 3

PHASE	1	2	3	4	5	6	7	8
SPLIT	0	114	0	36	21	93	0	0
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 3

PHASE	9	10	11	12	13	14	15	16
SPLIT	0	0	0	0	0	0	0	0
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 4

PHASE	1	2	3	4	5	6	7	8
SPLIT	0	81	0	39	18	63	0	0
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 4

PHASE	9	10	11	12	13	14	15	16
SPLIT	0	0	0	0	0	0	0	0
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 5

PHASE	1	2	3	4	5	6	7	8
SPLIT	0	0	0	0	0	0	0	0
COORD		X				X		
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

Split 5

PHASE	9	10	11	12	13	14	15	16
SPLIT	0	0	0	0	0	0	0	0
COORD								
PHASE MODE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE

ACTION PLAN 1

PATTERN	1
TIMING PLAN	1
VEH DET PLAN	0
FLASH	
VEH DET DIAG PLN	0
DIMMING ENABLE	

SYS OVERRIDE	
SEQUENCE	1
DET LOG	0
RED REST	
PED DET DIAG PLN	0
PRIORITY RETURN	

PED PR RETURN	
QUEUE DELAY	
PMT COND DELAY	

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 2

PATTERN	2
TIMING PLAN	1
VEH DET PLAN	0
FLASH	
VEH DET DIAG PLN	0
DIMMING ENABLE	

SYS OVERRIDE	
SEQUENCE	1
DET LOG	0
RED REST	
PED DET DIAG PLN	0
PRIORITY RETURN	

PED PR RETURN	
QUEUE DELAY	
PMT COND DELAY	

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 3

PATTERN	3
TIMING PLAN	1
VEH DET PLAN	0
FLASH	

VEH DET DIAG PLN	0
DIMMING ENABLE	
SYS OVERRIDE	
SEQUENCE	1

DET LOG	0
RED REST	
PED DET DIAG PLN	0
PRIORITY RETURN	

PED PR RETURN	
QUEUE DELAY	
PMT COND DELAY	

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PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 4

PATTERN	4	SYS OVERRIDE		PED PR RETURN	
TIMING PLAN	1	SEQUENCE	1	QUEUE DELAY	
VEH DET PLAN	0	DET LOG	0	PMT COND DELAY	
FLASH		RED REST			
VEH DET DIAG PLN	0	PED DET DIAG PLN	0		
DIMMING ENABLE		PRIORITY RETURN			

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 5

PATTERN	5	SYS OVERRIDE		PED PR RETURN	
TIMING PLAN	1	SEQUENCE	1	QUEUE DELAY	
VEH DET PLAN	0	DET LOG	0	PMT COND DELAY	
FLASH		RED REST			
VEH DET DIAG PLN	0	PED DET DIAG PLN	0		
DIMMING ENABLE		PRIORITY RETURN			

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 98

PATTERN	98	VEH DET DIAG PLN	0	DET LOG	0	PED PR RETURN	
TIMING PLAN	1	DIMMING ENABLE		RED REST		QUEUE DELAY	
VEH DET PLAN	0	SYS OVERRIDE		PED DET DIAG PLN	0	PMT COND DELAY	
FLASH		SEQUENCE	0	PRIORITY RETURN			

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PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 99

PATTERN	FREE
TIMING PLAN	1
VEH DET PLAN	0
FLASH	
VEH DET DIAG PLN	0
DIMMING ENABLE	

SYS OVERRIDE	
SEQUENCE	1
DET LOG	0
RED REST	
PED DET DIAG PLN	0
PRIORITY RETURN	

PED PR RETURN	
QUEUE DELAY	
PMT COND DELAY	

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

ACTION PLAN 100

PATTERN	FLSH	DIMMING ENABLE		PED DET DIAG PLN	0
TIMING PLAN	1	SYS OVERRIDE		PRIORITY RETURN	
VEH DET PLAN	0	SEQUENCE	1	PED PR RETURN	
FLASH	X	DET LOG	0	QUEUE DELAY	
VEH DET DIAG PLN	0	RED REST		PMT COND DELAY	

PHASE TABLE

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED RCL																
WALK 2																
VEX 2																
VEH RCL																
MAX RCL																
MAX 2																
MAX 3																
CS INH																
OMIT																
SPC FCT																
AUX FCT																

LP TABLE

LP Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LP 1-15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 91-100	.	.	.	.	.	.	.	.	.	.					

Day Plan 1

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	6	10	15	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 1

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 2

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	6	10	15	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 2

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 3

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	6	10	15	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 3

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 4

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	6	10	15	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 4

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 5

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	6	10	15	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 5

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 5

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 6

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 6

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 7

EVENT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ACTION PLAN	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan 7

EVENT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACTION PLAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - HH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
START TIME - MM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix D

Traffic Counts

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Data

Start Time	Stewart Lane Southbound						Old Columbia Pike Westbound						Stewart Lane Northbound						Old Columbia Pike Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	7	18	2	0	0	27	20	3	0	0	0	23	33	0	0	0	1	33	4	10	0	0	0	14	97
6:15 AM	6	17	5	0	0	28	20	0	0	0	0	20	37	0	2	0	0	39	1	7	0	0	0	8	95
6:30 AM	9	18	13	0	0	40	32	4	0	0	0	36	59	0	3	0	5	62	2	10	0	0	0	12	150
6:45 AM	10	23	5	0	0	38	30	6	2	0	1	38	47	0	2	0	4	49	1	11	0	0	0	12	137
Hourly Total	32	76	25	0	0	133	102	13	2	0	1	117	176	0	7	0	10	183	8	38	0	0	0	46	479
7:00 AM	10	27	12	0	0	49	28	4	1	0	1	33	42	0	1	0	3	43	3	23	0	0	0	26	151
7:15 AM	15	26	9	0	0	50	32	5	1	0	1	38	52	0	1	0	5	53	4	14	0	0	1	18	159
7:30 AM	12	31	12	0	0	55	30	7	1	0	1	38	56	0	2	0	4	58	4	7	0	0	0	11	162
7:45 AM	18	45	13	0	0	76	26	10	2	0	0	38	52	0	2	0	4	54	1	13	0	0	0	14	182
Hourly Total	55	129	46	0	0	230	116	26	5	0	3	147	202	0	6	0	16	208	12	57	0	0	1	69	654
8:00 AM	19	38	20	0	0	77	17	6	5	0	0	28	49	0	1	0	0	50	3	17	0	0	0	20	175
8:15 AM	16	56	24	0	0	96	22	4	1	0	0	27	47	0	2	0	0	49	5	13	0	0	0	18	190
8:30 AM	22	54	9	0	0	85	32	9	3	0	0	44	80	0	6	0	8	86	8	12	0	0	1	20	235
8:45 AM	23	78	17	0	0	118	22	6	2	0	1	30	60	0	4	0	2	64	9	16	0	0	0	25	237
Hourly Total	80	226	70	0	0	376	93	25	11	0	1	129	236	0	13	0	10	249	25	58	0	0	1	83	837
9:00 AM	24	59	9	0	0	92	14	7	0	0	1	21	45	0	3	0	2	48	1	14	0	0	0	15	176
9:15 AM	17	54	12	0	0	83	9	5	0	0	0	14	46	0	0	0	2	46	6	11	0	0	0	17	160
9:30 AM	28	39	14	0	0	81	18	6	0	0	0	24	39	0	0	0	3	39	4	17	0	0	0	21	165
9:45 AM	18	41	10	0	0	69	21	1	3	0	0	25	42	0	3	0	2	45	6	21	0	0	0	27	166
Hourly Total	87	193	45	0	0	325	62	19	3	0	1	84	172	0	6	0	9	178	17	63	0	0	0	80	667
10:00 AM	23	32	7	1	0	63	13	1	1	0	0	15	53	0	0	0	0	53	6	14	0	0	0	20	151
10:15 AM	20	45	8	0	0	73	17	2	0	0	0	19	41	0	2	0	2	43	6	25	0	0	0	31	166
10:30 AM	23	46	11	0	0	80	13	3	2	0	0	18	42	0	4	0	3	46	4	20	0	0	0	24	168
10:45 AM	24	53	13	0	0	90	17	1	3	0	1	21	32	0	3	0	4	35	2	21	0	0	0	23	169
Hourly Total	90	176	39	1	0	306	60	7	6	0	1	73	168	0	9	0	9	177	18	80	0	0	0	98	654
11:00 AM	20	38	17	0	0	75	17	2	1	0	0	20	29	0	3	0	0	32	4	17	0	0	0	21	148
11:15 AM	32	38	15	0	0	85	12	7	0	0	0	19	34	0	0	0	3	34	5	18	0	0	3	23	161
11:30 AM	17	39	17	0	0	73	20	2	0	0	0	22	37	0	1	0	5	38	3	22	0	0	1	25	158
11:45 AM	23	42	8	0	0	73	22	1	0	0	0	23	43	0	4	0	1	47	4	28	0	0	0	32	175
Hourly Total	92	157	57	0	0	306	71	12	1	0	0	84	143	0	8	0	9	151	16	85	0	0	4	101	642
12:00 PM	33	34	11	0	0	78	6	6	0	0	1	12	48	0	1	0	3	49	2	22	1	0	1	25	164
12:15 PM	31	48	11	0	0	90	11	2	3	0	0	16	46	0	4	0	3	50	3	22	0	0	0	25	181
12:30 PM	41	35	17	0	0	93	18	5	1	0	0	24	47	0	1	0	3	48	6	27	0	0	1	33	198
12:45 PM	34	41	22	0	0	97	20	4	2	0	0	26	34	0	2	0	7	36	6	26	1	0	0	33	192
Hourly Total	139	158	61	0	0	358	55	17	6	0	1	78	175	0	8	0	16	183	17	97	2	0	2	116	735
1:00 PM	25	38	11	0	0	74	10	6	1	0	0	17	32	0	5	0	3	37	5	34	0	0	0	39	167
1:15 PM	17	37	10	0	0	64	13	3	1	0	0	17	51	0	1	0	1	52	3	23	0	0	0	26	159
1:30 PM	24	51	16	0	0	91	14	2	3	0	1	19	44	0	2	0	6	46	2	22	0	0	0	24	180

1:45 PM	24	53	17	0	0	94	16	2	0	0	0	18	49	0	1	0	2	50	2	18	0	0	0	20	182
Hourly Total	90	179	54	0	0	323	53	13	5	0	1	71	176	0	9	0	12	185	12	97	0	0	0	109	688
2:00 PM	30	56	10	0	0	96	9	5	2	0	0	16	43	0	6	0	2	49	9	25	0	0	0	34	195
2:15 PM	25	52	16	0	0	93	9	1	2	0	0	12	45	0	3	0	1	48	6	23	0	0	0	29	182
2:30 PM	30	50	20	0	0	100	23	3	1	0	0	27	40	0	2	0	1	42	6	16	0	0	0	22	191
2:45 PM	37	67	12	0	0	116	20	4	2	0	1	26	66	0	2	0	8	68	5	29	0	0	0	34	244
Hourly Total	122	225	58	0	0	405	61	13	7	0	1	81	194	0	13	0	12	207	26	93	0	0	0	119	812
3:00 PM	33	66	29	0	0	128	21	2	1	0	1	24	56	0	2	0	4	58	7	25	0	0	0	32	242
3:15 PM	27	74	21	0	0	122	16	2	1	1	0	20	63	0	2	0	1	65	3	33	0	0	0	36	243
3:30 PM	28	80	20	0	0	128	12	6	1	0	0	19	63	0	3	0	3	66	6	24	0	0	0	30	243
3:45 PM	43	70	24	0	0	137	19	2	2	0	0	23	60	0	0	0	6	60	12	22	0	0	1	34	254
Hourly Total	131	290	94	0	0	515	68	12	5	1	1	86	242	0	7	0	14	249	28	104	0	0	1	132	982
4:00 PM	33	77	26	0	0	136	28	2	1	0	0	31	55	0	3	0	2	58	3	33	0	0	0	36	261
4:15 PM	36	67	19	0	0	122	14	5	4	0	0	23	54	0	7	0	3	61	5	23	0	0	0	28	234
4:30 PM	27	71	30	0	0	128	12	4	3	0	0	19	64	0	7	0	1	71	6	28	0	0	0	34	252
4:45 PM	42	74	30	0	0	146	18	1	3	0	0	22	60	0	1	0	2	61	13	29	0	0	0	42	271
Hourly Total	138	289	105	0	0	532	72	12	11	0	0	95	233	0	18	0	8	251	27	113	0	0	0	140	1018
5:00 PM	35	68	24	0	0	127	16	5	3	0	0	24	59	0	3	0	2	62	7	23	0	0	0	30	243
5:15 PM	42	88	32	0	0	162	14	2	0	0	0	16	58	0	4	0	5	62	3	31	0	0	0	34	274
5:30 PM	27	75	24	0	0	126	19	0	3	0	0	22	55	0	1	0	0	56	6	29	0	0	0	35	239
5:45 PM	42	84	24	0	0	150	19	2	3	0	0	24	55	0	2	0	2	57	11	34	0	0	0	45	276
Hourly Total	146	315	104	0	0	565	68	9	9	0	0	86	227	0	10	0	9	237	27	117	0	0	0	144	1032
6:00 PM	27	91	26	0	0	144	14	1	0	0	0	15	50	0	1	0	3	51	5	37	0	0	0	42	252
6:15 PM	23	80	27	0	0	130	15	6	2	0	1	23	58	0	5	0	2	63	10	28	0	0	0	38	254
6:30 PM	25	65	30	0	0	120	18	7	1	0	0	26	44	0	2	0	0	46	8	28	0	0	0	36	228
6:45 PM	38	67	31	0	0	136	13	4	4	0	0	21	37	0	4	0	3	41	6	26	0	0	1	32	230
Hourly Total	113	303	114	0	0	530	60	18	7	0	1	85	189	0	12	0	8	201	29	119	0	0	1	148	964
Grand Total	1315	2716	872	1	0	4904	941	196	78	1	12	1216	2533	0	126	0	142	2659	262	1121	2	0	10	1385	10164
Approach %	26.8	55.4	17.8	0.0	-	-	77.4	16.1	6.4	0.1	-	-	95.3	0.0	4.7	0.0	-	-	18.9	80.9	0.1	0.0	-	-	-
Total %	12.9	26.7	8.6	0.0	-	48.2	9.3	1.9	0.8	0.0	-	12.0	24.9	0.0	1.2	0.0	-	26.2	2.6	11.0	0.0	0.0	-	13.6	-
Lights	1219	2484	818	1	-	4522	883	186	76	1	-	1146	2305	0	124	0	-	2429	249	1099	2	0	-	1350	9447
% Lights	92.7	91.5	93.8	100.0	-	92.2	93.8	94.9	97.4	100.0	-	94.2	91.0	-	98.4	-	-	91.4	95.0	98.0	100.0	-	-	97.5	92.9
Buses	86	208	35	0	-	329	42	9	0	0	-	51	204	0	1	0	-	205	11	11	0	0	-	22	607
% Buses	6.5	7.7	4.0	0.0	-	6.7	4.5	4.6	0.0	0.0	-	4.2	8.1	-	0.8	-	-	7.7	4.2	1.0	0.0	-	-	1.6	6.0
Trucks	10	24	19	0	-	53	16	1	2	0	-	19	24	0	1	0	-	25	2	11	0	0	-	13	110
% Trucks	0.8	0.9	2.2	0.0	-	1.1	1.7	0.5	2.6	0.0	-	1.6	0.9	-	0.8	-	-	0.9	0.8	1.0	0.0	-	-	0.9	1.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	6	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	8.3	-	-	-	-	-	4.2	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	11	-	-	-	-	-	136	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	91.7	-	-	-	-	-	95.8	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Stewart Lane
Site Code:
Start Date: 03/08/2022
Page No: 3

Stewart Lane [SB]

Out	In	Total
886	4522	5408
42	329	371
16	53	69
0	0	0
0	0	0
944	**4904**	**5848**

1219	2484	818	1	0
86	208	35	0	0
10	24	19	0	0
0	0	0	0	0
0	0	0	0	0
1315	**2716**	**872**	**1**	**0**
R	T	L	U	P

Old Columbia Pike [EB]

Out	In	Total
1529	1350	2879
96	22	118
12	13	25
0	0	0
0	0	0
1637	**1385**	**3022**

U	L	T	R	P
0	2	1099	249	0
0	0	11	11	0
0	0	11	2	0
0	0	0	0	0
0	0	0	0	10
0	**2**	**1121**	**262**	**10**

03/08/2022 6:00 AM
Ending At
03/08/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Old Columbia Pike [WB]

R	T	L	U	P
883	186	76	1	0
42	9	0	0	0
16	1	2	0	0
0	0	0	0	1
0	0	0	0	11
941	**196**	**78**	**1**	**12**

Out	In	Total
4223	1146	5369
250	51	301
54	19	73
0	0	0
0	0	0
4527	**1216**	**5743**

U	L	T	R	P
0	124	0	2305	0
0	1	0	204	0
0	1	0	24	0
0	0	0	0	6
0	0	0	0	136
0	**126**	**0**	**2533**	**142**

2809	2429	5238
219	205	424
28	25	53
0	0	0
0	0	0
3056	**2659**	**5715**
Out	In	Total

Stewart Lane [NB]

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Stewart Lane
Site Code:
Start Date: 03/08/2022

Turning Movement Peak Hour Data (8:15 AM)

	Stewart Lane Southbound						Old Columbia Pike Westbound						Stewart Lane Northbound						Old Columbia Pike Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
8:15 AM	16	56	24	0	0	96	22	4	1	0	0	27	47	0	2	0	0	49	5	13	0	0	0	18	190
8:30 AM	22	54	9	0	0	85	32	9	3	0	0	44	80	0	6	0	8	86	8	12	0	0	1	20	235
8:45 AM	23	78	17	0	0	118	22	6	2	0	1	30	60	0	4	0	2	64	9	16	0	0	0	25	237
9:00 AM	24	59	9	0	0	92	14	7	0	0	1	21	45	0	3	0	2	48	1	14	0	0	0	15	176
Total	85	247	59	0	0	391	90	26	6	0	2	122	232	0	15	0	12	247	23	55	0	0	1	78	838
Approach %	21.7	63.2	15.1	0.0	-	-	73.8	21.3	4.9	0.0	-	-	93.9	0.0	6.1	0.0	-	-	29.5	70.5	0.0	0.0	-	-	-
Total %	10.1	29.5	7.0	0.0	-	46.7	10.7	3.1	0.7	0.0	-	14.6	27.7	0.0	1.8	0.0	-	29.5	2.7	6.6	0.0	0.0	-	9.3	-
PHF	0.885	0.792	0.615	0.000	-	0.828	0.703	0.722	0.500	0.000	-	0.693	0.725	0.000	0.625	0.000	-	0.718	0.639	0.859	0.000	0.000	-	0.780	0.884
Lights	77	223	51	0	-	351	86	24	6	0	-	116	205	0	15	0	-	220	18	53	0	0	-	71	758
% Lights	90.6	90.3	86.4	-	-	89.8	95.6	92.3	100.0	-	-	95.1	88.4	-	100.0	-	-	89.1	78.3	96.4	-	-	-	91.0	90.5
Buses	8	20	4	0	-	32	3	2	0	0	-	5	24	0	0	0	-	24	5	2	0	0	-	7	68
% Buses	9.4	8.1	6.8	-	-	8.2	3.3	7.7	0.0	-	-	4.1	10.3	-	0.0	-	-	9.7	21.7	3.6	-	-	-	9.0	8.1
Trucks	0	4	4	0	-	8	1	0	0	0	-	1	3	0	0	0	-	3	0	0	0	0	-	0	12
% Trucks	0.0	1.6	6.8	-	-	2.0	1.1	0.0	0.0	-	-	0.8	1.3	-	0.0	-	-	1.2	0.0	0.0	-	-	-	0.0	1.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	12	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Stewart Lane
Site Code:
Start Date: 03/08/2022
Page No: 5

Stewart Lane [SB]

Out	In	Total
86	351	437
3	32	35
1	8	9
0	0	0
0	0	0
90	**391**	**481**

R	T	L	U	P
77	223	51	0	0
8	20	4	0	0
0	4	4	0	0
0	0	0	0	0
0	0	0	0	0
85	**247**	**59**	**0**	**0**

Old Columbia Pike [EB]

Out	In	Total
116	71	187
10	7	17
0	0	0
0	0	0
0	0	0
126	**78**	**204**

U	L	T	R	P
0	0	53	18	0
0	0	2	5	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	1
0	**0**	**55**	**23**	**1**

Peak Hour Data

03/08/2022 8:15 AM
Ending At
03/08/2022 9:15 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Old Columbia Pike [WB]

R	T	L	U	P
86	24	6	0	0
3	2	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	2
90	**26**	**6**	**0**	**2**

Out	In	Total
309	116	425
30	5	35
7	1	8
0	0	0
0	0	0
346	**122**	**468**

U	L	T	R	P
0	15	0	205	0
0	0	0	24	0
0	0	0	3	0
0	0	0	0	0
0	0	0	0	12
0	**15**	**0**	**232**	**12**

Out	In	Total
247	220	467
25	24	49
4	3	7
0	0	0
0	0	0
276	**247**	**523**

Stewart Lane [NB]

Turning Movement Peak Hour Data Plot (8:15 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (5:15 PM)

	Stewart Lane						Old Columbia Pike						Stewart Lane						Old Columbia Pike						
	Southbound						Westbound						Northbound						Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
5:15 PM	42	88	32	0	0	162	14	2	0	0	0	16	58	0	4	0	5	62	3	31	0	0	0	34	274
5:30 PM	27	75	24	0	0	126	19	0	3	0	0	22	55	0	1	0	0	56	6	29	0	0	0	35	239
5:45 PM	42	84	24	0	0	150	19	2	3	0	0	24	55	0	2	0	2	57	11	34	0	0	0	45	276
6:00 PM	27	91	26	0	0	144	14	1	0	0	0	15	50	0	1	0	3	51	5	37	0	0	0	42	252
Total	138	338	106	0	0	582	66	5	6	0	0	77	218	0	8	0	10	226	25	131	0	0	0	156	1041
Approach %	23.7	58.1	18.2	0.0	-	-	85.7	6.5	7.8	0.0	-	-	96.5	0.0	3.5	0.0	-	-	16.0	84.0	0.0	0.0	-	-	-
Total %	13.3	32.5	10.2	0.0	-	55.9	6.3	0.5	0.6	0.0	-	7.4	20.9	0.0	0.8	0.0	-	21.7	2.4	12.6	0.0	0.0	-	15.0	-
PHF	0.821	0.929	0.828	0.000	-	0.898	0.868	0.625	0.500	0.000	-	0.802	0.940	0.000	0.500	0.000	-	0.911	0.568	0.885	0.000	0.000	-	0.867	0.943
Lights	129	327	104	0	-	560	62	5	6	0	-	73	202	0	8	0	-	210	25	131	0	0	-	156	999
% Lights	93.5	96.7	98.1	-	-	96.2	93.9	100.0	100.0	-	-	94.8	92.7	-	100.0	-	-	92.9	100.0	100.0	-	-	-	100.0	96.0
Buses	7	11	1	0	-	19	2	0	0	0	-	2	15	0	0	0	-	15	0	0	0	0	-	0	36
% Buses	5.1	3.3	0.9	-	-	3.3	3.0	0.0	0.0	-	-	2.6	6.9	-	0.0	-	-	6.6	0.0	0.0	-	-	-	0.0	3.5
Trucks	2	0	1	0	-	3	2	0	0	0	-	2	1	0	0	0	-	1	0	0	0	0	-	0	6
% Trucks	1.4	0.0	0.9	-	-	0.5	3.0	0.0	0.0	-	-	2.6	0.5	-	0.0	-	-	0.4	0.0	0.0	-	-	-	0.0	0.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	10	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Stewart Lane
Site Code:
Start Date: 03/08/2022

Peak Hour Data

03/08/2022 5:15 PM
Ending At
03/08/2022 6:15 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Stewart Lane [SB]

Out	In	Total
62	560	622
2	19	21
2	3	5
0	0	0
0	0	0
66	**582**	**648**

R	T	L	U	P
129	327	104	0	0
7	11	1	0	0
2	0	1	0	0
0	0	0	0	0
0	0	0	0	0
138	**338**	**106**	**0**	**0**

Old Columbia Pike [EB]

Out	In	Total
142	156	298
7	0	7
2	0	2
0	0	0
0	0	0
151	**156**	**307**

U	L	T	R	P
0	0	131	25	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	**0**	**131**	**25**	**0**

Old Columbia Pike [WB]

Out	In	Total
437	73	510
16	2	18
2	2	4
0	0	0
0	0	0
455	**77**	**532**

R	T	L	U	P
62	5	6	0	0
2	0	0	0	0
2	0	0	0	0
0	0	0	0	0
0	0	0	0	0
66	**5**	**6**	**0**	**0**

U	L	T	R	P
0	8	0	202	0
0	0	0	15	0
0	0	0	1	0
0	0	0	0	0
0	0	0	0	10
0	**8**	**0**	**218**	**10**

Out	In	Total
358	210	568
11	15	26
0	1	1
0	0	0
0	0	0
369	**226**	**595**

Stewart Lane [NB]

Turning Movement Peak Hour Data Plot (5:15 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Industrial Parkway
Site Code:
Start Date: 03/08/2022

Turning Movement Data

	Industrial Parkway Southbound						Old Columbia Pike Westbound						Industrial Parkway Northbound						Old Columbia Pike Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	0	32	1	0	2	33	0	0	3	0	0	3	0	20	0	0	1	20	10	0	4	0	0	14	70
6:15 AM	3	33	0	0	0	36	0	0	0	0	0	0	0	24	1	0	0	25	13	0	6	0	0	19	80
6:30 AM	2	26	0	0	0	28	0	1	2	0	0	3	0	27	1	0	0	28	12	0	6	0	0	18	77
6:45 AM	4	36	0	0	0	40	0	1	2	0	0	3	0	40	1	0	1	41	26	0	3	0	0	29	113
Hourly Total	9	127	1	0	2	137	0	2	7	0	0	9	0	111	3	0	2	114	61	0	19	0	0	80	340
7:00 AM	5	33	0	0	0	38	0	1	2	0	0	3	2	40	0	0	0	42	37	0	5	0	0	42	125
7:15 AM	3	38	0	0	0	41	0	2	0	0	0	2	1	51	2	0	1	54	36	0	4	0	0	40	137
7:30 AM	1	37	0	0	0	38	0	2	2	0	1	4	2	47	3	0	0	52	39	0	1	0	0	40	134
7:45 AM	7	56	0	0	0	63	0	0	2	0	1	2	0	31	1	0	1	32	19	0	1	0	0	20	117
Hourly Total	16	164	0	0	0	180	0	5	6	0	2	11	5	169	6	0	2	180	131	0	11	0	0	142	513
8:00 AM	10	71	0	0	0	81	0	2	0	0	0	2	1	56	2	0	1	59	28	0	1	0	0	29	171
8:15 AM	12	78	0	0	0	90	0	1	2	0	0	3	2	51	5	0	0	58	27	0	4	0	0	31	182
8:30 AM	10	61	0	0	0	71	0	1	3	0	0	4	1	48	4	0	0	53	25	0	1	0	0	26	154
8:45 AM	9	74	0	0	0	83	0	1	0	0	0	1	4	61	4	0	1	69	22	0	0	0	0	22	175
Hourly Total	41	284	0	0	0	325	0	5	5	0	0	10	8	216	15	0	2	239	102	0	6	0	0	108	682
9:00 AM	7	83	1	0	0	91	1	1	2	0	0	4	3	42	1	0	1	46	36	0	17	0	0	53	194
9:15 AM	6	99	0	0	0	105	0	1	1	0	0	2	2	44	4	0	1	50	15	0	10	0	0	25	182
9:30 AM	6	102	0	0	0	108	0	0	0	0	0	0	4	53	5	0	1	62	15	0	6	0	0	21	191
9:45 AM	5	81	1	0	0	87	0	1	2	0	2	3	2	58	7	0	4	67	14	0	4	0	0	18	175
Hourly Total	24	365	2	0	0	391	1	3	5	0	2	9	11	197	17	0	7	225	80	0	37	0	0	117	742
10:00 AM	5	63	0	0	0	68	0	0	2	0	1	2	2	67	4	0	1	73	13	1	0	0	0	14	157
10:15 AM	13	75	0	0	0	88	0	0	1	0	1	1	3	60	4	0	2	67	15	0	0	0	0	15	171
10:30 AM	7	86	0	0	0	93	0	1	2	0	1	3	3	83	5	0	0	91	18	0	2	0	0	20	207
10:45 AM	11	80	1	0	0	92	0	1	0	0	0	1	4	66	3	0	1	73	16	0	1	0	1	17	183
Hourly Total	36	304	1	0	0	341	0	2	5	0	3	7	12	276	16	0	4	304	62	1	3	0	1	66	718
11:00 AM	9	82	0	0	0	91	0	0	3	0	0	3	4	52	4	1	1	61	13	0	8	0	0	21	176
11:15 AM	6	64	0	0	0	70	1	3	0	0	1	4	1	62	9	0	2	72	15	0	9	0	0	24	170
11:30 AM	7	66	1	0	0	74	0	0	0	0	0	0	2	63	6	0	0	71	14	0	5	0	0	19	164
11:45 AM	10	92	0	0	0	102	0	3	1	0	1	4	4	51	3	1	0	59	21	1	7	0	0	29	194
Hourly Total	32	304	1	0	0	337	1	6	4	0	2	11	11	228	22	2	3	263	63	1	29	0	0	93	704
12:00 PM	10	74	0	0	0	84	0	0	1	0	0	1	6	84	4	0	2	94	14	0	0	0	0	14	193
12:15 PM	13	61	0	0	0	74	2	0	0	0	0	2	3	65	7	0	0	75	13	0	0	0	0	13	164
12:30 PM	12	69	0	0	0	81	0	0	2	0	1	2	1	75	6	0	1	82	19	0	0	0	0	19	184
12:45 PM	5	80	0	1	1	86	0	2	1	0	0	3	4	65	4	0	0	73	14	0	1	0	1	15	177
Hourly Total	40	284	0	1	1	325	2	2	4	0	1	8	14	289	21	0	3	324	60	0	1	0	1	61	718
1:00 PM	13	60	0	0	0	73	1	0	0	0	1	1	5	55	5	0	2	65	7	0	1	0	0	8	147
1:15 PM	10	65	0	0	1	75	0	0	2	0	0	2	1	66	6	0	1	73	7	0	1	0	1	8	158
1:30 PM	7	69	0	0	0	76	1	2	1	0	0	4	2	67	8	0	1	77	13	0	0	0	0	13	170

1:45 PM	11	80	0	0	1	91	0	1	3	0	0	4	3	52	4	0	0	59	12	0	0	0	1	12	166
Hourly Total	41	274	0	0	2	315	2	3	6	0	1	11	11	240	23	0	4	274	39	0	2	0	2	41	641
2:00 PM	9	76	0	0	0	85	0	0	1	0	0	1	2	67	5	0	1	74	9	0	1	0	0	10	170
2:15 PM	10	74	0	0	1	84	0	2	0	0	1	2	3	78	10	0	1	91	24	0	2	0	1	26	203
2:30 PM	13	74	0	0	1	87	0	0	0	0	2	0	2	68	4	0	1	74	22	0	2	0	1	24	185
2:45 PM	15	78	0	0	5	93	0	2	1	0	0	3	3	62	5	0	2	70	16	0	1	0	5	17	183
Hourly Total	47	302	0	0	7	349	0	4	2	0	3	6	10	275	24	0	5	309	71	0	6	0	7	77	741
3:00 PM	10	67	0	0	0	77	0	3	0	0	0	3	1	66	9	0	0	76	23	0	0	0	0	23	179
3:15 PM	10	81	0	0	0	91	0	3	0	0	0	3	2	57	5	0	1	64	22	0	1	0	1	23	181
3:30 PM	12	102	0	0	0	114	0	1	0	0	0	1	1	67	9	1	1	78	13	0	0	0	0	13	206
3:45 PM	17	108	0	0	0	125	0	4	0	0	0	4	2	54	16	0	1	72	18	0	0	0	0	18	219
Hourly Total	49	358	0	0	0	407	0	11	0	0	0	11	6	244	39	1	3	290	76	0	1	0	1	77	785
4:00 PM	15	85	0	0	0	100	0	3	0	0	0	3	2	73	14	0	0	89	24	0	2	0	0	26	218
4:15 PM	12	79	0	0	0	91	0	1	1	0	0	2	3	59	7	0	4	69	18	0	1	0	0	19	181
4:30 PM	16	100	0	0	0	116	0	2	0	0	0	2	5	65	13	0	0	83	20	0	2	0	0	22	223
4:45 PM	21	103	0	0	0	124	2	1	0	0	0	3	3	67	11	0	1	81	20	0	0	0	0	20	228
Hourly Total	64	367	0	0	0	431	2	7	1	0	0	10	13	264	45	0	5	322	82	0	5	0	0	87	850
5:00 PM	22	83	1	0	0	106	0	1	0	0	0	1	2	75	13	0	0	90	16	0	1	0	0	17	214
5:15 PM	13	91	0	0	0	104	0	1	1	0	1	2	5	71	10	0	4	86	21	0	0	0	0	21	213
5:30 PM	21	107	0	0	0	128	0	6	0	0	0	6	4	58	15	0	2	77	29	0	0	0	0	29	240
5:45 PM	19	110	0	0	0	129	0	1	0	0	1	1	2	80	5	0	2	87	19	1	2	0	0	22	239
Hourly Total	75	391	1	0	0	467	0	9	1	0	2	10	13	284	43	0	8	340	85	1	3	0	0	89	906
6:00 PM	25	97	1	0	0	123	0	1	0	0	2	1	4	66	7	0	2	77	16	0	1	0	1	17	218
6:15 PM	27	70	0	0	1	97	0	3	1	0	0	4	1	36	7	0	1	44	18	1	3	0	2	22	167
6:30 PM	19	61	0	0	0	80	0	5	0	0	0	5	0	42	7	0	1	49	19	0	1	0	0	20	154
6:45 PM	18	47	0	0	0	65	0	4	1	0	0	5	1	35	9	0	1	45	21	0	1	0	0	22	137
Hourly Total	89	275	1	0	1	365	0	13	2	0	2	15	6	179	30	0	5	215	74	1	6	0	3	81	676
Grand Total	563	3799	7	1	13	4370	8	72	48	0	18	128	120	2972	304	3	53	3399	986	4	129	0	15	1119	9016
Approach %	12.9	86.9	0.2	0.0	-	-	6.3	56.3	37.5	0.0	-	-	3.5	87.4	8.9	0.1	-	-	88.1	0.4	11.5	0.0	-	-	-
Total %	6.2	42.1	0.1	0.0	-	48.5	0.1	0.8	0.5	0.0	-	1.4	1.3	33.0	3.4	0.0	-	37.7	10.9	0.0	1.4	0.0	-	12.4	-
Lights	542	3544	7	1	-	4094	8	69	48	0	-	125	120	2839	290	3	-	3252	950	4	128	0	-	1082	8553
% Lights	96.3	93.3	100.0	100.0	-	93.7	100.0	95.8	100.0	-	-	97.7	100.0	95.5	95.4	100.0	-	95.7	96.3	100.0	99.2	-	-	96.7	94.9
Buses	16	209	0	0	-	225	0	3	0	0	-	3	0	82	7	0	-	89	25	0	0	0	-	25	342
% Buses	2.8	5.5	0.0	0.0	-	5.1	0.0	4.2	0.0	-	-	2.3	0.0	2.8	2.3	0.0	-	2.6	2.5	0.0	0.0	-	-	2.2	3.8
Trucks	5	46	0	0	-	51	0	0	0	0	-	0	0	51	7	0	-	58	11	0	1	0	-	12	121
% Trucks	0.9	1.2	0.0	0.0	-	1.2	0.0	0.0	0.0	-	-	0.0	0.0	1.7	2.3	0.0	-	1.7	1.1	0.0	0.8	-	-	1.1	1.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	1.9	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	18	-	-	-	-	-	52	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	98.1	-	-	-	-	-	100.0	-	-

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Industrial Parkway [SB]

Out	In	Total
2976	4094	7070
82	225	307
52	51	103
0	0	0
0	0	0
3110	**4370**	**7480**

R	T	L	U	P
542	3544	7	1	0
16	209	0	0	0
5	46	0	0	0
0	0	0	0	0
0	0	0	0	13
563	**3799**	**7**	**1**	**13**

Old Columbia Pike [EB]

Out	In	Total
901	1082	1983
26	25	51
12	12	24
0	0	0
0	0	0
939	**1119**	**2058**

U	L	T	R	P
0	128	4	950	0
0	0	0	25	0
0	1	0	11	0
0	0	0	0	0
0	0	0	0	15
0	**129**	**4**	**986**	**15**

03/08/2022 6:00 AM
Ending At
03/08/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Old Columbia Pike [WB]

Out	In	Total
131	125	256
0	3	3
0	0	0
0	0	0
0	0	0
131	**128**	**259**

R	T	L	U	P
8	69	48	0	0
0	3	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	18
8	**72**	**48**	**0**	**18**

U	L	T	R	P
3	290	2839	120	0
0	7	82	0	0
0	7	51	0	0
0	0	0	0	1
0	0	0	0	52
3	**304**	**2972**	**120**	**53**

Out	In	Total
4545	3252	7797
234	89	323
57	58	115
0	0	0
0	0	0
4836	**3399**	**8235**

Industrial Parkway [NB]

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Industrial Parkway
Site Code:
Start Date: 03/08/2022

Turning Movement Peak Hour Data (8:45 AM)

	Industrial Parkway Southbound						Old Columbia Pike Westbound						Industrial Parkway Northbound						Old Columbia Pike Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
8:45 AM	9	74	0	0	0	83	0	1	0	0	0	1	4	61	4	0	1	69	22	0	0	0	0	22	175
9:00 AM	7	83	1	0	0	91	1	1	2	0	0	4	3	42	1	0	1	46	36	0	17	0	0	53	194
9:15 AM	6	99	0	0	0	105	0	1	1	0	0	2	2	44	4	0	1	50	15	0	10	0	0	25	182
9:30 AM	6	102	0	0	0	108	0	0	0	0	0	0	4	53	5	0	1	62	15	0	6	0	0	21	191
Total	28	358	1	0	0	387	1	3	3	0	0	7	13	200	14	0	4	227	88	0	33	0	0	121	742
Approach %	7.2	92.5	0.3	0.0	-	-	14.3	42.9	42.9	0.0	-	-	5.7	88.1	6.2	0.0	-	-	72.7	0.0	27.3	0.0	-	-	-
Total %	3.8	48.2	0.1	0.0	-	52.2	0.1	0.4	0.4	0.0	-	0.9	1.8	27.0	1.9	0.0	-	30.6	11.9	0.0	4.4	0.0	-	16.3	-
PHF	0.778	0.877	0.250	0.000	-	0.896	0.250	0.750	0.375	0.000	-	0.438	0.813	0.820	0.700	0.000	-	0.822	0.611	0.000	0.485	0.000	-	0.571	0.956
Lights	26	315	1	0	-	342	1	3	3	0	-	7	13	192	14	0	-	219	83	0	33	0	-	116	684
% Lights	92.9	88.0	100.0	-	-	88.4	100.0	100.0	100.0	-	-	100.0	100.0	96.0	100.0	-	-	96.5	94.3	-	100.0	-	-	95.9	92.2
Buses	1	41	0	0	-	42	0	0	0	0	-	0	0	5	0	0	-	5	4	0	0	0	-	4	51
% Buses	3.6	11.5	0.0	-	-	10.9	0.0	0.0	0.0	-	-	0.0	0.0	2.5	0.0	-	-	2.2	4.5	-	0.0	-	-	3.3	6.9
Trucks	1	2	0	0	-	3	0	0	0	0	-	0	0	3	0	0	-	3	1	0	0	0	-	1	7
% Trucks	3.6	0.6	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.0	-	-	1.3	1.1	-	0.0	-	-	0.8	0.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
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Peak Hour Data

03/08/2022 8:45 AM
Ending At
03/08/2022 9:45 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Industrial Parkway [SB]

Out	In	Total
226	342	568
5	42	47
3	3	6
0	0	0
0	0	0
234	**387**	**621**

R	T	L	U	P
26	315	1	0	0
1	41	0	0	0
1	2	0	0	0
0	0	0	0	0
0	0	0	0	0
28	**358**	**1**	**0**	**0**

Old Columbia Pike [EB]

Out	In	Total
43	116	159
1	4	5
1	1	2
0	0	0
0	0	0
45	**121**	**166**

U	L	T	R	P
0	33	0	83	0
0	0	0	4	0
0	0	0	1	0
0	0	0	0	0
0	0	0	0	0
0	**33**	**0**	**88**	**0**

Old Columbia Pike [WB]

Out	In	Total
14	7	21
0	0	0
0	0	0
0	0	0
0	0	0
14	**7**	**21**

R	T	L	U	P
1	3	3	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	**3**	**3**	**0**	**0**

U	L	T	R	P
0	14	192	13	0
0	0	5	0	0
0	0	3	0	0
0	0	0	0	0
0	0	0	0	4
0	**14**	**200**	**13**	**4**

Out	In	Total
401	219	620
45	5	50
3	3	6
0	0	0
0	0	0
449	**227**	**676**

Industrial Parkway [NB]

Turning Movement Peak Hour Data Plot (8:45 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
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Turning Movement Peak Hour Data (5:15 PM)

Start Time	Industrial Parkway Southbound						Old Columbia Pike Westbound						Industrial Parkway Northbound						Old Columbia Pike Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
5:15 PM	13	91	0	0	0	104	0	1	1	0	1	2	5	71	10	0	4	86	21	0	0	0	0	21	213
5:30 PM	21	107	0	0	0	128	0	6	0	0	0	6	4	58	15	0	2	77	29	0	0	0	0	29	240
5:45 PM	19	110	0	0	0	129	0	1	0	0	1	1	2	80	5	0	2	87	19	1	2	0	0	22	239
6:00 PM	25	97	1	0	0	123	0	1	0	0	2	1	4	66	7	0	2	77	16	0	1	0	1	17	218
Total	78	405	1	0	0	484	0	9	1	0	4	10	15	275	37	0	10	327	85	1	3	0	1	89	910
Approach %	16.1	83.7	0.2	0.0	-	-	0.0	90.0	10.0	0.0	-	-	4.6	84.1	11.3	0.0	-	-	95.5	1.1	3.4	0.0	-	-	-
Total %	8.6	44.5	0.1	0.0	-	53.2	0.0	1.0	0.1	0.0	-	1.1	1.6	30.2	4.1	0.0	-	35.9	9.3	0.1	0.3	0.0	-	9.8	-
PHF	0.780	0.920	0.250	0.000	-	0.938	0.000	0.375	0.250	0.000	-	0.417	0.750	0.859	0.617	0.000	-	0.940	0.733	0.250	0.375	0.000	-	0.767	0.948
Lights	77	375	1	0	-	453	0	9	1	0	-	10	15	271	34	0	-	320	81	1	3	0	-	85	868
% Lights	98.7	92.6	100.0	-	-	93.6	-	100.0	100.0	-	-	100.0	100.0	98.5	91.9	-	-	97.9	95.3	100.0	100.0	-	-	95.5	95.4
Buses	1	26	0	0	-	27	0	0	0	0	-	0	0	4	1	0	-	5	2	0	0	0	-	2	34
% Buses	1.3	6.4	0.0	-	-	5.6	-	0.0	0.0	-	-	0.0	0.0	1.5	2.7	-	-	1.5	2.4	0.0	0.0	-	-	2.2	3.7
Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	0	2	0	-	2	2	0	0	0	-	2	8
% Trucks	0.0	1.0	0.0	-	-	0.8	-	0.0	0.0	-	-	0.0	0.0	0.0	5.4	-	-	0.6	2.4	0.0	0.0	-	-	2.2	0.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	10	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Industrial Parkway
Site Code:
Start Date: 03/08/2022

Peak Hour Data

03/08/2022 5:15 PM
Ending At
03/08/2022 6:15 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Industrial Parkway [SB]

Out	In	Total
274	453	727
4	27	31
0	4	4
0	0	0
0	0	0
278	**484**	**762**

R	T	L	U	P
77	375	1	0	0
1	26	0	0	0
0	4	0	0	0
0	0	0	0	0
0	0	0	0	0
78	**405**	**1**	**0**	**0**

Old Columbia Pike [EB]

Out	In	Total
120	85	205
2	2	4
2	2	4
0	0	0
0	0	0
124	**89**	**213**

U	L	T	R	P
0	3	1	81	0
0	0	0	2	0
0	0	0	2	0
0	0	0	0	0
0	0	0	0	1
0	**3**	**1**	**85**	**1**

Old Columbia Pike [WB]

Out	In	Total
17	10	27
0	0	0
0	0	0
0	0	0
0	0	0
17	**10**	**27**

R	T	L	U	P
0	9	1	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	4
0	**9**	**1**	**0**	**4**

U	L	T	R	P
0	34	271	15	0
0	1	4	0	0
0	2	0	0	0
0	0	0	0	0
0	0	0	0	10
0	**37**	**275**	**15**	**10**

Out	In	Total
457	320	777
28	5	33
6	2	8
0	0	0
0	0	0
491	**327**	**818**

Industrial Parkway [NB]

Turning Movement Peak Hour Data Plot (5:15 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Tech Road
Site Code:
Start Date: 03/08/2022

Turning Movement Data

Start Time	Tech Road Southbound						Prosperity Drive Westbound						Tech Road Northbound						Old Columbia Pike Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	3	86	0	0	0	89	6	0	0	0	2	6	1	31	0	0	0	32	1	0	0	0	0	1	128
6:15 AM	0	95	0	0	0	95	12	0	0	0	0	12	2	61	0	0	2	63	0	0	0	0	0	0	170
6:30 AM	3	91	0	0	0	94	13	0	0	0	3	13	1	93	0	0	3	94	0	0	0	0	0	0	201
6:45 AM	3	78	0	0	0	81	17	0	0	0	1	17	4	87	0	0	0	91	0	0	0	0	0	0	189
Hourly Total	9	350	0	0	0	359	48	0	0	0	6	48	8	272	0	0	5	280	1	0	0	0	0	1	688
7:00 AM	4	82	0	0	0	86	13	0	0	0	2	13	2	65	0	0	2	67	2	0	0	0	0	2	168
7:15 AM	2	84	0	0	0	86	12	0	0	0	1	12	3	61	0	0	0	64	1	0	0	0	0	1	163
7:30 AM	3	104	0	0	0	107	16	0	0	1	3	17	3	84	0	0	0	87	2	0	0	0	0	2	213
7:45 AM	2	152	0	0	0	154	14	0	0	0	4	14	5	55	0	0	1	60	0	0	0	0	0	0	228
Hourly Total	11	422	0	0	0	433	55	0	0	1	10	56	13	265	0	0	3	278	5	0	0	0	0	5	772
8:00 AM	2	150	0	0	0	152	15	0	0	0	0	15	5	75	0	0	0	80	1	0	0	0	0	1	248
8:15 AM	4	105	0	0	0	109	17	0	0	0	2	17	7	67	0	0	1	74	2	0	0	0	0	2	202
8:30 AM	3	99	0	0	1	102	18	0	0	0	2	18	4	82	0	0	0	86	1	0	0	0	0	1	207
8:45 AM	1	144	0	0	0	145	26	0	0	0	1	26	9	72	0	0	0	81	4	0	0	0	0	4	256
Hourly Total	10	498	0	0	1	508	76	0	0	0	5	76	25	296	0	0	1	321	8	0	0	0	0	8	913
9:00 AM	3	155	0	0	0	158	22	0	0	0	2	22	6	87	0	0	2	93	2	0	0	0	0	2	275
9:15 AM	2	150	0	0	0	152	22	0	0	0	1	22	3	98	0	0	2	101	2	0	0	0	0	2	277
9:30 AM	1	165	0	0	0	166	27	0	0	0	0	27	10	113	0	0	0	123	6	0	0	0	0	6	322
9:45 AM	3	153	0	0	0	156	20	0	0	1	3	21	6	125	0	0	0	131	4	0	0	0	0	4	312
Hourly Total	9	623	0	0	0	632	91	0	0	1	6	92	25	423	0	0	4	448	14	0	0	0	0	14	1186
10:00 AM	2	124	0	0	1	126	30	0	0	0	3	30	7	115	0	0	0	122	3	0	0	0	0	3	281
10:15 AM	2	117	0	0	0	119	24	0	0	1	1	25	7	101	0	0	2	108	3	0	0	0	0	3	255
10:30 AM	2	105	0	0	0	107	31	0	0	0	0	31	8	106	0	0	0	114	5	0	0	0	0	5	257
10:45 AM	1	106	0	0	0	107	23	0	0	0	4	23	7	99	0	0	0	106	5	0	0	0	0	5	241
Hourly Total	7	452	0	0	1	459	108	0	0	1	8	109	29	421	0	0	2	450	16	0	0	0	0	16	1034
11:00 AM	2	117	0	0	0	119	18	0	0	0	4	18	5	113	0	0	2	118	3	0	0	0	0	3	258
11:15 AM	3	134	0	0	1	137	19	0	0	0	5	19	3	142	0	0	1	145	0	0	0	0	0	0	301
11:30 AM	0	122	0	0	0	122	17	0	0	0	2	17	11	124	0	0	0	135	2	0	0	0	1	2	276
11:45 AM	4	135	0	0	0	139	32	0	0	0	6	32	3	108	0	0	2	111	6	0	0	0	0	6	288
Hourly Total	9	508	0	0	1	517	86	0	0	0	17	86	22	487	0	0	5	509	11	0	0	0	1	11	1123
12:00 PM	1	129	0	0	0	130	30	0	0	0	8	30	5	146	0	0	1	151	7	0	0	0	0	7	318
12:15 PM	0	163	0	0	0	163	31	0	0	0	9	31	8	137	0	0	0	145	1	0	0	1	0	2	341
12:30 PM	2	152	0	0	0	154	40	0	0	0	1	40	3	132	0	0	1	135	1	0	0	0	0	1	330
12:45 PM	3	129	0	0	0	132	31	0	0	0	2	31	7	143	0	0	0	150	4	0	0	0	0	4	317
Hourly Total	6	573	0	0	0	579	132	0	0	0	20	132	23	558	0	0	2	581	13	0	0	1	0	14	1306
1:00 PM	0	156	0	0	2	156	18	0	0	0	3	18	5	146	0	0	0	151	4	0	0	0	2	4	329
1:15 PM	2	136	0	0	0	138	25	0	0	1	2	26	4	117	0	0	1	121	1	0	0	0	0	1	286
1:30 PM	3	149	0	0	0	152	26	0	0	0	4	26	10	120	0	0	2	130	1	0	0	0	0	1	309

1:45 PM	4	130	0	0	0	134	22	0	0	0	1	22	7	131	0	0	2	138	2	0	0	0	0	2	296
Hourly Total	9	571	0	0	2	580	91	0	0	1	10	92	26	514	0	0	5	540	8	0	0	0	2	8	1220
2:00 PM	1	139	0	0	1	140	19	0	0	0	6	19	6	184	0	0	4	190	3	0	0	0	0	3	352
2:15 PM	2	114	0	0	0	116	20	0	0	1	3	21	6	166	0	0	1	172	3	0	0	0	0	3	312
2:30 PM	0	109	0	0	0	109	26	0	0	0	4	26	4	158	0	0	0	162	2	0	0	0	0	2	299
2:45 PM	2	125	0	0	1	127	27	0	1	0	6	28	4	123	0	0	0	127	3	0	0	0	1	3	285
Hourly Total	5	487	0	0	2	492	92	0	1	1	19	94	20	631	0	0	5	651	11	0	0	0	1	11	1248
3:00 PM	3	102	0	0	0	105	27	0	0	0	12	27	5	117	0	0	0	122	1	0	0	0	0	1	255
3:15 PM	3	101	0	0	0	104	23	0	0	0	7	23	9	140	0	0	7	149	1	0	0	0	0	1	277
3:30 PM	2	125	0	0	0	127	26	0	1	1	5	28	7	146	0	0	1	153	3	0	0	0	0	3	311
3:45 PM	3	129	0	0	0	132	17	0	0	1	19	18	11	141	0	0	3	152	1	0	0	0	0	1	303
Hourly Total	11	457	0	0	0	468	93	0	1	2	43	96	32	544	0	0	11	576	6	0	0	0	0	6	1146
4:00 PM	3	121	0	0	0	124	30	0	0	0	4	30	4	141	0	0	0	145	2	0	0	0	0	2	301
4:15 PM	2	132	0	0	0	134	24	0	0	1	5	25	8	153	0	0	0	161	2	0	0	0	0	2	322
4:30 PM	2	106	0	0	0	108	16	0	0	0	6	16	2	161	0	0	4	163	4	0	0	0	0	4	291
4:45 PM	2	131	0	0	0	133	27	0	0	0	5	27	4	161	0	0	0	165	4	0	0	0	0	4	329
Hourly Total	9	490	0	0	0	499	97	0	0	1	20	98	18	616	0	0	4	634	12	0	0	0	0	12	1243
5:00 PM	1	97	0	0	0	98	28	0	0	0	6	28	5	190	0	0	0	195	3	0	0	0	0	3	324
5:15 PM	3	127	0	0	0	130	26	0	0	0	8	26	3	179	0	0	0	182	5	0	0	0	0	5	343
5:30 PM	6	108	0	0	0	114	32	0	0	0	6	32	1	169	0	0	3	170	3	0	0	0	0	3	319
5:45 PM	2	114	0	0	0	116	14	0	0	0	7	14	7	162	0	0	2	169	4	0	0	0	1	4	303
Hourly Total	12	446	0	0	0	458	100	0	0	0	27	100	16	700	0	0	5	716	15	0	0	0	1	15	1289
6:00 PM	1	111	0	0	0	112	25	0	0	0	10	25	3	116	0	0	2	119	5	0	0	0	1	5	261
6:15 PM	4	125	0	0	1	129	15	0	0	0	2	15	11	134	0	0	0	145	2	0	0	0	2	2	291
6:30 PM	4	119	0	0	0	123	20	0	0	0	4	20	4	149	0	0	4	153	0	0	0	0	0	0	296
6:45 PM	8	120	0	0	0	128	24	0	0	0	5	24	1	142	0	0	2	143	1	0	0	0	0	1	296
Hourly Total	17	475	0	0	1	492	84	0	0	0	21	84	19	541	0	0	8	560	8	0	0	0	3	8	1144
Grand Total	124	6352	0	0	8	6476	1153	0	2	8	212	1163	276	6268	0	0	60	6544	128	0	0	1	8	129	14312
Approach %	1.9	98.1	0.0	0.0	-	-	99.1	0.0	0.2	0.7	-	-	4.2	95.8	0.0	0.0	-	-	99.2	0.0	0.0	0.8	-	-	-
Total %	0.9	44.4	0.0	0.0	-	45.2	8.1	0.0	0.0	0.1	-	8.1	1.9	43.8	0.0	0.0	-	45.7	0.9	0.0	0.0	0.0	-	0.9	-
Lights	121	5954	0	0	-	6075	1136	0	2	8	-	1146	269	5756	0	0	-	6025	128	0	0	1	-	129	13375
% Lights	97.6	93.7	-	-	-	93.8	98.5	-	100.0	100.0	-	98.5	97.5	91.8	-	-	-	92.1	100.0	-	-	100.0	-	100.0	93.5
Buses	3	316	0	0	-	319	1	0	0	0	-	1	2	439	0	0	-	441	0	0	0	0	-	0	761
% Buses	2.4	5.0	-	-	-	4.9	0.1	-	0.0	0.0	-	0.1	0.7	7.0	-	-	-	6.7	0.0	-	-	0.0	-	0.0	5.3
Trucks	0	82	0	0	-	82	16	0	0	0	-	16	5	73	0	0	-	78	0	0	0	0	-	0	176
% Trucks	0.0	1.3	-	-	-	1.3	1.4	-	0.0	0.0	-	1.4	1.8	1.2	-	-	-	1.2	0.0	-	-	0.0	-	0.0	1.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	3.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	212	-	-	-	-	-	58	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	96.7	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Tech Road
Site Code:
Start Date: 03/08/2022

Tech Road [SB]		
Out	In	Total
6892	6075	12967
440	319	759
89	82	171
0	0	0
0	0	0
7421	**6476**	**13897**

121	5954	0	0	0
3	316	0	0	0
0	82	0	0	0
0	0	0	0	0
0	0	0	0	8
124	**6352**	**0**	**0**	**8**
R	T	L	U	P

Old Columbia Pike [EB]		
Out	In	Total
122	129	251
3	0	3
0	0	0
0	0	0
0	0	0
125	**129**	**254**

1	0	0	128	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	8
1	**0**	**0**	**128**	**8**
U	L	T	R	P

R	T	L	U	P
1153	**0**	**2**	**8**	**212**
0	0	0	0	212
0	0	0	0	0
16	0	0	0	0
1	0	0	0	0
1136	0	2	8	0

Prosperity Drive [WB]		
Out	In	Total
277	1146	1423
2	1	3
5	16	21
0	0	0
0	0	0
284	**1163**	**1447**

03/08/2022 6:00 AM
Ending At
03/08/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

U	L	T	R	P
0	0	5756	269	0
0	0	439	2	0
0	0	73	5	0
0	0	0	0	2
0	0	0	0	58
0	**0**	**6268**	**276**	**60**

6084	6025	12109
316	441	757
82	78	160
0	0	0
0	0	0
6482	**6544**	**13026**
Out	In	Total
Tech Road [NB]		

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (9:15 AM)

Start Time	Tech Road Southbound Right	Thru	Left	U-Turn	Peds	App. Total
9:15 AM	2	150	0	0	0	152
9:30 AM	1	165	0	0	0	166
9:45 AM	3	153	0	0	0	156
10:00 AM	2	124	0	0	1	126
Total	8	592	0	0	1	600
Approach %	1.3	98.7	0.0	0.0	-	-
Total %	0.7	49.7	0.0	0.0	-	50.3
PHF	0.667	0.897	0.000	0.000	-	0.904
Lights	8	480	0	0	-	488
% Lights	100.0	81.1	-	-	-	81.3
Buses	0	97	0	0	-	97
% Buses	0.0	16.4	-	-	-	16.2
Trucks	0	15	0	0	-	15
% Trucks	0.0	2.5	-	-	-	2.5
Bicycles on Crosswalk	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	1	-
% Pedestrians	-	-	-	-	100.0	-

Start Time	Prosperity Drive Westbound Right	Thru	Left	U-Turn	Peds	App. Total
9:15 AM	22	0	0	0	1	22
9:30 AM	27	0	0	0	0	27
9:45 AM	20	0	0	1	3	21
10:00 AM	30	0	0	0	3	30
Total	99	0	0	1	7	100
Approach %	99.0	0.0	0.0	1.0	-	-
Total %	8.3	0.0	0.0	0.1	-	8.4
PHF	0.825	0.000	0.000	0.250	-	0.833
Lights	98	0	0	1	-	99
% Lights	99.0	-	-	100.0	-	99.0
Buses	0	0	0	0	-	0
% Buses	0.0	-	-	0.0	-	0.0
Trucks	1	0	0	0	-	1
% Trucks	1.0	-	-	0.0	-	1.0
Bicycles on Crosswalk	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	7	-
% Pedestrians	-	-	-	-	100.0	-

Start Time	Tech Road Northbound Right	Thru	Left	U-Turn	Peds	App. Total
9:15 AM	3	98	0	0	2	101
9:30 AM	10	113	0	0	0	123
9:45 AM	6	125	0	0	0	131
10:00 AM	7	115	0	0	0	122
Total	26	451	0	0	2	477
Approach %	5.5	94.5	0.0	0.0	-	-
Total %	2.2	37.8	0.0	0.0	-	40.0
PHF	0.650	0.902	0.000	0.000	-	0.910
Lights	26	437	0	0	-	463
% Lights	100.0	96.9	-	-	-	97.1
Buses	0	8	0	0	-	8
% Buses	0.0	1.8	-	-	-	1.7
Trucks	0	6	0	0	-	6
% Trucks	0.0	1.3	-	-	-	1.3
Bicycles on Crosswalk	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	2	-
% Pedestrians	-	-	-	-	100.0	-

Start Time	Old Columbia Pike Eastbound Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
9:15 AM	2	0	0	0	0	2	277
9:30 AM	6	0	0	0	0	6	322
9:45 AM	4	0	0	0	0	4	312
10:00 AM	3	0	0	0	0	3	281
Total	15	0	0	0	0	15	1192
Approach %	100.0	0.0	0.0	0.0	-	-	-
Total %	1.3	0.0	0.0	0.0	-	1.3	-
PHF	0.625	0.000	0.000	0.000	-	0.625	0.925
Lights	15	0	0	0	-	15	1065
% Lights	100.0	-	-	-	-	100.0	89.3
Buses	0	0	0	0	-	0	105
% Buses	0.0	-	-	-	-	0.0	8.8
Trucks	0	0	0	0	-	0	22
% Trucks	0.0	-	-	-	-	0.0	1.8
Bicycles on Crosswalk	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-

RJM Engineering
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Peak Hour Data

03/08/2022 9:15 AM
Ending At
03/08/2022 10:15 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Tech Road [SB]

Out	In	Total
535	488	1023
8	97	105
7	15	22
0	0	0
0	0	0
550	**600**	**1150**

R	T	L	U	P
8	480	0	0	0
0	97	0	0	0
0	15	0	0	0
0	0	0	0	0
0	0	0	0	1
8	**592**	**0**	**0**	**1**

Old Columbia Pike [EB]

Out	In	Total
8	15	23
0	0	0
0	0	0
0	0	0
0	0	0
8	**15**	**23**

U	L	T	R	P
0	0	0	15	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	**0**	**0**	**15**	**0**

Prosperity Drive [WB]

Out	In	Total
27	99	126
0	0	0
0	1	1
0	0	0
0	0	0
27	**100**	**127**

R	T	L	U	P
98	0	0	1	0
0	0	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	7
99	**0**	**0**	**1**	**7**

U	L	T	R	P
0	0	437	26	0
0	0	8	0	0
0	0	6	0	0
0	0	0	0	0
0	0	0	0	2
0	**0**	**451**	**26**	**2**

Out	In	Total
495	463	958
97	8	105
15	6	21
0	0	0
0	0	0
607	**477**	**1084**

Tech Road [NB]

Turning Movement Peak Hour Data Plot (9:15 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
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Turning Movement Peak Hour Data (12:15 PM)

	Tech Road Southbound						Prosperity Drive Westbound						Tech Road Northbound						Old Columbia Pike Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
12:15 PM	0	163	0	0	0	163	31	0	0	0	9	31	8	137	0	0	0	145	1	0	0	1	0	2	341
12:30 PM	2	152	0	0	0	154	40	0	0	0	1	40	3	132	0	0	1	135	1	0	0	0	0	1	330
12:45 PM	3	129	0	0	0	132	31	0	0	0	2	31	7	143	0	0	0	150	4	0	0	0	0	4	317
1:00 PM	0	156	0	0	2	156	18	0	0	0	3	18	5	146	0	0	0	151	4	0	0	0	2	4	329
Total	5	600	0	0	2	605	120	0	0	0	15	120	23	558	0	0	1	581	10	0	0	1	2	11	1317
Approach %	0.8	99.2	0.0	0.0	-	-	100.0	0.0	0.0	0.0	-	-	4.0	96.0	0.0	0.0	-	-	90.9	0.0	0.0	9.1	-	-	-
Total %	0.4	45.6	0.0	0.0	-	45.9	9.1	0.0	0.0	0.0	-	9.1	1.7	42.4	0.0	0.0	-	44.1	0.8	0.0	0.0	0.1	-	0.8	-
PHF	0.417	0.920	0.000	0.000	-	0.928	0.750	0.000	0.000	0.000	-	0.750	0.719	0.955	0.000	0.000	-	0.962	0.625	0.000	0.000	0.250	-	0.688	0.966
Lights	5	569	0	0	-	574	119	0	0	0	-	119	22	519	0	0	-	541	10	0	0	1	-	11	1245
% Lights	100.0	94.8	-	-	-	94.9	99.2	-	-	-	-	99.2	95.7	93.0	-	-	-	93.1	100.0	-	-	100.0	-	100.0	94.5
Buses	0	24	0	0	-	24	0	0	0	0	-	0	0	32	0	0	-	32	0	0	0	0	-	0	56
% Buses	0.0	4.0	-	-	-	4.0	0.0	-	-	-	-	0.0	0.0	5.7	-	-	-	5.5	0.0	-	-	0.0	-	0.0	4.3
Trucks	0	7	0	0	-	7	1	0	0	0	-	1	1	7	0	0	-	8	0	0	0	0	-	0	16
% Trucks	0.0	1.2	-	-	-	1.2	0.8	-	-	-	-	0.8	4.3	1.3	-	-	-	1.4	0.0	-	-	0.0	-	0.0	1.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	15	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Old Columbia Pike at Tech Road
Site Code:
Start Date: 03/08/2022

Peak Hour Data

03/08/2022 12:15 PM
Ending At
03/08/2022 1:15 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Tech Road [SB]

Out	In	Total
638	574	1212
32	24	56
8	7	15
0	0	0
0	0	0
678	**605**	**1283**

R	T	L	U	P
5	569	0	0	0
0	24	0	0	0
0	7	0	0	0
0	0	0	0	0
0	0	0	0	2
5	**600**	**0**	**0**	**2**

Old Columbia Pike [EB]

Out	In	Total
6	11	17
0	0	0
0	0	0
0	0	0
0	0	0
6	**11**	**17**

U	L	T	R	P
1	0	0	10	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	2
1	**0**	**0**	**10**	**2**

Prosperity Drive [WB]

Out	In	Total
22	119	141
0	0	0
1	1	2
0	0	0
0	0	0
23	**120**	**143**

R	T	L	U	P
119	0	0	0	0
0	0	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	15
120	**0**	**0**	**0**	**15**

U	L	T	R	P
0	0	519	22	0
0	0	32	0	0
0	0	7	1	0
0	0	0	0	0
0	0	0	0	1
0	**0**	**558**	**23**	**1**

Tech Road [NB]

Out	In	Total
579	541	1120
24	32	56
7	8	15
0	0	0
0	0	0
610	**581**	**1191**

Turning Movement Peak Hour Data Plot (12:15 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Whitethorn Court
Site Code:
Start Date: 03/08/2022

Turning Movement Data

Start Time	Parking Lot Southbound						Prosperity Drive Westbound						Whitethorn Court Northbound						Prosperity Drive Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	1	0	0	0	0	1	1	5	17	0	0	23	2	1	3	0	1	6	0	0	0	0	0	0	30
6:15 AM	0	0	0	0	0	0	0	11	10	0	0	21	4	0	5	0	1	9	1	4	0	0	0	5	35
6:30 AM	1	0	1	0	0	2	2	9	14	0	0	25	8	1	4	0	0	13	0	0	0	0	0	0	40
6:45 AM	0	0	2	0	1	2	3	21	19	0	0	43	8	0	4	0	0	12	7	8	0	0	1	15	72
Hourly Total	2	0	3	0	1	5	6	46	60	0	0	112	22	2	16	0	2	40	8	12	0	0	1	20	177
7:00 AM	0	0	0	0	0	0	0	24	16	0	1	40	11	0	2	0	1	13	1	4	1	0	0	6	59
7:15 AM	0	0	1	0	0	1	1	15	27	0	0	43	10	1	7	0	0	18	2	3	0	0	0	5	67
7:30 AM	0	0	0	0	2	0	2	22	27	0	0	51	23	0	4	0	0	27	2	5	0	0	2	7	85
7:45 AM	0	0	1	0	0	1	3	20	32	0	0	55	24	0	8	0	0	32	4	6	2	0	0	12	100
Hourly Total	0	0	2	0	2	2	6	81	102	0	1	189	68	1	21	0	1	90	9	18	3	0	2	30	311
8:00 AM	0	0	2	0	2	2	5	27	36	0	1	68	35	0	6	0	1	41	1	11	1	0	0	13	124
8:15 AM	0	2	1	0	1	3	6	32	34	0	1	72	26	0	5	0	1	31	3	14	1	0	0	18	124
8:30 AM	1	0	0	0	1	1	3	25	36	0	0	64	16	0	7	0	0	23	2	12	1	0	0	15	103
8:45 AM	0	0	4	0	0	4	3	22	31	2	0	58	27	1	12	0	1	40	3	11	1	0	1	15	117
Hourly Total	1	2	7	0	4	10	17	106	137	2	2	262	104	1	30	0	3	135	9	48	4	0	1	61	468
9:00 AM	0	1	3	0	3	4	5	20	38	0	0	63	24	1	13	0	0	38	2	12	0	0	1	14	119
9:15 AM	1	0	3	0	0	4	5	35	28	0	0	68	24	0	9	0	0	33	0	17	3	0	0	20	125
9:30 AM	5	0	1	0	2	6	1	34	36	0	0	71	30	0	6	0	1	36	9	19	1	0	0	29	142
9:45 AM	0	0	0	0	4	0	8	30	48	0	0	86	32	0	9	0	0	41	2	19	1	0	1	22	149
Hourly Total	6	1	7	0	9	14	19	119	150	0	0	288	110	1	37	0	1	148	13	67	5	0	2	85	535
10:00 AM	2	1	3	0	1	6	1	29	37	0	0	67	42	0	10	0	0	52	0	21	4	0	0	25	150
10:15 AM	1	4	3	0	0	8	7	27	36	0	0	70	26	0	10	0	0	36	4	17	2	0	0	23	137
10:30 AM	1	1	2	0	0	4	9	33	33	0	0	75	43	1	14	0	0	58	5	17	1	0	0	23	160
10:45 AM	0	1	4	0	1	5	3	20	25	0	1	48	27	0	7	0	1	34	1	23	1	0	0	25	112
Hourly Total	4	7	12	0	2	23	20	109	131	0	1	260	138	1	41	0	1	180	10	78	8	0	0	96	559
11:00 AM	3	0	10	0	1	13	8	18	41	0	0	67	46	0	10	0	0	56	2	19	1	0	0	22	158
11:15 AM	1	2	4	0	4	7	3	27	31	0	1	61	44	3	12	0	0	59	0	25	0	0	0	25	152
11:30 AM	0	3	6	0	1	9	7	25	46	0	0	78	24	0	8	0	0	32	3	31	3	0	1	37	156
11:45 AM	3	1	6	0	1	10	1	22	31	0	0	54	41	0	11	0	0	52	9	17	1	0	0	27	143
Hourly Total	7	6	26	0	7	39	19	92	149	0	1	260	155	3	41	0	0	199	14	92	5	0	1	111	609
12:00 PM	3	1	8	0	0	12	6	27	39	1	0	73	47	1	6	0	0	54	3	15	0	0	0	18	157
12:15 PM	3	0	8	0	0	11	3	31	37	0	0	71	32	1	17	0	3	50	4	18	1	0	0	23	155
12:30 PM	1	0	4	0	0	5	6	28	36	0	0	70	41	0	16	0	1	57	5	23	0	0	0	28	160
12:45 PM	8	0	6	0	0	14	3	33	36	0	0	72	45	3	11	0	1	59	3	27	2	0	0	32	177
Hourly Total	15	1	26	0	0	42	18	119	148	1	0	286	165	5	50	0	5	220	15	83	3	0	0	101	649
1:00 PM	1	0	10	0	1	11	3	22	42	0	0	67	37	1	13	0	0	51	2	31	4	0	1	37	166
1:15 PM	1	1	4	0	1	6	5	26	46	0	0	77	27	2	9	0	1	38	3	15	1	0	1	19	140
1:30 PM	2	2	3	0	4	7	5	25	37	0	0	67	40	0	6	0	0	46	2	16	5	0	3	23	143

1:45 PM	1	1	3	0	2	5	6	16	48	0	0	70	41	0	13	0	0	54	1	22	1	0	2	24	153
Hourly Total	5	4	20	0	8	29	19	89	173	0	0	281	145	3	41	0	1	189	8	84	11	0	7	103	602
2:00 PM	0	2	8	0	0	10	7	26	29	0	0	62	40	0	7	0	3	47	1	20	0	0	0	21	140
2:15 PM	2	1	3	0	2	6	7	25	27	0	0	59	48	0	8	0	0	56	6	25	2	1	2	34	155
2:30 PM	3	0	7	0	1	10	5	21	29	0	0	55	38	0	10	0	0	48	2	17	0	0	1	19	132
2:45 PM	3	3	5	0	0	11	8	16	38	1	0	63	37	2	13	0	0	52	3	28	2	0	0	33	159
Hourly Total	8	6	23	0	3	37	27	88	123	1	0	239	163	2	38	0	3	203	12	90	4	1	3	107	586
3:00 PM	1	0	6	0	0	7	4	30	44	0	0	78	36	0	17	0	0	53	2	18	0	0	0	20	158
3:15 PM	1	0	2	0	1	3	4	19	37	1	0	61	44	0	10	0	0	54	3	18	3	0	0	24	142
3:30 PM	3	0	8	0	1	11	8	28	33	0	0	69	29	0	12	0	2	41	4	11	1	0	1	16	137
3:45 PM	2	0	6	0	1	8	8	21	27	0	0	56	24	0	10	0	0	34	8	30	2	0	0	40	138
Hourly Total	7	0	22	0	3	29	24	98	141	1	0	264	133	0	49	0	2	182	17	77	6	0	1	100	575
4:00 PM	2	1	2	0	1	5	4	29	24	0	0	57	37	0	8	0	2	45	3	19	1	0	0	23	130
4:15 PM	0	1	3	0	1	4	9	25	25	0	0	59	27	1	7	0	0	35	3	29	1	0	0	33	131
4:30 PM	1	1	9	0	3	11	3	21	28	0	0	52	32	0	7	0	0	39	3	28	1	0	1	32	134
4:45 PM	0	0	5	0	0	5	5	25	21	0	0	51	42	1	10	0	2	53	1	25	0	0	0	26	135
Hourly Total	3	3	19	0	5	25	21	100	98	0	0	219	138	2	32	0	4	172	10	101	3	0	1	114	530
5:00 PM	3	0	5	0	1	8	2	27	21	0	0	50	45	0	8	0	1	53	6	37	2	0	0	45	156
5:15 PM	1	0	9	0	0	10	5	34	32	0	0	71	31	1	12	0	0	44	0	19	2	0	0	21	146
5:30 PM	1	0	9	0	0	10	1	25	28	0	0	54	41	0	13	0	2	54	3	28	0	0	0	31	149
5:45 PM	1	3	3	0	0	7	2	25	32	0	1	59	43	1	4	0	0	48	3	23	3	0	0	29	143
Hourly Total	6	3	26	0	1	35	10	111	113	0	1	234	160	2	37	0	3	199	12	107	7	0	0	126	594
6:00 PM	0	0	0	0	1	0	0	26	23	0	1	49	29	0	6	0	0	35	1	24	0	0	0	25	109
6:15 PM	0	0	1	0	0	1	2	20	31	0	0	53	30	0	7	0	0	37	2	23	2	0	0	27	118
6:30 PM	1	0	3	0	0	4	0	19	14	1	0	34	33	0	9	0	0	42	1	21	1	0	0	23	103
6:45 PM	0	0	2	0	0	2	2	24	23	0	0	49	30	0	6	0	2	36	2	11	0	0	0	13	100
Hourly Total	1	0	6	0	1	7	4	89	91	1	1	185	122	0	28	0	2	150	6	79	3	0	0	88	430
Grand Total	65	33	199	0	46	297	210	1247	1616	6	7	3079	1623	23	461	0	28	2107	143	936	62	1	19	1142	6625
Approach %	21.9	11.1	67.0	0.0	-	-	6.8	40.5	52.5	0.2	-	-	77.0	1.1	21.9	0.0	-	-	12.5	82.0	5.4	0.1	-	-	-
Total %	1.0	0.5	3.0	0.0	-	4.5	3.2	18.8	24.4	0.1	-	46.5	24.5	0.3	7.0	0.0	-	31.8	2.2	14.1	0.9	0.0	-	17.2	-
Lights	63	31	196	0	-	290	207	1235	1563	6	-	3011	1570	23	448	0	-	2041	140	923	62	1	-	1126	6468
% Lights	96.9	93.9	98.5	-	-	97.6	98.6	99.0	96.7	100.0	-	97.8	96.7	100.0	97.2	-	-	96.9	97.9	98.6	100.0	100.0	-	98.6	97.6
Buses	0	0	0	0	-	0	0	0	4	0	-	4	1	0	0	0	-	1	0	2	0	0	-	2	7
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.2	0.0	-	0.1	0.1	0.0	0.0	-	-	0.0	0.0	0.2	0.0	0.0	-	0.2	0.1
Trucks	2	2	3	0	-	7	3	12	49	0	-	64	52	0	13	0	-	65	3	11	0	0	-	14	150
% Trucks	3.1	6.1	1.5	-	-	2.4	1.4	1.0	3.0	0.0	-	2.1	3.2	0.0	2.8	-	-	3.1	2.1	1.2	0.0	0.0	-	1.2	2.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	46	-	-	-	-	-	7	-	-	-	-	-	28	-	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Whitethorn Court
Site Code:
Start Date: 03/08/2022

03/08/2022 6:00 AM
Ending At
03/08/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Parking Lot [SB]

Out	In	Total
292	290	582
0	0	0
3	7	10
0	0	0
0	0	0
295	**297**	**592**

R	T	L	U	P
63	31	196	0	0
0	0	0	0	0
2	2	3	0	0
0	0	0	0	0
0	0	0	0	46
65	**33**	**199**	**0**	**46**

Prosperity Drive [EB]

Out	In	Total
1747	1126	2873
0	2	2
27	14	41
0	0	0
0	0	0
1774	**1142**	**2916**

U	L	T	R	P
1	62	923	140	0
0	0	2	0	0
0	0	11	3	0
0	0	0	0	0
0	0	0	0	19
1	**62**	**936**	**143**	**19**

Prosperity Drive [WB]

Out	In	Total
2695	3011	5706
3	4	7
66	64	130
0	0	0
0	0	0
2764	**3079**	**5843**

R	T	L	U	P
207	1235	1563	6	0
0	0	4	0	0
3	12	49	0	0
0	0	0	0	0
0	0	0	0	7
210	**1247**	**1616**	**6**	**7**

Whitethorn Court [NB]

U	L	T	R	P
0	448	23	1570	0
0	0	0	1	0
0	13	0	52	0
0	0	0	0	0
0	0	0	0	28
0	**461**	**23**	**1623**	**28**

Out	In	Total
1734	2041	3775
4	1	5
54	65	119
0	0	0
0	0	0
1792	**2107**	**3899**

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (11:00 AM)

	Parking Lot Southbound						Prosperity Drive Westbound						Whitethorn Court Northbound						Prosperity Drive Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
11:00 AM	3	0	10	0	1	13	8	18	41	0	0	67	46	0	10	0	0	56	2	19	1	0	0	22	158
11:15 AM	1	2	4	0	4	7	3	27	31	0	1	61	44	3	12	0	0	59	0	25	0	0	0	25	152
11:30 AM	0	3	6	0	1	9	7	25	46	0	0	78	24	0	8	0	0	32	3	31	3	0	1	37	156
11:45 AM	3	1	6	0	1	10	1	22	31	0	0	54	41	0	11	0	0	52	9	17	1	0	0	27	143
Total	7	6	26	0	7	39	19	92	149	0	1	260	155	3	41	0	0	199	14	92	5	0	1	111	609
Approach %	17.9	15.4	66.7	0.0	-	-	7.3	35.4	57.3	0.0	-	-	77.9	1.5	20.6	0.0	-	-	12.6	82.9	4.5	0.0	-	-	-
Total %	1.1	1.0	4.3	0.0	-	6.4	3.1	15.1	24.5	0.0	-	42.7	25.5	0.5	6.7	0.0	-	32.7	2.3	15.1	0.8	0.0	-	18.2	-
PHF	0.583	0.500	0.650	0.000	-	0.750	0.594	0.852	0.810	0.000	-	0.833	0.842	0.250	0.854	0.000	-	0.843	0.389	0.742	0.417	0.000	-	0.750	0.964
Lights	7	6	25	0	-	38	18	89	143	0	-	250	150	3	37	0	-	190	14	89	5	0	-	108	586
% Lights	100.0	100.0	96.2	-	-	97.4	94.7	96.7	96.0	-	-	96.2	96.8	100.0	90.2	-	-	95.5	100.0	96.7	100.0	-	-	97.3	96.2
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Trucks	0	0	1	0	-	1	1	3	6	0	-	10	5	0	4	0	-	9	0	3	0	0	-	3	23
% Trucks	0.0	0.0	3.8	-	-	2.6	5.3	3.3	4.0	-	-	3.8	3.2	0.0	9.8	-	-	4.5	0.0	3.3	0.0	-	-	2.7	3.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Whitethorn Court
Site Code:
Start Date: 03/08/2022
Page No: 5

Peak Hour Data

03/08/2022 11:00 AM
Ending At
03/08/2022 12:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Parking Lot [SB]

Out	In	Total
26	38	64
0	0	0
1	1	2
0	0	0
0	0	0
27	**39**	**66**

R	T	L	U	P
7	6	25	0	0
0	0	0	0	0
0	0	1	0	0
0	0	0	0	0
0	0	0	0	7
7	**6**	**26**	**0**	**7**

Prosperity Drive [EB]

Out	In	Total
133	108	241
0	0	0
7	3	10
0	0	0
0	0	0
140	**111**	**251**

U	L	T	R	P
0	5	89	14	0
0	0	0	0	0
0	0	3	0	0
0	0	0	0	0
0	0	0	0	1
0	**5**	**92**	**14**	**1**

Prosperity Drive [WB]

Out	In	Total
264	250	514
0	0	0
9	10	19
0	0	0
0	0	0
273	**260**	**533**

R	T	L	U	P
18	89	143	0	0
0	0	0	0	0
1	3	6	0	0
0	0	0	0	0
0	0	0	0	1
19	**92**	**149**	**0**	**1**

Whitethorn Court [NB]

U	L	T	R	P
0	37	3	150	0
0	0	0	0	0
0	4	0	5	0
0	0	0	0	0
0	0	0	0	0
0	**41**	**3**	**155**	**0**

Out	In	Total
163	190	353
0	0	0
6	9	15
0	0	0
0	0	0
169	**199**	**368**

Turning Movement Peak Hour Data Plot (11:00 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (12:15 PM)

Start Time	Parking Lot Southbound						Prosperity Drive Westbound						Whitethorn Court Northbound						Prosperity Drive Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
12:15 PM	3	0	8	0	0	11	3	31	37	0	0	71	32	1	17	0	3	50	4	18	1	0	0	23	155
12:30 PM	1	0	4	0	0	5	6	28	36	0	0	70	41	0	16	0	1	57	5	23	0	0	0	28	160
12:45 PM	8	0	6	0	0	14	3	33	36	0	0	72	45	3	11	0	1	59	3	27	2	0	0	32	177
1:00 PM	1	0	10	0	1	11	3	22	42	0	0	67	37	1	13	0	0	51	2	31	4	0	1	37	166
Total	13	0	28	0	1	41	15	114	151	0	0	280	155	5	57	0	5	217	14	99	7	0	1	120	658
Approach %	31.7	0.0	68.3	0.0	-	-	5.4	40.7	53.9	0.0	-	-	71.4	2.3	26.3	0.0	-	-	11.7	82.5	5.8	0.0	-	-	-
Total %	2.0	0.0	4.3	0.0	-	6.2	2.3	17.3	22.9	0.0	-	42.6	23.6	0.8	8.7	0.0	-	33.0	2.1	15.0	1.1	0.0	-	18.2	-
PHF	0.406	0.000	0.700	0.000	-	0.732	0.625	0.864	0.899	0.000	-	0.972	0.861	0.417	0.838	0.000	-	0.919	0.700	0.798	0.438	0.000	-	0.811	0.929
Lights	13	0	28	0	-	41	15	110	150	0	-	275	149	5	57	0	-	211	14	96	7	0	-	117	644
% Lights	100.0	-	100.0	-	-	100.0	100.0	96.5	99.3	-	-	98.2	96.1	100.0	100.0	-	-	97.2	100.0	97.0	100.0	-	-	97.5	97.9
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Buses	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.0	-	-	0.8	0.2
Trucks	0	0	0	0	-	0	0	4	1	0	-	5	6	0	0	0	-	6	0	2	0	0	-	2	13
% Trucks	0.0	-	0.0	-	-	0.0	0.0	3.5	0.7	-	-	1.8	3.9	0.0	0.0	-	-	2.8	0.0	2.0	0.0	-	-	1.7	2.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Whitethorn Court
Site Code:
Start Date: 03/08/2022

Peak Hour Data

03/08/2022 12:15 PM
Ending At
03/08/2022 1:15 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Parking Lot [SB]

Out	In	Total
27	41	68
0	0	0
0	0	0
0	0	0
0	0	0
27	**41**	**68**

R	T	L	U	P
13	0	28	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	1
13	**0**	**28**	**0**	**1**

Prosperity Drive [EB]

Out	In	Total
180	117	297
0	1	1
4	2	6
0	0	0
0	0	0
184	**120**	**304**

U	L	T	R	P
0	7	96	14	0
0	0	1	0	0
0	0	2	0	0
0	0	0	0	0
0	0	0	0	1
0	**7**	**99**	**14**	**1**

Prosperity Drive [WB]

Out	In	Total
273	275	548
1	0	1
8	5	13
0	0	0
0	0	0
282	**280**	**562**

R	T	L	U	P
15	110	150	0	0
0	0	0	0	0
0	4	1	0	0
0	0	0	0	0
0	0	0	0	0
15	**114**	**151**	**0**	**0**

U	L	T	R	P
0	57	5	149	0
0	0	0	0	0
0	0	0	6	0
0	0	0	0	0
0	0	0	0	5
0	**57**	**5**	**155**	**5**

Whitethorn Court [NB]

Out	In	Total
164	211	375
0	0	0
1	6	7
0	0	0
0	0	0
165	**217**	**382**

Turning Movement Peak Hour Data Plot (12:15 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Prosperity Terrace
Site Code:
Start Date: 03/15/2022

Turning Movement Data

Start Time	Prosperity Drive Southbound						Prosperity Terrace Westbound						Prosperity Drive Northbound						Parking Lot Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	0	45	13	0	0	58	3	0	2	0	0	5	2	7	0	0	0	9	0	0	0	0	0	0	72
6:15 AM	7	36	11	0	0	54	6	0	2	0	0	8	2	18	0	0	0	20	0	0	0	0	0	0	82
6:30 AM	28	63	8	0	0	99	8	0	3	1	0	12	6	20	1	0	0	27	0	0	0	0	0	0	138
6:45 AM	38	59	5	0	0	102	3	0	5	0	1	8	3	25	0	0	0	28	0	0	0	0	1	0	138
Hourly Total	73	203	37	0	0	313	20	0	12	1	1	33	13	70	1	0	0	84	0	0	0	0	1	0	430
7:00 AM	24	73	17	0	0	114	6	0	4	1	1	11	3	36	1	0	0	40	0	0	2	0	0	2	167
7:15 AM	25	72	14	0	0	111	3	0	5	0	0	8	4	34	1	0	0	39	0	0	3	0	0	3	161
7:30 AM	24	60	10	0	0	94	7	0	6	0	0	13	8	40	1	0	0	49	3	0	8	0	0	11	167
7:45 AM	22	68	7	0	0	97	9	0	6	0	1	15	7	23	1	0	0	31	2	0	7	0	0	9	152
Hourly Total	95	273	48	0	0	416	25	0	21	1	2	47	22	133	4	0	0	159	5	0	20	0	0	25	647
8:00 AM	18	66	21	0	0	105	9	0	8	0	0	17	14	48	0	0	0	62	2	0	7	0	0	9	193
8:15 AM	18	54	14	0	0	86	2	0	9	0	0	11	6	32	1	0	0	39	2	0	13	0	0	15	151
8:30 AM	14	45	14	0	0	73	5	1	10	0	3	16	15	47	0	0	0	62	1	0	11	0	0	12	163
8:45 AM	22	73	12	0	0	107	7	1	8	0	0	16	6	37	3	0	0	46	0	0	10	0	0	10	179
Hourly Total	72	238	61	0	0	371	23	2	35	0	3	60	41	164	4	0	0	209	5	0	41	0	0	46	686
9:00 AM	21	55	21	0	0	97	12	1	12	0	0	25	16	52	0	0	0	68	3	1	7	0	0	11	201
9:15 AM	16	52	10	0	0	78	6	1	18	1	0	26	14	42	0	0	0	56	2	1	5	0	0	8	168
9:30 AM	13	56	13	0	0	82	12	0	14	0	2	26	11	49	1	0	0	61	2	0	8	0	0	10	179
9:45 AM	20	71	10	1	0	102	12	1	14	1	0	28	12	45	1	0	0	58	1	0	7	0	0	8	196
Hourly Total	70	234	54	1	0	359	42	3	58	2	2	105	53	188	2	0	0	243	8	2	27	0	0	37	744
10:00 AM	5	59	14	0	0	78	8	0	10	0	1	18	8	65	2	0	0	75	3	0	14	0	0	17	188
10:15 AM	15	53	14	0	0	82	13	0	6	0	0	19	12	53	0	0	0	65	4	0	6	0	0	10	176
10:30 AM	10	65	10	0	0	85	7	0	21	0	1	28	3	69	1	0	0	73	1	0	8	0	0	9	195
10:45 AM	12	44	8	0	0	64	10	0	12	0	1	22	15	52	1	0	0	68	0	0	10	0	0	10	164
Hourly Total	42	221	46	0	0	309	38	0	49	0	3	87	38	239	4	0	0	281	8	0	38	0	0	46	723
11:00 AM	11	66	9	0	0	86	16	0	15	0	0	31	15	60	1	0	0	76	2	0	12	0	0	14	207
11:15 AM	12	54	8	0	3	74	15	0	16	0	4	31	11	61	0	0	1	72	1	0	6	0	0	7	184
11:30 AM	7	57	7	0	0	71	11	0	5	0	2	16	11	66	0	0	1	77	3	0	17	0	1	20	184
11:45 AM	10	55	11	0	0	76	12	0	10	0	0	22	12	71	2	0	0	85	1	0	13	0	1	14	197
Hourly Total	40	232	35	0	3	307	54	0	46	0	6	100	49	258	3	0	2	310	7	0	48	0	2	55	772
12:00 PM	16	68	12	0	0	96	14	0	13	0	1	27	9	70	0	0	0	79	1	0	6	0	0	7	209
12:15 PM	8	60	8	0	0	76	8	1	7	0	2	16	12	49	1	0	0	62	1	0	5	0	6	6	160
12:30 PM	20	60	10	1	0	91	11	0	11	0	1	22	8	65	1	0	0	74	0	0	2	0	0	2	189
12:45 PM	25	66	8	0	0	99	13	0	22	0	0	35	11	55	0	0	1	66	0	0	3	0	0	3	203
Hourly Total	69	254	38	1	0	362	46	1	53	0	4	100	40	239	2	0	1	281	2	0	16	0	6	18	761
1:00 PM	14	53	11	0	0	78	12	0	14	0	1	26	21	70	1	0	0	92	0	0	3	0	1	3	199
1:15 PM	13	44	4	0	0	61	10	2	10	0	0	22	18	64	1	0	0	83	1	0	4	0	0	5	171
1:30 PM	22	48	8	0	1	78	5	0	17	0	0	22	17	58	1	0	0	76	2	0	9	0	2	11	187

1:45 PM	20	58	11	0	0	89	14	0	11	0	0	25	12	48	0	0	0	60	1	0	11	0	0	12	186
Hourly Total	69	203	34	0	1	306	41	2	52	0	1	95	68	240	3	0	0	311	4	0	27	0	3	31	743
2:00 PM	11	41	4	0	1	56	6	0	11	0	0	17	11	53	1	0	0	65	1	0	14	0	0	15	153
2:15 PM	13	45	7	0	0	65	7	0	11	0	0	18	10	52	0	0	0	62	3	0	7	0	0	10	155
2:30 PM	11	58	11	0	0	80	11	1	11	0	0	23	14	58	0	0	0	72	2	2	8	0	0	12	187
2:45 PM	14	41	12	1	0	68	9	0	11	0	1	20	9	46	1	0	0	56	3	0	10	0	0	13	157
Hourly Total	49	185	34	1	1	269	33	1	44	0	1	78	44	209	2	0	0	255	9	2	39	0	0	50	652
3:00 PM	12	58	4	0	0	74	10	0	14	0	3	24	13	64	0	0	0	77	3	0	10	0	0	13	188
3:15 PM	11	45	6	0	0	62	8	0	11	0	1	19	11	47	1	0	0	59	4	0	8	0	0	12	152
3:30 PM	3	56	7	0	0	66	13	0	11	0	0	24	7	74	0	0	0	81	4	0	13	0	0	17	188
3:45 PM	9	43	7	0	0	59	9	1	8	0	0	18	12	72	0	0	0	84	3	1	18	0	0	22	183
Hourly Total	35	202	24	0	0	261	40	1	44	0	4	85	43	257	1	0	0	301	14	1	49	0	0	64	711
4:00 PM	1	37	10	0	0	48	25	0	11	0	0	36	8	104	0	0	0	112	2	0	18	0	0	20	216
4:15 PM	6	47	12	0	1	65	18	0	7	0	1	25	7	79	0	0	0	86	4	1	19	0	0	24	200
4:30 PM	2	44	8	0	0	54	18	0	8	0	1	26	6	62	0	0	0	68	2	0	12	0	0	14	162
4:45 PM	3	63	6	0	0	72	12	0	11	0	0	23	7	51	1	0	0	59	0	0	5	0	0	5	159
Hourly Total	12	191	36	0	1	239	73	0	37	0	2	110	28	296	1	0	0	325	8	1	54	0	0	63	737
5:00 PM	0	44	10	0	0	54	14	0	15	0	1	29	14	73	0	0	0	87	1	0	7	0	1	8	178
5:15 PM	3	36	4	0	0	43	9	0	10	0	1	19	9	42	1	0	0	52	0	0	1	0	1	1	115
5:30 PM	0	52	5	1	0	58	7	0	6	0	4	13	8	48	0	0	0	56	0	0	1	0	1	1	128
5:45 PM	1	35	4	0	0	40	5	0	15	1	1	21	12	42	0	0	0	54	0	0	0	0	1	0	115
Hourly Total	4	167	23	1	0	195	35	0	46	1	7	82	43	205	1	0	0	249	1	0	9	0	4	10	536
6:00 PM	0	27	3	0	0	30	11	0	16	0	2	27	9	43	0	0	0	52	0	0	1	0	0	1	110
6:15 PM	0	27	3	0	0	30	12	0	4	0	0	16	7	50	0	0	0	57	0	0	1	0	0	1	104
6:30 PM	0	32	8	0	0	40	8	0	2	0	0	10	4	29	0	0	0	33	0	0	1	0	0	1	84
6:45 PM	2	25	4	0	1	31	9	1	5	0	1	15	5	34	0	0	0	39	0	0	1	0	0	1	86
Hourly Total	2	111	18	0	1	131	40	1	27	0	3	68	25	156	0	0	0	181	0	0	4	0	0	4	384
Grand Total	632	2714	488	4	7	3838	510	11	524	5	39	1050	507	2654	28	0	3	3189	71	6	372	0	16	449	8526
Approach %	16.5	70.7	12.7	0.1	-	-	48.6	1.0	49.9	0.5	-	-	15.9	83.2	0.9	0.0	-	-	15.8	1.3	82.9	0.0	-	-	-
Total %	7.4	31.8	5.7	0.0	-	45.0	6.0	0.1	6.1	0.1	-	12.3	5.9	31.1	0.3	0.0	-	37.4	0.8	0.1	4.4	0.0	-	5.3	-
Lights	625	2655	476	3	-	3759	490	7	522	5	-	1024	495	2590	25	0	-	3110	70	5	368	0	-	443	8336
% Lights	98.9	97.8	97.5	75.0	-	97.9	96.1	63.6	99.6	100.0	-	97.5	97.6	97.6	89.3	-	-	97.5	98.6	83.3	98.9	-	-	98.7	97.8
Buses	0	3	0	0	-	3	0	1	0	0	-	1	0	3	0	0	-	3	0	0	0	0	-	0	7
% Buses	0.0	0.1	0.0	0.0	-	0.1	0.0	9.1	0.0	0.0	-	0.1	0.0	0.1	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.1
Trucks	7	56	12	1	-	76	20	3	2	0	-	25	12	61	3	0	-	76	1	1	4	0	-	6	183
% Trucks	1.1	2.1	2.5	25.0	-	2.0	3.9	27.3	0.4	0.0	-	2.4	2.4	2.3	10.7	-	-	2.4	1.4	16.7	1.1	-	-	1.3	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	2.6	-	-	-	-	-	0.0	-	-	-	-	-	6.3	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	38	-	-	-	-	-	3	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	97.4	-	-	-	-	-	100.0	-	-	-	-	-	93.8	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Prosperity Terrace
Site Code:
Start Date: 03/15/2022

03/15/2022 6:00 AM
Ending At
03/15/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Prosperity Drive [SB]

	Out	In	Total
Lights	3451	3759	7210
Buses	3	3	6
Trucks	86	76	162
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**3540**	**3838**	**7378**

	R	T	L	U	P
Lights	625	2655	476	3	0
Buses	0	3	0	0	0
Trucks	7	56	12	1	0
Bicycles on Crosswalk	0	0	0	0	0
Pedestrians	0	0	0	0	7
Total	**632**	**2714**	**488**	**4**	**7**

Parking Lot [EB]

	Out	In	Total
Lights	657	443	1100
Buses	1	0	1
Trucks	13	6	19
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**671**	**449**	**1120**

	U	L	T	R	P
Lights	0	368	5	70	0
Buses	0	0	0	0	0
Trucks	0	4	1	1	0
Bicycles on Crosswalk	0	0	0	0	1
Pedestrians	0	0	0	0	15
Total	**0**	**372**	**6**	**71**	**16**

Prosperity Terrace [WB]

	Out	In	Total
Lights	981	1024	2005
Buses	0	1	1
Trucks	25	25	50
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**1006**	**1050**	**2056**

	R	T	L	U	P
Lights	490	7	522	5	0
Buses	0	1	0	0	0
Trucks	20	3	2	0	0
Bicycles on Crosswalk	0	0	0	0	1
Pedestrians	0	0	0	0	38
Total	**510**	**11**	**524**	**5**	**39**

Prosperity Drive [NB]

	U	L	T	R	P
Lights	0	25	2590	495	0
Buses	0	0	3	0	0
Trucks	0	3	61	12	0
Bicycles on Crosswalk	0	0	0	0	0
Pedestrians	0	0	0	0	3
Total	**0**	**28**	**2654**	**507**	**3**

	Out	In	Total
Lights	3247	3110	6357
Buses	3	3	6
Trucks	59	76	135
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**3309**	**3189**	**6498**

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (11:00 AM)

	Prosperity Drive						Prosperity Terrace						Prosperity Drive						Parking Lot						
	Southbound						Westbound						Northbound						Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
11:00 AM	11	66	9	0	0	86	16	0	15	0	0	31	15	60	1	0	0	76	2	0	12	0	0	14	207
11:15 AM	12	54	8	0	3	74	15	0	16	0	4	31	11	61	0	0	1	72	1	0	6	0	0	7	184
11:30 AM	7	57	7	0	0	71	11	0	5	0	2	16	11	66	0	0	1	77	3	0	17	0	1	20	184
11:45 AM	10	55	11	0	0	76	12	0	10	0	0	22	12	71	2	0	0	85	1	0	13	0	1	14	197
Total	40	232	35	0	3	307	54	0	46	0	6	100	49	258	3	0	2	310	7	0	48	0	2	55	772
Approach %	13.0	75.6	11.4	0.0	-	-	54.0	0.0	46.0	0.0	-	-	15.8	83.2	1.0	0.0	-	-	12.7	0.0	87.3	0.0	-	-	-
Total %	5.2	30.1	4.5	0.0	-	39.8	7.0	0.0	6.0	0.0	-	13.0	6.3	33.4	0.4	0.0	-	40.2	0.9	0.0	6.2	0.0	-	7.1	-
PHF	0.833	0.879	0.795	0.000	-	0.892	0.844	0.000	0.719	0.000	-	0.806	0.817	0.908	0.375	0.000	-	0.912	0.583	0.000	0.706	0.000	-	0.688	0.932
Lights	37	230	34	0	-	301	51	0	46	0	-	97	47	253	3	0	-	303	7	0	47	0	-	54	755
% Lights	92.5	99.1	97.1	-	-	98.0	94.4	-	100.0	-	-	97.0	95.9	98.1	100.0	-	-	97.7	100.0	-	97.9	-	-	98.2	97.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.0	-	0.0	-	-	0.0	0.1
Trucks	3	2	1	0	-	6	3	0	0	0	-	3	2	4	0	0	-	6	0	0	1	0	-	1	16
% Trucks	7.5	0.9	2.9	-	-	2.0	5.6	-	0.0	-	-	3.0	4.1	1.6	0.0	-	-	1.9	0.0	-	2.1	-	-	1.8	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Prosperity Terrace
Site Code:
Start Date: 03/15/2022

Peak Hour Data

03/15/2022 11:00 AM
Ending At
03/15/2022 12:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Prosperity Drive [SB]

Out	In	Total
351	301	652
1	0	1
8	6	14
0	0	0
0	0	0
360	**307**	**667**

R	T	L	U	P
37	230	34	0	0
0	0	0	0	0
3	2	1	0	0
0	0	0	0	0
0	0	0	0	3
40	**232**	**35**	**0**	**3**

Parking Lot [EB]

Out	In	Total
40	54	94
0	0	0
3	1	4
0	0	0
0	0	0
43	**55**	**98**

U	L	T	R	P
0	47	0	7	0
0	0	0	0	0
0	1	0	0	0
0	0	0	0	0
0	0	0	0	2
0	**48**	**0**	**7**	**2**

Prosperity Terrace [WB]

Out	In	Total
81	97	178
0	0	0
3	3	6
0	0	0
0	0	0
84	**100**	**184**

R	T	L	U	P
51	0	46	0	0
0	0	0	0	0
3	0	0	0	0
0	0	0	0	0
0	0	0	0	6
54	**0**	**46**	**0**	**6**

Prosperity Drive [NB]

U	L	T	R	P
0	3	253	47	0
0	0	1	0	0
0	0	4	2	0
0	0	0	0	0
0	0	0	0	2
0	**3**	**258**	**49**	**2**

Out	In	Total
283	303	586
0	1	1
2	6	8
0	0	0
0	0	0
285	**310**	**595**

Turning Movement Peak Hour Data Plot (11:00 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Prosperity Terrace
Site Code:
Start Date: 03/15/2022

Turning Movement Peak Hour Data (3:30 PM)

Start Time	Prosperity Drive Southbound						Prosperity Terrace Westbound						Prosperity Drive Northbound						Parking Lot Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:30 PM	3	56	7	0	0	66	13	0	11	0	0	24	7	74	0	0	0	81	4	0	13	0	0	17	188
3:45 PM	9	43	7	0	0	59	9	1	8	0	0	18	12	72	0	0	0	84	3	1	18	0	0	22	183
4:00 PM	1	37	10	0	0	48	25	0	11	0	0	36	8	104	0	0	0	112	2	0	18	0	0	20	216
4:15 PM	6	47	12	0	1	65	18	0	7	0	1	25	7	79	0	0	0	86	4	1	19	0	0	24	200
Total	19	183	36	0	1	238	65	1	37	0	1	103	34	329	0	0	0	363	13	2	68	0	0	83	787
Approach %	8.0	76.9	15.1	0.0	-	-	63.1	1.0	35.9	0.0	-	-	9.4	90.6	0.0	0.0	-	-	15.7	2.4	81.9	0.0	-	-	-
Total %	2.4	23.3	4.6	0.0	-	30.2	8.3	0.1	4.7	0.0	-	13.1	4.3	41.8	0.0	0.0	-	46.1	1.7	0.3	8.6	0.0	-	10.5	-
PHF	0.528	0.817	0.750	0.000	-	0.902	0.650	0.250	0.841	0.000	-	0.715	0.708	0.791	0.000	0.000	-	0.810	0.813	0.500	0.895	0.000	-	0.865	0.911
Lights	19	178	36	0	-	233	63	1	37	0	-	101	33	327	0	0	-	360	13	1	67	0	-	81	775
% Lights	100.0	97.3	100.0	-	-	97.9	96.9	100.0	100.0	-	-	98.1	97.1	99.4	-	-	-	99.2	100.0	50.0	98.5	-	-	97.6	98.5
Buses	0	2	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	3
% Buses	0.0	1.1	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.3	-	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.4
Trucks	0	3	0	0	-	3	2	0	0	0	-	2	1	1	0	0	-	2	0	1	1	0	-	2	9
% Trucks	0.0	1.6	0.0	-	-	1.3	3.1	0.0	0.0	-	-	1.9	2.9	0.3	-	-	-	0.6	0.0	50.0	1.5	-	-	2.4	1.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Prosperity Terrace
Site Code:
Start Date: 03/15/2022
Page No: 7

Peak Hour Data

03/15/2022 3:30 PM
Ending At
03/15/2022 4:30 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Prosperity Drive [SB]		
Out	In	Total
457	233	690
1	2	3
4	3	7
0	0	0
0	0	0
462	**238**	**700**

19	178	36	0	0
0	2	0	0	0
0	3	0	0	0
0	0	0	0	0
0	0	0	0	1
19	**183**	**36**	**0**	**1**
R	T	L	U	P

Parking Lot [EB]		
Out	In	Total
20	81	101
0	0	0
0	2	2
0	0	0
0	0	0
20	**83**	**103**

0	67	1	13	0
0	0	0	0	0
0	1	1	0	0
0	0	0	0	0
0	0	0	0	0
0	**68**	**2**	**13**	**0**
U	L	T	R	P

R	T	L	U	P
65	**1**	**37**	**0**	**1**
0	0	0	0	1
0	0	0	0	0
2	0	0	0	0
0	0	0	0	0
63	1	37	0	0

Prosperity Terrace [WB]		
Out	In	Total
70	101	171
0	0	0
2	2	4
0	0	0
0	0	0
72	**103**	**175**

U	L	T	R	P
0	0	327	33	0
0	0	1	0	0
0	0	1	1	0
0	0	0	0	0
0	0	0	0	0
0	**0**	**329**	**34**	**0**

228	360	588
2	1	3
3	2	5
0	0	0
0	0	0
233	**363**	**596**
Out	In	Total
Prosperity Drive [NB]		

Turning Movement Peak Hour Data Plot (3:30 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Cherry Hill Road
Site Code:
Start Date: 03/08/2022
Page No: 1

Turning Movement Data

Start Time	Cherry Hill Rd Westbound					Prosperity Drive Northbound					Cherry Hill Rd Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
6:00 AM	95	3	0	0	98	0	4	0	0	4	26	76	0	0	102	204
6:15 AM	110	8	0	0	118	5	4	0	0	9	16	135	0	0	151	278
6:30 AM	166	9	0	0	175	4	6	0	0	10	19	140	0	0	159	344
6:45 AM	200	23	0	0	223	9	6	0	0	15	37	185	0	0	222	460
Hourly Total	571	43	0	0	614	18	20	0	0	38	98	536	0	0	634	1286
7:00 AM	213	20	0	0	233	3	15	0	0	18	47	147	1	0	195	446
7:15 AM	234	18	0	0	252	5	14	0	3	19	47	197	0	0	244	515
7:30 AM	271	29	0	0	300	8	22	0	3	30	61	239	0	0	300	630
7:45 AM	251	31	0	0	282	10	28	0	0	38	84	255	0	0	339	659
Hourly Total	969	98	0	0	1067	26	79	0	6	105	239	838	1	0	1078	2250
8:00 AM	245	29	0	0	274	16	28	0	1	44	89	250	0	0	339	657
8:15 AM	270	27	1	0	298	9	38	0	0	47	75	269	0	0	344	689
8:30 AM	231	26	0	2	257	14	32	0	0	46	75	250	0	0	325	628
8:45 AM	202	27	0	0	229	17	42	0	1	59	75	237	0	0	312	600
Hourly Total	948	109	1	2	1058	56	140	0	2	196	314	1006	0	0	1320	2574
9:00 AM	155	22	0	0	177	17	36	0	1	53	71	212	0	0	283	513
9:15 AM	174	26	0	0	200	18	37	0	0	55	68	220	0	0	288	543
9:30 AM	166	20	0	0	186	17	38	0	0	55	59	197	0	0	256	497
9:45 AM	159	37	0	0	196	17	39	0	1	56	80	204	1	0	285	537
Hourly Total	654	105	0	0	759	69	150	0	2	219	278	833	1	0	1112	2090
10:00 AM	161	17	0	1	178	24	51	0	0	75	57	159	0	0	216	469
10:15 AM	148	20	0	0	168	20	37	0	0	57	66	172	0	0	238	463
10:30 AM	161	27	1	0	189	25	48	0	0	73	61	190	0	0	251	513
10:45 AM	144	13	0	0	157	20	53	0	1	73	54	164	0	0	218	448
Hourly Total	614	77	1	1	692	89	189	0	1	278	238	685	0	0	923	1893
11:00 AM	128	26	3	0	157	30	57	0	1	87	56	166	0	0	222	466
11:15 AM	143	17	0	0	160	32	49	0	0	81	59	153	1	0	213	454
11:30 AM	156	20	0	0	176	27	45	0	0	72	76	160	0	0	236	484
11:45 AM	162	17	0	0	179	25	64	0	1	89	46	171	0	0	217	485
Hourly Total	589	80	3	0	672	114	215	0	2	329	237	650	1	0	888	1889
12:00 PM	168	19	0	0	187	36	66	0	1	102	60	147	0	0	207	496
12:15 PM	145	18	0	0	163	25	48	0	0	73	65	186	0	0	251	487
12:30 PM	194	22	1	0	217	34	56	0	0	90	61	177	1	0	239	546
12:45 PM	185	19	0	0	204	39	58	1	0	98	56	158	2	0	216	518
Hourly Total	692	78	1	0	771	134	228	1	1	363	242	668	3	0	913	2047
1:00 PM	192	26	0	1	218	37	44	0	1	81	54	171	0	0	225	524
1:15 PM	188	22	0	0	210	24	37	0	1	61	68	167	0	0	235	506
1:30 PM	217	27	1	0	245	17	43	0	0	60	54	190	0	0	244	549
1:45 PM	195	29	0	0	224	29	45	0	0	74	69	191	0	0	260	558

Hourly Total	792	104	1	1	897	107	169	0	2	276	245	719	0	0	964	2137
2:00 PM	223	22	0	0	245	25	58	0	1	83	55	161	0	0	216	544
2:15 PM	239	19	0	1	258	28	57	0	0	85	50	167	0	0	217	560
2:30 PM	248	28	1	0	277	37	44	0	0	81	43	197	0	0	240	598
2:45 PM	241	26	0	0	267	22	70	0	0	92	62	177	0	0	239	598
Hourly Total	951	95	1	1	1047	112	229	0	1	341	210	702	0	0	912	2300
3:00 PM	260	26	0	1	286	29	50	0	1	79	64	227	0	0	291	656
3:15 PM	265	15	0	0	280	25	46	0	1	71	59	250	0	0	309	660
3:30 PM	293	15	1	1	309	26	42	0	0	68	61	242	0	0	303	680
3:45 PM	316	22	1	0	339	31	53	0	1	84	64	254	1	0	319	742
Hourly Total	1134	78	2	2	1214	111	191	0	3	302	248	973	1	0	1222	2738
4:00 PM	304	23	0	1	327	25	62	0	0	87	47	238	0	0	285	699
4:15 PM	294	19	0	0	313	23	55	0	0	78	53	248	0	0	301	692
4:30 PM	283	12	0	0	295	27	59	0	0	86	37	233	0	0	270	651
4:45 PM	254	21	2	1	277	22	63	0	1	85	29	252	0	0	281	643
Hourly Total	1135	75	2	2	1212	97	239	0	1	336	166	971	0	0	1137	2685
5:00 PM	289	7	0	0	296	32	95	0	0	127	45	270	0	0	315	738
5:15 PM	327	23	0	0	350	37	85	1	0	123	47	281	1	0	329	802
5:30 PM	338	15	0	0	353	30	66	0	0	96	35	301	0	0	336	785
5:45 PM	269	13	0	0	282	21	62	0	1	83	54	277	1	0	332	697
Hourly Total	1223	58	0	0	1281	120	308	1	1	429	181	1129	2	0	1312	3022
6:00 PM	279	12	1	0	292	22	54	0	1	76	40	248	1	0	289	657
6:15 PM	273	18	0	0	291	28	36	0	0	64	39	274	0	0	313	668
6:30 PM	270	9	0	0	279	23	43	0	0	66	23	220	0	0	243	588
6:45 PM	215	12	0	1	227	20	33	0	0	53	35	193	1	0	229	509
Hourly Total	1037	51	1	1	1089	93	166	0	1	259	137	935	2	0	1074	2422
Grand Total	11309	1051	13	10	12373	1146	2323	2	23	3471	2833	10645	11	0	13489	29333
Approach %	91.4	8.5	0.1	-	-	33.0	66.9	0.1	-	-	21.0	78.9	0.1	-	-	-
Total %	38.6	3.6	0.0	-	42.2	3.9	7.9	0.0	-	11.8	9.7	36.3	0.0	-	46.0	-
Lights	10982	1032	13	-	12027	1119	2267	2	-	3388	2764	10346	9	-	13119	28534
% Lights	97.1	98.2	100.0	-	97.2	97.6	97.6	100.0	-	97.6	97.6	97.2	81.8	-	97.3	97.3
Buses	153	1	0	-	154	1	2	0	-	3	3	132	1	-	136	293
% Buses	1.4	0.1	0.0	-	1.2	0.1	0.1	0.0	-	0.1	0.1	1.2	9.1	-	1.0	1.0
Trucks	174	18	0	-	192	26	54	0	-	80	66	167	1	-	234	506
% Trucks	1.5	1.7	0.0	-	1.6	2.3	2.3	0.0	-	2.3	2.3	1.6	9.1	-	1.7	1.7
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	10.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	9	-	-	-	-	23	-	-	-	-	0	-	-
% Pedestrians	-	-	-	90.0	-	-	-	-	100.0	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Cherry Hill Road
Site Code:
Start Date: 03/08/2022

03/08/2022 6:00 AM
Ending At
03/08/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Cherry Hill Rd [EB]

U	T	R	P
9	10346	2764	0
1	132	3	0
1	167	66	0
0	0	0	0
0	0	0	0
11	**10645**	**2833**	**0**

Out	In	Total
13258	13119	26377
156	136	292
229	234	463
0	0	0
0	0	0
13643	**13489**	**27132**

Cherry Hill Rd [WB]

T	L	U	P
10982	1032	13	0
153	1	0	0
174	18	0	0
0	0	0	1
0	0	0	9
11309	**1051**	**13**	**10**

Out	In	Total
11478	12027	23505
133	154	287
193	192	385
0	0	0
0	0	0
11804	**12373**	**24177**

Prosperity Drive [NB]

U	L	R	P
2	2267	1119	0
0	2	1	0
0	54	26	0
0	0	0	0
0	0	0	23
2	**2323**	**1146**	**23**

Out	In	Total
3798	3388	7186
4	3	7
84	80	164
0	0	0
0	0	0
3886	**3471**	**7357**

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Cherry Hill Rd Westbound					Prosperity Drive Northbound					Cherry Hill Rd Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	271	29	0	0	300	8	22	0	3	30	61	239	0	0	300	630
7:45 AM	251	31	0	0	282	10	28	0	0	38	84	255	0	0	339	659
8:00 AM	245	29	0	0	274	16	28	0	1	44	89	250	0	0	339	657
8:15 AM	270	27	1	0	298	9	38	0	0	47	75	269	0	0	344	689
Total	1037	116	1	0	1154	43	116	0	4	159	309	1013	0	0	1322	2635
Approach %	89.9	10.1	0.1	-	-	27.0	73.0	0.0	-	-	23.4	76.6	0.0	-	-	-
Total %	39.4	4.4	0.0	-	43.8	1.6	4.4	0.0	-	6.0	11.7	38.4	0.0	-	50.2	-
PHF	0.957	0.935	0.250	-	0.962	0.672	0.763	0.000	-	0.846	0.868	0.941	0.000	-	0.961	0.956
Lights	996	114	1	-	1111	42	111	0	-	153	301	991	0	-	1292	2556
% Lights	96.0	98.3	100.0	-	96.3	97.7	95.7	-	-	96.2	97.4	97.8	-	-	97.7	97.0
Buses	17	0	0	-	17	0	0	0	-	0	0	10	0	-	10	27
% Buses	1.6	0.0	0.0	-	1.5	0.0	0.0	-	-	0.0	0.0	1.0	-	-	0.8	1.0
Trucks	24	2	0	-	26	1	5	0	-	6	8	12	0	-	20	52
% Trucks	2.3	1.7	0.0	-	2.3	2.3	4.3	-	-	3.8	2.6	1.2	-	-	1.5	2.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	4	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Cherry Hill Road
Site Code:
Start Date: 03/08/2022

Peak Hour Data

03/08/2022 7:30 AM
Ending At
03/08/2022 8:30 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Cherry Hill Rd [EB]

Out	In	Total
1107	1292	2399
17	10	27
29	20	49
0	0	0
0	0	0
1153	**1322**	**2475**

U	T	R	P
0	991	301	0
0	10	0	0
0	12	8	0
0	0	0	0
0	0	0	0
0	**1013**	**309**	**0**

Cherry Hill Rd [WB]

Out	In	Total
1034	1111	2145
10	17	27
13	26	39
0	0	0
0	0	0
1057	**1154**	**2211**

T	L	U	P
996	114	1	0
17	0	0	0
24	2	0	0
0	0	0	0
0	0	0	0
1037	**116**	**1**	**0**

U	L	R	P
0	111	42	0
0	0	0	0
0	5	1	0
0	0	0	0
0	0	0	4
0	**116**	**43**	**4**

415	153	568
0	0	0
10	6	16
0	0	0
0	0	0
425	**159**	**584**
Out	In	Total

Prosperity Drive [NB]

Turning Movement Peak Hour Data Plot (7:30 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Cherry Hill Rd Westbound					Prosperity Drive Northbound					Cherry Hill Rd Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
5:00 PM	289	7	0	0	296	32	95	0	0	127	45	270	0	0	315	738
5:15 PM	327	23	0	0	350	37	85	1	0	123	47	281	1	0	329	802
5:30 PM	338	15	0	0	353	30	66	0	0	96	35	301	0	0	336	785
5:45 PM	269	13	0	0	282	21	62	0	1	83	54	277	1	0	332	697
Total	1223	58	0	0	1281	120	308	1	1	429	181	1129	2	0	1312	3022
Approach %	95.5	4.5	0.0	-	-	28.0	71.8	0.2	-	-	13.8	86.1	0.2	-	-	-
Total %	40.5	1.9	0.0	-	42.4	4.0	10.2	0.0	-	14.2	6.0	37.4	0.1	-	43.4	-
PHF	0.905	0.630	0.000	-	0.907	0.811	0.811	0.250	-	0.844	0.838	0.938	0.500	-	0.976	0.942
Lights	1215	57	0	-	1272	118	304	1	-	423	177	1118	1	-	1296	2991
% Lights	99.3	98.3	-	-	99.3	98.3	98.7	100.0	-	98.6	97.8	99.0	50.0	-	98.8	99.0
Buses	1	0	0	-	1	0	0	0	-	0	1	8	1	-	10	11
% Buses	0.1	0.0	-	-	0.1	0.0	0.0	0.0	-	0.0	0.6	0.7	50.0	-	0.8	0.4
Trucks	7	1	0	-	8	2	4	0	-	6	3	3	0	-	6	20
% Trucks	0.6	1.7	-	-	0.6	1.7	1.3	0.0	-	1.4	1.7	0.3	0.0	-	0.5	0.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: Prosperity Drive at Cherry Hill Road
Site Code:
Start Date: 03/08/2022
Page No: 7

Peak Hour Data

03/08/2022 5:00 PM
Ending At
03/08/2022 6:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Cherry Hill Rd [EB]

Out	In	Total
1520	1296	2816
2	10	12
11	6	17
0	0	0
0	0	0
1533	**1312**	**2845**

U	T	R	P
1	1118	177	0
1	8	1	0
0	3	3	0
0	0	0	0
0	0	0	0
2	**1129**	**181**	**0**

Cherry Hill Rd [WB]

T	L	U	P
1215	57	0	0
1	0	0	0
7	1	0	0
0	0	0	0
0	0	0	0
1223	**58**	**0**	**0**

Out	In	Total
1236	1272	2508
8	1	9
5	8	13
0	0	0
0	0	0
1249	**1281**	**2530**

U	L	R	P
1	304	118	0
0	0	0	0
0	4	2	0
0	0	0	0
0	0	0	1
1	**308**	**120**	**1**

Out	In	Total
235	423	658
1	0	1
4	6	10
0	0	0
0	0	0
240	**429**	**669**

Prosperity Drive [NB]

Turning Movement Peak Hour Data Plot (5:00 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Stewart Lane
Site Code:
Start Date: 03/01/2022

Turning Movement Data

Start Time	Stewart Lane Southbound						US 29 (Columbia Pike) Westbound						Stewart Lane Northbound						US 29 (Columbia Pike) Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	11	2	5	0	0	18	3	389	15	0	0	407	7	0	13	0	0	20	3	121	0	0	0	124	569
6:15 AM	7	0	0	0	0	7	1	495	18	0	0	514	1	0	13	0	0	14	10	216	1	0	0	227	762
6:30 AM	6	2	3	0	0	11	6	670	21	1	0	698	2	0	26	0	0	28	10	209	0	0	0	219	956
6:45 AM	11	1	3	0	0	15	4	708	24	0	1	736	6	1	20	0	0	27	14	240	1	0	0	255	1033
Hourly Total	35	5	11	0	0	51	14	2262	78	1	1	2355	16	1	72	0	0	89	37	786	2	0	0	825	3320
7:00 AM	9	0	9	0	0	18	4	740	19	1	0	764	3	0	25	0	0	28	20	265	4	2	0	291	1101
7:15 AM	12	2	9	0	0	23	6	696	21	0	0	723	10	0	23	0	0	33	23	319	3	1	0	346	1125
7:30 AM	7	2	12	0	0	21	17	650	41	0	0	708	8	0	18	0	0	26	22	343	4	0	0	369	1124
7:45 AM	7	2	9	0	0	18	18	661	42	0	0	721	7	3	18	0	0	28	32	453	4	0	0	489	1256
Hourly Total	35	6	39	0	0	80	45	2747	123	1	0	2916	28	3	84	0	0	115	97	1380	15	3	0	1495	4606
8:00 AM	10	3	14	0	0	27	8	654	56	0	0	718	3	0	24	0	0	27	34	355	6	0	0	395	1167
8:15 AM	10	6	12	0	0	28	17	703	51	0	0	771	7	0	20	0	0	27	33	362	7	0	1	402	1228
8:30 AM	18	4	14	0	0	36	19	590	33	0	0	642	8	2	17	0	0	27	20	311	11	1	1	343	1048
8:45 AM	14	13	11	0	0	38	11	598	49	0	0	658	12	0	22	0	0	34	46	391	10	1	0	448	1178
Hourly Total	52	26	51	0	0	129	55	2545	189	0	0	2789	30	2	83	0	0	115	133	1419	34	2	2	1588	4621
9:00 AM	8	3	5	0	0	16	8	611	51	0	0	670	4	0	20	0	0	24	26	341	6	0	0	373	1083
9:15 AM	12	5	8	0	0	25	4	546	46	1	0	597	2	0	12	0	0	14	32	325	6	1	0	364	1000
9:30 AM	7	5	5	0	0	17	13	530	54	2	3	599	0	1	13	0	0	14	34	315	2	1	0	352	982
9:45 AM	3	4	3	1	0	11	7	466	46	0	1	519	2	3	13	0	0	18	30	330	2	1	0	363	911
Hourly Total	30	17	21	1	0	69	32	2153	197	3	4	2385	8	4	58	0	0	70	122	1311	16	3	0	1452	3976
10:00 AM	4	4	3	0	0	11	5	392	35	0	0	432	2	0	6	0	0	8	31	310	2	0	0	343	794
10:15 AM	9	2	5	0	0	16	8	370	42	1	0	421	1	0	12	0	0	13	26	299	5	1	0	331	781
10:30 AM	11	7	5	0	0	23	8	368	37	0	0	413	2	2	13	0	0	17	41	338	2	1	0	382	835
10:45 AM	3	3	6	0	0	12	9	324	44	1	0	378	4	0	8	0	0	12	24	300	4	0	0	328	730
Hourly Total	27	16	19	0	0	62	30	1454	158	2	0	1644	9	2	39	0	0	50	122	1247	13	2	0	1384	3140
11:00 AM	2	4	4	0	0	10	6	324	32	1	0	363	2	0	12	0	0	14	23	328	3	2	1	356	743
11:15 AM	11	5	2	0	0	18	7	318	53	1	0	379	2	0	11	0	0	13	32	332	2	3	0	369	779
11:30 AM	8	0	6	0	0	14	3	338	37	1	1	379	4	0	17	0	0	21	31	298	6	0	0	335	749
11:45 AM	3	0	6	0	0	9	9	343	58	2	1	412	8	0	7	0	0	15	32	343	2	2	1	379	815
Hourly Total	24	9	18	0	0	51	25	1323	180	5	2	1533	16	0	47	0	0	63	118	1301	13	7	2	1439	3086
12:00 PM	8	0	11	0	0	19	17	318	55	0	0	390	4	0	6	0	0	10	34	301	6	1	0	342	761
12:15 PM	4	4	8	0	0	16	5	295	51	1	0	352	12	0	9	0	0	21	29	342	5	1	1	377	766
12:30 PM	5	5	9	0	0	19	12	375	61	1	0	449	6	1	13	0	0	20	32	317	4	0	0	353	841
12:45 PM	4	1	7	0	1	12	13	335	56	0	0	404	3	0	11	0	0	14	29	343	3	0	1	375	805
Hourly Total	21	10	35	0	1	66	47	1323	223	2	0	1595	25	1	39	0	0	65	124	1303	18	2	2	1447	3173
1:00 PM	3	4	12	0	0	19	7	299	45	0	0	351	5	0	4	0	0	9	41	330	6	0	0	377	756
1:15 PM	7	9	5	0	0	21	12	351	45	1	1	409	7	0	7	0	0	14	37	350	4	0	0	391	835
1:30 PM	2	3	3	0	0	8	10	339	41	0	0	390	6	0	10	0	0	16	43	408	3	0	0	454	868

1:45 PM	4	4	6	0	0	14	6	407	61	3	0	477	2	0	14	0	0	16	46	346	5	0	0	397	904
Hourly Total	16	20	26	0	0	62	35	1396	192	4	1	1627	20	0	35	0	0	55	167	1434	18	0	0	1619	3363
2:00 PM	6	3	7	0	0	16	16	519	48	1	0	584	3	1	10	0	0	14	19	394	3	1	0	417	1031
2:15 PM	2	0	5	0	0	7	13	527	49	2	1	591	6	0	12	0	0	18	38	405	1	2	0	446	1062
2:30 PM	8	6	4	0	0	18	15	455	55	0	0	525	0	0	17	0	0	17	37	383	1	1	0	422	982
2:45 PM	8	6	11	0	0	25	12	465	61	0	0	538	8	1	10	0	1	19	47	430	6	2	2	485	1067
Hourly Total	24	15	27	0	0	66	56	1966	213	3	1	2238	17	2	49	0	1	68	141	1612	11	6	2	1770	4142
3:00 PM	4	5	13	0	0	22	6	426	64	2	0	498	9	0	14	0	0	23	59	518	5	3	0	585	1128
3:15 PM	11	6	18	0	0	35	16	374	51	2	1	443	1	2	10	0	0	13	58	511	3	0	0	572	1063
3:30 PM	10	12	12	0	1	34	8	439	70	0	2	517	3	1	12	0	0	16	54	507	4	0	0	565	1132
3:45 PM	9	8	5	0	0	22	12	373	72	1	1	458	3	0	8	0	0	11	50	585	9	2	0	646	1137
Hourly Total	34	31	48	0	1	113	42	1612	257	5	4	1916	16	3	44	0	0	63	221	2121	21	5	0	2368	4460
4:00 PM	7	3	11	0	0	21	10	371	71	0	0	452	5	0	7	0	0	12	58	608	7	0	0	673	1158
4:15 PM	3	5	9	0	0	17	15	420	73	0	0	508	9	1	12	0	0	22	65	579	7	2	0	653	1200
4:30 PM	5	4	9	0	0	18	15	388	59	0	1	462	4	2	10	0	0	16	57	597	5	1	0	660	1156
4:45 PM	8	4	11	0	0	23	20	411	79	0	0	510	13	2	8	0	0	23	44	636	8	4	0	692	1248
Hourly Total	23	16	40	0	0	79	60	1590	282	0	1	1932	31	5	37	0	0	73	224	2420	27	7	0	2678	4762
5:00 PM	10	9	9	0	0	28	12	437	84	0	0	533	5	0	16	0	0	21	59	552	7	1	0	619	1201
5:15 PM	8	5	4	0	0	17	13	474	79	0	0	566	3	3	10	0	0	16	58	555	5	3	1	621	1220
5:30 PM	16	3	14	0	1	33	19	417	69	1	0	506	8	1	12	0	0	21	71	577	10	0	1	658	1218
5:45 PM	12	3	7	0	0	22	21	428	84	0	0	533	4	0	13	0	0	17	70	562	9	0	0	641	1213
Hourly Total	46	20	34	0	1	100	65	1756	316	1	0	2138	20	4	51	0	0	75	258	2246	31	4	2	2539	4852
6:00 PM	9	10	6	0	0	25	7	396	83	2	0	488	9	2	11	0	0	22	56	493	8	0	0	557	1092
6:15 PM	3	5	9	0	0	17	15	402	73	0	0	490	8	0	8	0	0	16	62	483	6	0	0	551	1074
6:30 PM	9	10	9	0	0	28	8	359	65	1	1	433	3	1	15	0	0	19	59	564	4	0	0	627	1107
6:45 PM	6	5	7	0	0	18	8	355	62	0	0	425	6	0	14	0	0	20	52	416	2	1	0	471	934
Hourly Total	27	30	31	0	0	88	38	1512	283	3	1	1836	26	3	48	0	0	77	229	1956	20	1	0	2206	4207
Grand Total	394	221	400	1	3	1016	544	23639	2691	30	15	26904	262	30	686	0	1	978	1993	20536	239	42	10	22810	51708
Approach %	38.8	21.8	39.4	0.1	-	-	2.0	87.9	10.0	0.1	-	-	26.8	3.1	70.1	0.0	-	-	8.7	90.0	1.0	0.2	-	-	-
Total %	0.8	0.4	0.8	0.0	-	2.0	1.1	45.7	5.2	0.1	-	52.0	0.5	0.1	1.3	0.0	-	1.9	3.9	39.7	0.5	0.1	-	44.1	-
Lights	391	214	397	1	-	1003	534	22750	2463	30	-	25777	230	26	670	0	-	926	1843	19830	236	42	-	21951	49657
% Lights	99.2	96.8	99.3	100.0	-	98.7	98.2	96.2	91.5	100.0	-	95.8	87.8	86.7	97.7	-	-	94.7	92.5	96.6	98.7	100.0	-	96.2	96.0
Buses	1	6	1	0	-	8	6	363	194	0	-	563	28	2	14	0	-	44	126	319	2	0	-	447	1062
% Buses	0.3	2.7	0.3	0.0	-	0.8	1.1	1.5	7.2	0.0	-	2.1	10.7	6.7	2.0	-	-	4.5	6.3	1.6	0.8	0.0	-	2.0	2.1
Trucks	2	1	2	0	-	5	4	526	34	0	-	564	4	2	2	0	-	8	24	387	1	0	-	412	989
% Trucks	0.5	0.5	0.5	0.0	-	0.5	0.7	2.2	1.3	0.0	-	2.1	1.5	6.7	0.3	-	-	0.8	1.2	1.9	0.4	0.0	-	1.8	1.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	15	-	-	-	-	-	1	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Stewart Lane
Site Code:
Start Date: 03/01/2022
Page No: 3

Stewart Lane [SB]

Out	In	Total
797	1003	1800
10	8	18
7	5	12
0	0	0
0	0	0
814	**1016**	**1830**

391	214	397	1	0
1	6	1	0	0
2	1	2	0	0
0	0	0	0	0
0	0	0	0	3
394	**221**	**400**	**1**	**3**
R	T	L	U	P

US 29 (Columbia Pike) [EB]

Out	In	Total
23853	21951	45804
378	447	825
530	412	942
0	0	0
0	0	0
24761	**22810**	**47571**

U	L	T	R	P
42	236	19830	1843	0
0	2	319	126	0
0	1	387	24	0
0	0	0	0	0
0	0	0	0	10
42	**239**	**20536**	**1993**	**10**

03/01/2022 6:00 AM
Ending At
03/01/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

US 29 (Columbia Pike) [WB]

R	T	L	U	P
534	22750	2463	30	0
6	363	194	0	0
4	526	34	0	0
0	0	0	0	0
0	0	0	0	15
544	**23639**	**2691**	**30**	**15**

Out	In	Total
20487	25777	46264
348	563	911
393	564	957
0	0	0
0	0	0
21228	**26904**	**48132**

U	L	T	R	P
0	670	26	230	0
0	14	2	28	0
0	2	2	4	0
0	0	0	0	0
0	0	0	0	1
0	**686**	**30**	**262**	**1**

4520	926	5446
326	44	370
59	8	67
0	0	0
0	0	0
4905	**978**	**5883**
Out	In	Total

Stewart Lane [NB]

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Stewart Lane
Site Code:
Start Date: 03/01/2022

Turning Movement Peak Hour Data (7:30 AM)

	Stewart Lane Southbound						US 29 (Columbia Pike) Westbound						Stewart Lane Northbound						US 29 (Columbia Pike) Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:30 AM	7	2	12	0	0	21	17	650	41	0	0	708	8	0	18	0	0	26	22	343	4	0	0	369	1124
7:45 AM	7	2	9	0	0	18	18	661	42	0	0	721	7	3	18	0	0	28	32	453	4	0	0	489	1256
8:00 AM	10	3	14	0	0	27	8	654	56	0	0	718	3	0	24	0	0	27	34	355	6	0	0	395	1167
8:15 AM	10	6	12	0	0	28	17	703	51	0	0	771	7	0	20	0	0	27	33	362	7	0	1	402	1228
Total	34	13	47	0	0	94	60	2668	190	0	0	2918	25	3	80	0	0	108	121	1513	21	0	1	1655	4775
Approach %	36.2	13.8	50.0	0.0	-	-	2.1	91.4	6.5	0.0	-	-	23.1	2.8	74.1	0.0	-	-	7.3	91.4	1.3	0.0	-	-	-
Total %	0.7	0.3	1.0	0.0	-	2.0	1.3	55.9	4.0	0.0	-	61.1	0.5	0.1	1.7	0.0	-	2.3	2.5	31.7	0.4	0.0	-	34.7	-
PHF	0.850	0.542	0.839	0.000	-	0.839	0.833	0.949	0.848	0.000	-	0.946	0.781	0.250	0.833	0.000	-	0.964	0.890	0.835	0.750	0.000	-	0.846	0.950
Lights	33	12	47	0	-	92	59	2563	171	0	-	2793	21	3	80	0	-	104	108	1476	21	0	-	1605	4594
% Lights	97.1	92.3	100.0	-	-	97.9	98.3	96.1	90.0	-	-	95.7	84.0	100.0	100.0	-	-	96.3	89.3	97.6	100.0	-	-	97.0	96.2
Buses	1	1	0	0	-	2	1	31	18	0	-	50	4	0	0	0	-	4	10	17	0	0	-	27	83
% Buses	2.9	7.7	0.0	-	-	2.1	1.7	1.2	9.5	-	-	1.7	16.0	0.0	0.0	-	-	3.7	8.3	1.1	0.0	-	-	1.6	1.7
Trucks	0	0	0	0	-	0	0	74	1	0	-	75	0	0	0	0	-	0	3	20	0	0	-	23	98
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	2.8	0.5	-	-	2.6	0.0	0.0	0.0	-	-	0.0	2.5	1.3	0.0	-	-	1.4	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Peak Hour Data

03/01/2022 7:30 AM
Ending At
03/01/2022 8:30 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Stewart Lane [SB]

Out	In	Total
83	92	175
1	2	3
0	0	0
0	0	0
0	0	0
84	**94**	**178**

R	T	L	U	P
33	12	47	0	0
1	1	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
34	**13**	**47**	**0**	**0**

US 29 (Columbia Pike) [EB]

Out	In	Total
2676	1605	4281
32	27	59
74	23	97
0	0	0
0	0	0
2782	**1655**	**4437**

U	L	T	R	P
0	21	1476	108	0
0	0	17	10	0
0	0	20	3	0
0	0	0	0	0
0	0	0	0	1
0	**21**	**1513**	**121**	**1**

US 29 (Columbia Pike) [WB]

Out	In	Total
1544	2793	4337
21	50	71
20	75	95
0	0	0
0	0	0
1585	**2918**	**4503**

R	T	L	U	P
59	2563	171	0	0
1	31	18	0	0
0	74	1	0	0
0	0	0	0	0
0	0	0	0	0
60	**2668**	**190**	**0**	**0**

Stewart Lane [NB]

U	L	T	R	P
0	80	3	21	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	**80**	**3**	**25**	**0**

Out	In	Total
291	104	395
29	4	33
4	0	4
0	0	0
0	0	0
324	**108**	**432**

Turning Movement Peak Hour Data Plot (7:30 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Stewart Lane
Site Code:
Start Date: 03/01/2022

Turning Movement Peak Hour Data (4:45 PM)

	Stewart Lane Southbound						US 29 (Columbia Pike) Westbound						Stewart Lane Northbound						US 29 (Columbia Pike) Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
4:45 PM	8	4	11	0	0	23	20	411	79	0	0	510	13	2	8	0	0	23	44	636	8	4	0	692	1248
5:00 PM	10	9	9	0	0	28	12	437	84	0	0	533	5	0	16	0	0	21	59	552	7	1	0	619	1201
5:15 PM	8	5	4	0	0	17	13	474	79	0	0	566	3	3	10	0	0	16	58	555	5	3	1	621	1220
5:30 PM	16	3	14	0	1	33	19	417	69	1	0	506	8	1	12	0	0	21	71	577	10	0	1	658	1218
Total	42	21	38	0	1	101	64	1739	311	1	0	2115	29	6	46	0	0	81	232	2320	30	8	2	2590	4887
Approach %	41.6	20.8	37.6	0.0	-	-	3.0	82.2	14.7	0.0	-	-	35.8	7.4	56.8	0.0	-	-	9.0	89.6	1.2	0.3	-	-	-
Total %	0.9	0.4	0.8	0.0	-	2.1	1.3	35.6	6.4	0.0	-	43.3	0.6	0.1	0.9	0.0	-	1.7	4.7	47.5	0.6	0.2	-	53.0	-
PHF	0.656	0.583	0.679	0.000	-	0.765	0.800	0.917	0.926	0.250	-	0.934	0.558	0.500	0.719	0.000	-	0.880	0.817	0.912	0.750	0.500	-	0.936	0.979
Lights	42	21	38	0	-	101	63	1716	297	1	-	2077	26	6	46	0	-	78	223	2239	30	8	-	2500	4756
% Lights	100.0	100.0	100.0	-	-	100.0	98.4	98.7	95.5	100.0	-	98.2	89.7	100.0	100.0	-	-	96.3	96.1	96.5	100.0	100.0	-	96.5	97.3
Buses	0	0	0	0	-	0	0	6	13	0	-	19	2	0	0	0	-	2	8	47	0	0	-	55	76
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.3	4.2	0.0	-	0.9	6.9	0.0	0.0	-	-	2.5	3.4	2.0	0.0	0.0	-	2.1	1.6
Trucks	0	0	0	0	-	0	1	17	1	0	-	19	1	0	0	0	-	1	1	34	0	0	-	35	55
% Trucks	0.0	0.0	0.0	-	-	0.0	1.6	1.0	0.3	0.0	-	0.9	3.4	0.0	0.0	-	-	1.2	0.4	1.5	0.0	0.0	-	1.4	1.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Stewart Lane
Site Code:
Start Date: 03/01/2022
Page No: 7

Peak Hour Data

03/01/2022 4:45 PM
Ending At
03/01/2022 5:45 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Stewart Lane [SB]

Out	In	Total
99	101	200
0	0	0
1	0	1
0	0	0
0	0	0
100	**101**	**201**

R	T	L	U	P
42	21	38	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	1
42	**21**	**38**	**0**	**1**

US 29 (Columbia Pike) [EB]

Out	In	Total
1812	2500	4312
6	55	61
17	35	52
0	0	0
0	0	0
1835	**2590**	**4425**

U	L	T	R	P
8	30	2239	223	0
0	0	47	8	0
0	0	34	1	0
0	0	0	0	0
0	0	0	0	2
8	**30**	**2320**	**232**	**2**

US 29 (Columbia Pike) [WB]

Out	In	Total
2304	2077	4381
49	19	68
35	19	54
0	0	0
0	0	0
2388	**2115**	**4503**

R	T	L	U	P
63	1716	297	1	0
0	6	13	0	0
1	17	1	0	0
0	0	0	0	0
0	0	0	0	0
64	**1739**	**311**	**1**	**0**

U	L	T	R	P
0	46	6	26	0
0	0	0	2	0
0	0	0	1	0
0	0	0	0	0
0	0	0	0	0
0	**46**	**6**	**29**	**0**

Out	In	Total
541	78	619
21	2	23
2	1	3
0	0	0
0	0	0
564	**81**	**645**

Stewart Lane [NB]

Turning Movement Peak Hour Data Plot (4:45 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Industrial Parkway
Site Code:
Start Date: 03/01/2022

Turning Movement Data

Start Time	US 29 (Columbia Pike) Westbound					Industrial Parkway Northbound					US 29 (Columbia Pike) Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
6:00 AM	421	2	0	0	423	2	17	0	0	19	27	140	0	0	167	609
6:15 AM	487	4	0	0	491	4	25	0	0	29	26	208	0	0	234	754
6:30 AM	621	9	0	0	630	9	43	0	0	52	27	225	0	0	252	934
6:45 AM	699	7	0	0	706	8	41	0	2	49	32	224	0	0	256	1011
Hourly Total	2228	22	0	0	2250	23	126	0	2	149	112	797	0	0	909	3308
7:00 AM	662	4	0	0	666	11	29	0	0	40	42	284	0	0	326	1032
7:15 AM	673	5	0	0	678	15	27	0	0	42	30	324	0	0	354	1074
7:30 AM	590	8	1	0	599	15	30	0	0	45	56	347	0	0	403	1047
7:45 AM	612	16	1	0	629	11	28	0	0	39	57	433	0	0	490	1158
Hourly Total	2537	33	2	0	2572	52	114	0	0	166	185	1388	0	0	1573	4311
8:00 AM	573	13	0	0	586	14	44	0	0	58	56	385	0	0	441	1085
8:15 AM	646	25	0	0	671	11	29	0	0	40	62	379	0	0	441	1152
8:30 AM	559	21	1	1	581	17	30	0	1	47	44	315	0	0	359	987
8:45 AM	533	16	1	0	550	22	41	1	0	64	77	436	0	0	513	1127
Hourly Total	2311	75	2	1	2388	64	144	1	1	209	239	1515	0	0	1754	4351
9:00 AM	572	22	0	0	594	23	43	0	0	66	94	316	0	0	410	1070
9:15 AM	505	25	1	0	531	10	49	0	0	59	89	341	0	0	430	1020
9:30 AM	484	27	4	0	515	20	41	0	0	61	83	362	0	0	445	1021
9:45 AM	385	27	2	0	414	16	54	0	1	70	75	332	0	0	407	891
Hourly Total	1946	101	7	0	2054	69	187	0	1	256	341	1351	0	0	1692	4002
10:00 AM	345	30	2	1	377	15	39	0	1	54	64	286	0	0	350	781
10:15 AM	345	23	0	0	368	24	48	0	1	72	76	277	0	0	353	793
10:30 AM	316	17	1	0	334	17	42	1	0	60	72	325	0	0	397	791
10:45 AM	297	16	0	0	313	15	40	1	0	56	74	289	0	0	363	732
Hourly Total	1303	86	3	1	1392	71	169	2	2	242	286	1177	0	0	1463	3097
11:00 AM	283	20	2	0	305	18	47	0	0	65	73	299	0	0	372	742
11:15 AM	311	18	0	0	329	24	50	0	0	74	68	319	1	0	388	791
11:30 AM	303	19	0	0	322	30	52	0	0	82	67	291	0	0	358	762
11:45 AM	315	25	0	1	340	17	46	0	1	63	88	336	0	0	424	827
Hourly Total	1212	82	2	1	1296	89	195	0	1	284	296	1245	1	0	1542	3122
12:00 PM	290	18	1	1	309	20	40	0	0	60	63	275	0	0	338	707
12:15 PM	299	16	0	1	315	15	42	0	1	57	74	314	0	0	388	760
12:30 PM	353	20	0	0	373	16	40	0	0	56	71	325	0	0	396	825
12:45 PM	312	15	0	0	327	21	42	0	0	63	63	325	0	0	388	778
Hourly Total	1254	69	1	2	1324	72	164	0	1	236	271	1239	0	0	1510	3070
1:00 PM	277	17	0	0	294	20	42	0	0	62	65	317	0	0	382	738
1:15 PM	315	18	1	1	334	19	34	0	0	53	78	341	0	0	419	806
1:30 PM	304	13	0	0	317	22	38	0	0	60	65	390	0	0	455	832
1:45 PM	383	14	1	3	398	16	51	0	2	67	66	343	0	0	409	874

Hourly Total	1279	62	2	4	1343	77	165	0	2	242	274	1391	0	0	1665	3250
2:00 PM	504	14	3	2	521	21	53	0	1	74	79	360	0	0	439	1034
2:15 PM	469	21	1	1	491	16	58	1	1	75	62	381	0	0	443	1009
2:30 PM	400	16	0	0	416	14	57	0	0	71	49	398	0	0	447	934
2:45 PM	470	15	0	0	485	28	38	0	0	66	60	410	0	0	470	1021
Hourly Total	1843	66	4	3	1913	79	206	1	2	286	250	1549	0	0	1799	3998
3:00 PM	404	14	0	0	418	23	22	0	0	45	72	460	0	0	532	995
3:15 PM	366	19	1	0	386	19	48	0	0	67	82	514	0	0	596	1049
3:30 PM	402	22	3	6	427	24	49	0	5	73	68	495	0	0	563	1063
3:45 PM	351	28	1	0	380	18	37	0	1	55	103	557	0	0	660	1095
Hourly Total	1523	83	5	6	1611	84	156	0	6	240	325	2026	0	0	2351	4202
4:00 PM	367	26	2	0	395	26	42	0	0	68	88	549	0	0	637	1100
4:15 PM	446	13	1	0	460	27	48	0	0	75	87	570	0	0	657	1192
4:30 PM	402	15	1	0	418	28	43	0	0	71	85	539	0	1	624	1113
4:45 PM	437	12	1	0	450	34	56	0	0	90	94	551	0	0	645	1185
Hourly Total	1652	66	5	0	1723	115	189	0	0	304	354	2209	0	1	2563	4590
5:00 PM	454	15	0	0	469	18	51	0	0	69	106	558	0	0	664	1202
5:15 PM	446	18	0	0	464	14	41	0	0	55	82	531	0	0	613	1132
5:30 PM	430	8	0	0	438	18	42	0	0	60	83	561	0	0	644	1142
5:45 PM	473	14	0	0	487	16	46	0	0	62	88	558	0	0	646	1195
Hourly Total	1803	55	0	0	1858	66	180	0	0	246	359	2208	0	0	2567	4671
6:00 PM	404	9	0	2	413	13	39	0	2	52	68	518	0	0	586	1051
6:15 PM	388	12	0	0	400	10	29	0	0	39	66	474	0	0	540	979
6:30 PM	400	15	0	6	415	12	30	0	0	42	78	540	0	0	618	1075
6:45 PM	309	10	1	0	320	13	25	0	0	38	63	449	0	0	512	870
Hourly Total	1501	46	1	8	1548	48	123	0	2	171	275	1981	0	0	2256	3975
Grand Total	22392	846	34	26	23272	909	2118	4	20	3031	3567	20076	1	1	23644	49947
Approach %	96.2	3.6	0.1	-	-	30.0	69.9	0.1	-	-	15.1	84.9	0.0	-	-	-
Total %	44.8	1.7	0.1	-	46.6	1.8	4.2	0.0	-	6.1	7.1	40.2	0.0	-	47.3	-
Lights	21482	817	32	-	22331	895	2007	4	-	2906	3307	19440	0	-	22747	47984
% Lights	95.9	96.6	94.1	-	96.0	98.5	94.8	100.0	-	95.9	92.7	96.8	0.0	-	96.2	96.1
Buses	394	13	0	-	407	0	81	0	-	81	212	303	0	-	515	1003
% Buses	1.8	1.5	0.0	-	1.7	0.0	3.8	0.0	-	2.7	5.9	1.5	0.0	-	2.2	2.0
Trucks	516	16	2	-	534	14	30	0	-	44	48	333	1	-	382	960
% Trucks	2.3	1.9	5.9	-	2.3	1.5	1.4	0.0	-	1.5	1.3	1.7	100.0	-	1.6	1.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	5.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	26	-	-	-	-	19	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	95.0	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Industrial Parkway
Site Code:
Start Date: 03/01/2022

03/01/2022 6:00 AM
Ending At
03/01/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

US 29 (Columbia Pike) [EB]

	Out	In	Total
Lights	23489	22747	46236
Buses	475	515	990
Trucks	547	382	929
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**24511**	**23644**	**48155**

	U	T	R	P
Lights	0	19440	3307	0
Buses	0	303	212	0
Trucks	1	333	48	0
Bicycles on Crosswalk	0	0	0	0
Pedestrians	0	0	0	1
Total	**1**	**20076**	**3567**	**1**

US 29 (Columbia Pike) [WB]

	Out	In	Total
Lights	20367	22331	42698
Buses	303	407	710
Trucks	349	534	883
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**21019**	**23272**	**44291**

	T	L	U	P
Lights	21482	817	32	0
Buses	394	13	0	0
Trucks	516	16	2	0
Bicycles on Crosswalk	0	0	0	0
Pedestrians	0	0	0	26
Total	**22392**	**846**	**34**	**26**

Industrial Parkway [NB]

	U	L	R	P
Lights	4	2007	895	0
Buses	0	81	0	0
Trucks	0	30	14	0
Bicycles on Crosswalk	0	0	0	1
Pedestrians	0	0	0	19
Total	**4**	**2118**	**909**	**20**

	Out	In	Total
Lights	4128	2906	7034
Buses	225	81	306
Trucks	64	44	108
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**4417**	**3031**	**7448**

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Industrial Parkway
Site Code:
Start Date: 03/01/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	US 29 (Columbia Pike) Westbound					Industrial Parkway Northbound					US 29 (Columbia Pike) Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:30 AM	590	8	1	0	599	15	30	0	0	45	56	347	0	0	403	1047
7:45 AM	612	16	1	0	629	11	28	0	0	39	57	433	0	0	490	1158
8:00 AM	573	13	0	0	586	14	44	0	0	58	56	385	0	0	441	1085
8:15 AM	646	25	0	0	671	11	29	0	0	40	62	379	0	0	441	1152
Total	2421	62	2	0	2485	51	131	0	0	182	231	1544	0	0	1775	4442
Approach %	97.4	2.5	0.1	-	-	28.0	72.0	0.0	-	-	13.0	87.0	0.0	-	-	-
Total %	54.5	1.4	0.0	-	55.9	1.1	2.9	0.0	-	4.1	5.2	34.8	0.0	-	40.0	-
PHF	0.937	0.620	0.500	-	0.926	0.850	0.744	0.000	-	0.784	0.931	0.891	0.000	-	0.906	0.959
Lights	2326	62	2	-	2390	50	123	0	-	173	221	1491	0	-	1712	4275
% Lights	96.1	100.0	100.0	-	96.2	98.0	93.9	-	-	95.1	95.7	96.6	-	-	96.5	96.2
Buses	31	0	0	-	31	0	6	0	-	6	7	39	0	-	46	83
% Buses	1.3	0.0	0.0	-	1.2	0.0	4.6	-	-	3.3	3.0	2.5	-	-	2.6	1.9
Trucks	64	0	0	-	64	1	2	0	-	3	3	14	0	-	17	84
% Trucks	2.6	0.0	0.0	-	2.6	2.0	1.5	-	-	1.6	1.3	0.9	-	-	1.0	1.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Industrial Parkway
Site Code:
Start Date: 03/01/2022
Page No: 5

Peak Hour Data

03/01/2022 7:30 AM
Ending At
03/01/2022 8:30 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

US 29 (Columbia Pike) [EB]

	Out	In	Total
Lights	2449	1712	4161
Buses	37	46	83
Trucks	66	17	83
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**2552**	**1775**	**4327**

	U	T	R	P
Lights	0	1491	221	0
Buses	0	39	7	0
Trucks	0	14	3	0
Bicycles on Crosswalk	0	0	0	0
Pedestrians	0	0	0	0
Total	**0**	**1544**	**231**	**0**

US 29 (Columbia Pike) [WB]

	T	L	U	P
Lights	2326	62	2	0
Buses	31	0	0	0
Trucks	64	0	0	0
Bicycles on Crosswalk	0	0	0	0
Pedestrians	0	0	0	0
Total	**2421**	**62**	**2**	**0**

	Out	In	Total
Lights	1543	2390	3933
Buses	39	31	70
Trucks	15	64	79
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**1597**	**2485**	**4082**

Industrial Parkway [NB]

	U	L	R	P
Lights	0	123	50	0
Buses	0	6	0	0
Trucks	0	2	1	0
Bicycles on Crosswalk	0	0	0	0
Pedestrians	0	0	0	0
Total	**0**	**131**	**51**	**0**

	Out	In	Total
Lights	283	173	456
Buses	7	6	13
Trucks	3	3	6
Bicycles on Crosswalk	0	0	0
Pedestrians	0	0	0
Total	**293**	**182**	**475**

Turning Movement Peak Hour Data Plot (7:30 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Industrial Parkway
Site Code:
Start Date: 03/01/2022

Turning Movement Peak Hour Data (4:15 PM)

Start Time	US 29 (Columbia Pike) Westbound					Industrial Parkway Northbound					US 29 (Columbia Pike) Eastbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
4:15 PM	446	13	1	0	460	27	48	0	0	75	87	570	0	0	657	1192
4:30 PM	402	15	1	0	418	28	43	0	0	71	85	539	0	1	624	1113
4:45 PM	437	12	1	0	450	34	56	0	0	90	94	551	0	0	645	1185
5:00 PM	454	15	0	0	469	18	51	0	0	69	106	558	0	0	664	1202
Total	1739	55	3	0	1797	107	198	0	0	305	372	2218	0	1	2590	4692
Approach %	96.8	3.1	0.2	-	-	35.1	64.9	0.0	-	-	14.4	85.6	0.0	-	-	-
Total %	37.1	1.2	0.1	-	38.3	2.3	4.2	0.0	-	6.5	7.9	47.3	0.0	-	55.2	-
PHF	0.958	0.917	0.750	-	0.958	0.787	0.884	0.000	-	0.847	0.877	0.973	0.000	-	0.975	0.976
Lights	1711	51	3	-	1765	104	189	0	-	293	314	2149	0	-	2463	4521
% Lights	98.4	92.7	100.0	-	98.2	97.2	95.5	-	-	96.1	84.4	96.9	-	-	95.1	96.4
Buses	15	2	0	-	17	0	4	0	-	4	50	41	0	-	91	112
% Buses	0.9	3.6	0.0	-	0.9	0.0	2.0	-	-	1.3	13.4	1.8	-	-	3.5	2.4
Trucks	13	2	0	-	15	3	5	0	-	8	8	28	0	-	36	59
% Trucks	0.7	3.6	0.0	-	0.8	2.8	2.5	-	-	2.6	2.2	1.3	-	-	1.4	1.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Peak Hour Data

03/01/2022 4:15 PM
Ending At
03/01/2022 5:15 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

US 29 (Columbia Pike) [EB]

Out	In	Total
1900	2463	4363
19	91	110
18	36	54
0	0	0
0	0	0
1937	**2590**	**4527**

U	T	R	P
0	2149	314	0
0	41	50	0
0	28	8	0
0	0	0	0
0	0	0	1
0	**2218**	**372**	**1**

US 29 (Columbia Pike) [WB]

T	L	U	P
1711	51	3	0
15	2	0	0
13	2	0	0
0	0	0	0
0	0	0	0
1739	**55**	**3**	**0**

Out	In	Total
2256	1765	4021
41	17	58
31	15	46
0	0	0
0	0	0
2328	**1797**	**4125**

U	L	R	P
0	189	104	0
0	4	0	0
0	5	3	0
0	0	0	0
0	0	0	0
0	**198**	**107**	**0**

365	293	658
52	4	56
10	8	18
0	0	0
0	0	0
427	**305**	**732**
Out	In	Total

Industrial Parkway [NB]

Turning Movement Peak Hour Data Plot (4:15 PM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Tech Rd
Site Code:
Start Date: 03/01/2022

Turning Movement Data

Start Time	Old Columbia Pike Southbound						US 29 (Columbia Pike) Westbound						Tech Road Northbound						US 29 (Columbia Pike) Eastbound						
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
6:00 AM	5	22	3	0	0	30	7	363	25	1	2	396	10	7	20	0	0	37	43	92	5	0	0	140	603
6:15 AM	11	16	2	0	0	29	10	418	17	0	1	445	10	5	45	0	0	60	53	147	10	0	0	210	744
6:30 AM	9	22	5	0	0	36	8	510	22	0	1	540	12	31	74	0	0	117	44	186	6	0	0	236	929
6:45 AM	11	14	4	0	0	29	16	582	19	1	1	618	11	16	61	0	0	88	45	198	9	1	0	253	988
Hourly Total	36	74	14	0	0	124	41	1873	83	2	5	1999	43	59	200	0	0	302	185	623	30	1	0	839	3264
7:00 AM	18	8	9	0	0	35	18	530	25	0	3	573	15	16	78	0	0	109	48	204	16	0	0	268	985
7:15 AM	23	19	9	0	0	51	19	535	32	1	1	587	21	8	53	0	0	82	49	297	15	0	0	361	1081
7:30 AM	18	16	5	0	0	39	23	446	21	0	2	490	18	10	77	0	0	105	53	272	21	0	0	346	980
7:45 AM	24	24	5	0	0	53	21	496	44	0	1	561	10	18	66	0	0	94	70	332	22	0	0	424	1132
Hourly Total	83	67	28	0	0	178	81	2007	122	1	7	2211	64	52	274	0	0	390	220	1105	74	0	0	1399	4178
8:00 AM	20	27	7	0	0	54	35	473	38	0	3	546	22	18	61	0	0	101	70	314	45	0	0	429	1130
8:15 AM	22	22	3	0	0	47	33	516	55	1	3	605	22	17	72	0	0	111	61	279	38	0	0	378	1141
8:30 AM	35	21	8	0	1	64	15	412	31	1	3	459	24	13	69	0	0	106	57	252	27	2	0	338	967
8:45 AM	16	26	6	0	0	48	18	439	37	1	7	495	22	12	64	0	0	98	62	331	41	0	0	434	1075
Hourly Total	93	96	24	0	1	213	101	1840	161	3	16	2105	90	60	266	0	0	416	250	1176	151	2	0	1579	4313
9:00 AM	15	33	10	0	0	58	12	451	38	0	0	501	29	19	65	0	0	113	57	260	26	0	0	343	1015
9:15 AM	18	30	3	0	0	51	8	401	40	0	2	449	29	17	66	0	0	112	78	257	16	0	0	351	963
9:30 AM	17	26	8	0	0	51	9	331	54	0	3	394	30	27	90	0	0	147	91	251	32	2	0	376	968
9:45 AM	22	36	5	0	0	63	7	278	34	1	3	320	34	30	72	0	0	136	63	249	19	0	0	331	850
Hourly Total	72	125	26	0	0	223	36	1461	166	1	8	1664	122	93	293	0	0	508	289	1017	93	2	0	1401	3796
10:00 AM	31	26	1	0	0	58	4	226	25	0	2	255	32	23	98	0	0	153	65	202	38	0	0	305	771
10:15 AM	14	23	5	0	1	42	2	251	32	0	9	285	24	25	67	0	0	116	48	225	19	2	0	294	737
10:30 AM	12	18	4	0	0	34	3	225	27	2	5	257	27	20	95	0	0	142	70	239	31	0	0	340	773
10:45 AM	17	15	5	0	0	37	7	192	31	2	3	232	33	24	84	0	0	141	68	226	23	1	0	318	728
Hourly Total	74	82	15	0	1	171	16	894	115	4	19	1029	116	92	344	0	0	552	251	892	111	3	0	1257	3009
11:00 AM	11	21	6	0	0	38	4	186	29	0	1	219	28	17	85	0	0	130	72	215	27	1	0	315	702
11:15 AM	17	27	3	0	0	47	13	203	28	0	3	244	34	33	88	0	0	155	71	222	20	1	0	314	760
11:30 AM	16	14	3	0	0	33	6	187	33	1	1	227	29	18	91	0	0	138	84	226	21	0	0	331	729
11:45 AM	17	24	9	0	1	50	7	205	30	0	5	242	29	27	99	0	0	155	60	269	27	0	0	356	803
Hourly Total	61	86	21	0	1	168	30	781	120	1	10	932	120	95	363	0	0	578	287	932	95	2	0	1316	2994
12:00 PM	10	27	4	0	0	41	4	210	27	0	3	241	38	24	88	0	0	150	64	219	23	1	0	307	739
12:15 PM	9	31	6	0	1	46	6	215	26	0	5	247	39	35	84	0	0	158	82	221	22	1	0	326	777
12:30 PM	18	25	1	0	0	44	3	213	24	0	1	240	41	29	115	1	0	186	74	260	29	1	0	364	834
12:45 PM	11	15	9	0	1	35	5	218	34	2	3	259	38	23	90	0	0	151	85	239	19	0	0	343	788
Hourly Total	48	98	20	0	2	166	18	856	111	2	12	987	156	111	377	1	0	645	305	939	93	3	0	1340	3138
1:00 PM	15	26	4	0	0	45	14	189	44	0	1	247	37	23	79	0	0	139	106	225	34	1	0	366	797
1:15 PM	10	27	10	0	1	47	8	252	41	0	0	301	35	21	75	0	0	131	101	268	23	1	0	393	872
1:30 PM	14	29	5	0	0	48	6	225	34	1	3	266	42	25	82	0	0	149	127	288	31	0	0	446	909

1:45 PM	10	37	6	0	0	53	10	284	31	3	3	328	43	43	102	0	0	188	97	241	36	0	0	374	943
Hourly Total	49	119	25	0	1	193	38	950	150	4	7	1142	157	112	338	0	0	607	431	1022	124	2	0	1579	3521
2:00 PM	20	15	3	0	0	38	4	360	33	1	2	398	59	28	102	0	0	189	92	293	26	1	0	412	1037
2:15 PM	14	21	6	0	0	41	3	316	37	0	4	356	50	28	127	0	2	205	69	287	31	0	0	387	989
2:30 PM	15	14	8	0	0	37	2	290	25	1	5	318	44	27	92	0	0	163	64	323	36	2	0	425	943
2:45 PM	23	24	6	0	0	53	1	312	27	1	9	341	29	22	124	0	0	175	72	361	42	0	0	475	1044
Hourly Total	72	74	23	0	0	169	10	1278	122	3	20	1413	182	105	445	0	2	732	297	1264	135	3	0	1699	4013
3:00 PM	13	29	4	0	0	46	3	276	22	0	12	301	34	28	95	0	0	157	64	398	36	1	0	499	1003
3:15 PM	20	19	6	0	1	45	6	252	19	1	6	278	42	29	85	0	0	156	68	428	51	0	0	547	1026
3:30 PM	20	30	8	0	0	58	10	268	37	1	7	316	31	24	90	0	0	145	75	405	55	0	0	535	1054
3:45 PM	18	31	9	0	0	58	10	221	42	1	18	274	41	20	85	0	0	146	72	451	47	0	0	570	1048
Hourly Total	71	109	27	0	1	207	29	1017	120	3	43	1169	148	101	355	0	0	604	279	1682	189	1	0	2151	4131
4:00 PM	19	21	3	0	1	43	5	242	35	0	5	282	48	27	97	0	0	172	75	477	58	2	0	612	1109
4:15 PM	18	35	6	0	0	59	11	314	40	0	10	365	35	26	88	0	0	149	47	477	64	1	0	589	1162
4:30 PM	16	29	10	0	0	55	15	274	29	0	16	318	46	30	98	0	0	174	66	465	60	0	0	591	1138
4:45 PM	18	39	6	0	0	63	2	285	34	2	9	323	50	46	104	0	0	200	73	477	51	1	0	602	1188
Hourly Total	71	124	25	0	1	220	33	1115	138	2	40	1288	179	129	387	0	0	695	261	1896	233	4	0	2394	4597
5:00 PM	26	32	6	0	0	64	11	308	38	0	9	357	53	42	115	0	0	210	72	455	60	0	0	587	1218
5:15 PM	13	24	2	0	3	39	8	310	30	1	12	349	47	35	116	0	0	198	74	458	45	0	0	577	1163
5:30 PM	15	22	10	0	0	47	8	315	32	0	6	355	57	34	97	0	0	188	61	469	49	2	0	581	1171
5:45 PM	15	18	8	0	0	41	10	354	36	1	6	401	53	27	101	0	0	181	73	458	45	0	0	576	1199
Hourly Total	69	96	26	0	3	191	37	1287	136	2	33	1462	210	138	429	0	0	777	280	1840	199	2	0	2321	4751
6:00 PM	16	24	4	0	0	44	12	289	33	0	8	334	42	27	80	0	0	149	68	446	51	1	0	566	1093
6:15 PM	21	26	10	0	1	57	11	283	35	2	9	331	42	33	80	0	0	155	69	392	43	2	0	506	1049
6:30 PM	14	21	11	0	0	46	10	301	33	3	1	347	29	22	85	0	0	136	75	445	53	0	0	573	1102
6:45 PM	11	23	5	0	0	39	11	216	22	0	3	249	40	25	74	0	0	139	65	386	64	1	0	516	943
Hourly Total	62	94	30	0	1	186	44	1089	123	5	21	1261	153	107	319	0	0	579	277	1669	211	4	0	2161	4187
Grand Total	861	1244	304	0	12	2409	514	16448	1667	33	241	18662	1740	1254	4390	1	2	7385	3612	16057	1738	29	0	21436	49892
Approach %	35.7	51.6	12.6	0.0	-	-	2.8	88.1	8.9	0.2	-	-	23.6	17.0	59.4	0.0	-	-	16.9	74.9	8.1	0.1	-	-	-
Total %	1.7	2.5	0.6	0.0	-	4.8	1.0	33.0	3.3	0.1	-	37.4	3.5	2.5	8.8	0.0	-	14.8	7.2	32.2	3.5	0.1	-	43.0	-
Lights	825	1095	291	0	-	2211	504	15870	1535	33	-	17942	1619	1106	4098	1	-	6824	3470	15595	1677	29	-	20771	47748
% Lights	95.8	88.0	95.7	-	-	91.8	98.1	96.5	92.1	100.0	-	96.1	93.0	88.2	93.3	100.0	-	92.4	96.1	97.1	96.5	100.0	-	96.9	95.7
Buses	18	137	5	0	-	160	4	161	105	0	-	270	80	126	223	0	-	429	83	170	43	0	-	296	1155
% Buses	2.1	11.0	1.6	-	-	6.6	0.8	1.0	6.3	0.0	-	1.4	4.6	10.0	5.1	0.0	-	5.8	2.3	1.1	2.5	0.0	-	1.4	2.3
Trucks	18	12	8	0	-	38	6	417	27	0	-	450	41	22	69	0	-	132	59	292	18	0	-	369	989
% Trucks	2.1	1.0	2.6	-	-	1.6	1.2	2.5	1.6	0.0	-	2.4	2.4	1.8	1.6	0.0	-	1.8	1.6	1.8	1.0	0.0	-	1.7	2.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	2.1	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	236	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	97.9	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Tech Rd
Site Code:
Start Date: 03/01/2022

Old Columbia Pike [SB]

Out	In	Total
3287	2211	5498
173	160	333
46	38	84
0	0	0
0	0	0
3506	**2409**	**5915**

825	1095	291	0	0
18	137	5	0	0
18	12	8	0	0
0	0	0	0	0
0	0	0	0	12
861	**1244**	**304**	**0**	**12**
R	T	L	U	P

US 29 (Columbia Pike) [EB]

Total	In	Out
41593	20771	20822
698	296	402
873	369	504
0	0	0
0	0	0
43164	**21436**	**21728**

U	L	T	R	P
29	1677	15595	3470	0
0	43	170	83	0
0	18	292	59	0
0	0	0	0	0
0	0	0	0	0
29	**1738**	**16057**	**3612**	**0**

03/01/2022 6:00 AM
Ending At
03/01/2022 7:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

US 29 (Columbia Pike) [WB]

Out	In	Total
17538	17942	35480
255	270	525
341	450	791
0	0	0
0	0	0
18134	**18662**	**36796**

R	T	L	U	P
504	15870	1535	33	0
4	161	105	0	0
6	417	27	0	0
0	0	0	0	5
0	0	0	0	236
514	**16448**	**1667**	**33**	**241**

U	L	T	R	P
1	4098	1106	1619	0
0	223	126	80	0
0	69	22	41	0
0	0	0	0	0
0	0	0	0	2
1	**4390**	**1254**	**1740**	**2**

6101	6824	12925
325	429	754
98	132	230
0	0	0
0	0	0
6524	**7385**	**13909**
Out	In	Total

Tech Road [NB]

Turning Movement Data Plot

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Tech Rd
Site Code:
Start Date: 03/01/2022

Turning Movement Peak Hour Data (7:30 AM)

	Old Columbia Pike Southbound						US 29 (Columbia Pike) Westbound						Tech Road Northbound						US 29 (Columbia Pike) Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
7:30 AM	18	16	5	0	0	39	23	446	21	0	2	490	18	10	77	0	0	105	53	272	21	0	0	346	980
7:45 AM	24	24	5	0	0	53	21	496	44	0	1	561	10	18	66	0	0	94	70	332	22	0	0	424	1132
8:00 AM	20	27	7	0	0	54	35	473	38	0	3	546	22	18	61	0	0	101	70	314	45	0	0	429	1130
8:15 AM	22	22	3	0	0	47	33	516	55	1	3	605	22	17	72	0	0	111	61	279	38	0	0	378	1141
Total	84	89	20	0	0	193	112	1931	158	1	9	2202	72	63	276	0	0	411	254	1197	126	0	0	1577	4383
Approach %	43.5	46.1	10.4	0.0	-	-	5.1	87.7	7.2	0.0	-	-	17.5	15.3	67.2	0.0	-	-	16.1	75.9	8.0	0.0	-	-	-
Total %	1.9	2.0	0.5	0.0	-	4.4	2.6	44.1	3.6	0.0	-	50.2	1.6	1.4	6.3	0.0	-	9.4	5.8	27.3	2.9	0.0	-	36.0	-
PHF	0.875	0.824	0.714	0.000	-	0.894	0.800	0.936	0.718	0.250	-	0.910	0.818	0.875	0.896	0.000	-	0.926	0.907	0.901	0.700	0.000	-	0.919	0.960
Lights	77	87	20	0	-	184	110	1857	153	1	-	2121	69	60	259	0	-	388	249	1152	121	0	-	1522	4215
% Lights	91.7	97.8	100.0	-	-	95.3	98.2	96.2	96.8	100.0	-	96.3	95.8	95.2	93.8	-	-	94.4	98.0	96.2	96.0	-	-	96.5	96.2
Buses	5	2	0	0	-	7	2	19	2	0	-	23	2	3	8	0	-	13	2	28	5	0	-	35	78
% Buses	6.0	2.2	0.0	-	-	3.6	1.8	1.0	1.3	0.0	-	1.0	2.8	4.8	2.9	-	-	3.2	0.8	2.3	4.0	-	-	2.2	1.8
Trucks	2	0	0	0	-	2	0	55	3	0	-	58	1	0	9	0	-	10	3	17	0	0	-	20	90
% Trucks	2.4	0.0	0.0	-	-	1.0	0.0	2.8	1.9	0.0	-	2.6	1.4	0.0	3.3	-	-	2.4	1.2	1.4	0.0	-	-	1.3	2.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	9	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Tech Rd
Site Code:
Start Date: 03/01/2022
Page No: 5

Old Columbia Pike [SB]

Out	In	Total
291	184	475
10	7	17
0	2	2
0	0	0
0	0	0
301	**193**	**494**

77	87	20	0	0
5	2	0	0	0
2	0	0	0	0
0	0	0	0	0
0	0	0	0	0
84	**89**	**20**	**0**	**0**
R	T	L	U	P

US 29 (Columbia Pike) [EB]

Out	In	Total
2193	1522	3715
32	35	67
66	20	86
0	0	0
0	0	0
2291	**1577**	**3868**

0	121	1152	249	0
0	5	28	2	0
0	0	17	3	0
0	0	0	0	0
0	0	0	0	0
0	**126**	**1197**	**254**	**0**
U	L	T	R	P

Peak Hour Data

03/01/2022 7:30 AM
Ending At
03/01/2022 8:30 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

R	T	L	U	P
112	**1931**	**158**	**1**	**9**
0	0	0	0	9
0	0	0	0	0
0	55	3	0	0
2	19	2	0	0
110	1857	153	1	0

US 29 (Columbia Pike) [WB]

Out	In	Total
1242	2121	3363
30	23	53
18	58	76
0	0	0
0	0	0
1290	**2202**	**3492**

U	L	T	R	P
0	259	60	69	0
0	8	3	2	0
0	9	0	1	0
0	0	0	0	0
0	0	0	0	0
0	**276**	**63**	**72**	**0**

489	388	877
6	13	19
6	10	16
0	0	0
0	0	0
501	**411**	**912**
Out	In	Total

Tech Road [NB]

Turning Movement Peak Hour Data Plot (7:30 AM)

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
(410) 730-1001 kyle.funcheon@rjmengineering.com

Count Name: US 29 at Tech Rd
Site Code:
Start Date: 03/01/2022

Turning Movement Peak Hour Data (5:00 PM)

	Old Columbia Pike						US 29 (Columbia Pike)						Tech Road						US 29 (Columbia Pike)						
	Southbound						Westbound						Northbound						Eastbound						
Start Time	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Int. Total
5:00 PM	26	32	6	0	0	64	11	308	38	0	9	357	53	42	115	0	0	210	72	455	60	0	0	587	1218
5:15 PM	13	24	2	0	3	39	8	310	30	1	12	349	47	35	116	0	0	198	74	458	45	0	0	577	1163
5:30 PM	15	22	10	0	0	47	8	315	32	0	6	355	57	34	97	0	0	188	61	469	49	2	0	581	1171
5:45 PM	15	18	8	0	0	41	10	354	36	1	6	401	53	27	101	0	0	181	73	458	45	0	0	576	1199
Total	69	96	26	0	3	191	37	1287	136	2	33	1462	210	138	429	0	0	777	280	1840	199	2	0	2321	4751
Approach %	36.1	50.3	13.6	0.0	-	-	2.5	88.0	9.3	0.1	-	-	27.0	17.8	55.2	0.0	-	-	12.1	79.3	8.6	0.1	-	-	-
Total %	1.5	2.0	0.5	0.0	-	4.0	0.8	27.1	2.9	0.0	-	30.8	4.4	2.9	9.0	0.0	-	16.4	5.9	38.7	4.2	0.0	-	48.9	-
PHF	0.663	0.750	0.650	0.000	-	0.746	0.841	0.909	0.895	0.500	-	0.911	0.921	0.821	0.925	0.000	-	0.925	0.946	0.981	0.829	0.250	-	0.989	0.975
Lights	68	83	26	0	-	177	37	1276	124	2	-	1439	207	134	426	0	-	767	268	1808	194	2	-	2272	4655
% Lights	98.6	86.5	100.0	-	-	92.7	100.0	99.1	91.2	100.0	-	98.4	98.6	97.1	99.3	-	-	98.7	95.7	98.3	97.5	100.0	-	97.9	98.0
Buses	0	13	0	0	-	13	0	7	12	0	-	19	1	2	0	0	-	3	8	13	3	0	-	24	59
% Buses	0.0	13.5	0.0	-	-	6.8	0.0	0.5	8.8	0.0	-	1.3	0.5	1.4	0.0	-	-	0.4	2.9	0.7	1.5	0.0	-	1.0	1.2
Trucks	1	0	0	0	-	1	0	4	0	0	-	4	2	2	3	0	-	7	4	19	2	0	-	25	37
% Trucks	1.4	0.0	0.0	-	-	0.5	0.0	0.3	0.0	0.0	-	0.3	1.0	1.4	0.7	-	-	0.9	1.4	1.0	1.0	0.0	-	1.1	0.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	33	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RJM Engineering
6021 University Boulevard

Ellicott City, Maryland, United States 99999
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Count Name: US 29 at Tech Rd
Site Code:
Start Date: 03/01/2022
Page No: 7

Peak Hour Data

03/01/2022 5:00 PM
Ending At
03/01/2022 6:00 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Old Columbia Pike [SB]

Out	In	Total
365	177	542
5	13	18
4	1	5
0	0	0
0	0	0
374	**191**	**565**

R	T	L	U	P
68	83	26	0	0
0	13	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	3
69	**96**	**26**	**0**	**3**

US 29 (Columbia Pike) [EB]

Out	In	Total
1772	2272	4044
7	24	31
8	25	33
0	0	0
0	0	0
1787	**2321**	**4108**

U	L	T	R	P
2	194	1808	268	0
0	3	13	8	0
0	2	19	4	0
0	0	0	0	0
0	0	0	0	0
2	**199**	**1840**	**280**	**0**

US 29 (Columbia Pike) [WB]

Out	In	Total
2043	1439	3482
14	19	33
21	4	25
0	0	0
0	0	0
2078	**1462**	**3540**

R	T	L	U	P
37	1276	124	2	0
0	7	12	0	0
0	4	0	0	0
0	0	0	0	0
0	0	0	0	33
37	**1287**	**136**	**2**	**33**

U	L	T	R	P
0	426	134	207	0
0	0	2	1	0
0	3	2	2	0
0	0	0	0	0
0	0	0	0	0
0	**429**	**138**	**210**	**0**

Tech Road [NB]

Out	In	Total
475	767	1242
33	3	36
4	7	11
0	0	0
0	0	0
512	**777**	**1289**

Turning Movement Peak Hour Data Plot (5:00 PM)

Appendix E

Planned Development Memorandum

Kimley»Horn

MEMORANDUM

To: Montgomery County Planning Board

From: Andrew T. Smith, P.E. ATS

Date: March 29, 2021

Subject: ***White Oak Town Center***
Traffic Statement

This memorandum is prepared as part of the application for the proposed White Oak Town Center in the White Oak Policy Area (Area 38). This memorandum presents the proposed development program, the calculation of the fee for the White Oak Local Area Transportation Improvement Program (LATIP), and the calculation of the vehicle-trips and person-trips associated with the Local Area Transportation Review (LATR) Guidelines. The payment of the LATIP fee satisfies the LATR requirements of the Preliminary Plan for projects within the White Oak Policy Area.

Project Description and Location

The White Oak Town Center is located in the northeast corner of Columbia Pike (U.S. Route 29) and Industrial Parkway within the Montgomery Industrial Park. The property contains a vacant office building that has 87,900 square feet of gross floor area. The proposed redevelopment involves demolishing the existing office building and providing a mix of uses consisting of up to approximately 105,000 square feet of commercial space. The commercial space is currently planned to consist of 85,000 square feet of retail and 20,000 square feet of office. The site location is shown on Figure 1.

LATIP Fee Calculation

In accordance with the White Oak Science Gateway (WOSG) Master Plan, and consistent with the 2020-2024 Growth and Infrastructure Policy (GIP), the County established a replacement to the LATR process in the White Oak Policy Area.

Source: Google Earth Pro

Kimley»Horn

Site Location
White Oak Town Center
Silver Spring, MD

Figure
1
Page 2

This process calls for payment of a pro-rata fee (referred to as the LATIP fee) based on the peak hour trip generation, as set forth in Appendix 4 of the LATR Guidelines, for the proposed development. The LATIP fee is $5,010 per PM peak hour trip. The trips applied to the LATIP fee calculation are based on trip generation rates contained in the transportation model (referred to as the Local Area Model) that was used in the area-wide transportation study that identified the needed transportation improvements in the White Oak area.

The trip generation rates that establish the LATIP fee are different from the trip generation rates that are typically used in LATR traffic studies. The trip generation rates for the calculation of the LATIP fee are found in Appendix 4 of the LATR Guidelines.

The specific LATIP fee for the White Oak Town Center is based on the net additional trips generated by the development. Credit is applied for the trips that would be generated by the existing vacant office building on the property, which will be demolished.

Tables 1 and 2 show the calculation of the LATIP fee based on the mix of commercial space consisting of 59,000 square feet of retail and 16,000 square feet of office.

TABLE 1 – PM Peak Hour Trips

Land Use	Quantity	Trip Rate per 1,000 SF or per Dwelling Unit (DU)	PM Peak Hour Trips
Retail	85,000 SF	3.00/1000 SF	255
Office	20,000 SF	1.20/1000 SF	24
		Gross Trips [Retail/Office]	279
Office (Existing)	87,900 SF	1.20/1000 SF	105
		Net New Trips [Gross minus Existing Office]	**174**

TABLE 2 – LATIP Fee

174 PM peak hour trips	x	$5,010 / trip	=	$ 871,740

The resulting LATIP fee is **$871,740.**

Estimated Number of Vehicle Trips and Person Trips

While this project is not subject to LATR, this section provides the calculations of vehicle-trips and person-trips in accordance with the 2020-2024 GIP and most recent LATR Guidelines (2017). Based on the development program and the removal of the existing office building, the following shows the vehicle-trip and person-trip calculations.

In accordance with the LATR Guidelines, the ITE vehicle trips are converted to vehicle trips based on area-wide factors developed for each policy area. Specific factors for the different land uses have been developed, including in the White Oak Policy Area. For the proposed retail, a factor of 0.91 was applied to the ITE-based vehicle trips. For the proposed office space and removal of the existing office building, a factor of 0.90 was applied to the ITE-based vehicle trips. Table 3 shows the resulting vehicle-trip calculations for the White Oak Town Center.

Table 3 – Vehicle Trip Generation

Description	Quantity	Units	Calculation Method	Vehicle Trip Adj. Factor	AM Peak Hour of Adjacent Street			PM Peak Hour of Adjacent Street		
					In	Out	Total	In	Out	Total
ITE-Based Vehicle Trips										
ITE 820 - Shopping Center	85.0	KSF	Equation	-	120	74	194	231	251	482
ITE 710 - General Office Building	20.0	KSF	Rate	-	20	3	23	4	19	23
ITE 710 - General Office Building (Existing)	*87.9*	*KSF*	*Rate*	-	*88*	*14*	*102*	*16*	*85*	*101*
Vehicle Trips Adjusted for White Oak Policy Area										
Shopping Center	85.0	KSF	-	*91%*	110	67	177	211	228	439
Internal Capture					*-1*	*-1*	*-2*	*-4*	*-1*	*-5*
External Trips					109	66	175	207	227	434
Pass-by (34%)					*-30*	*-30*	*-60*	*-74*	*-74*	*-148*
Primary External Trips					**79**	**36**	**115**	**133**	**153**	**286**
General Office	20.0	KSF	-	90%	18	3	21	3	18	21
Internal Capture					*-1*	*-1*	*-2*	*-1*	*-4*	*-5*
External Trips					**17**	**2**	**19**	**2**	**14**	**16**
Gross External Vehicle Trips (including Pass-by Factor)					***96***	***38***	***134***	***135***	***167***	***302***
Gross External Vehicle Trips (without Pass-by Factor)					***126***	***68***	***194***	***209***	***241***	***450***
General Office Building (Existing)	87.9	KSF	-	90%	*79*	*13*	*92*	*15*	*76*	*91*
Net New Vehicle Trips (including Pass-by Factor)					***17***	***25***	***42***	***120***	***91***	***211***
Net New Vehicle Trips (without Pass-by Factor)					***47***	***55***	***102***	***194***	***165***	***359***

The number of person trips for the proposed White Oak Town Center was calculated by applying the mode split assumptions for the White Oak Policy Area. For the retail use, it is assumed that auto drivers represent 65.7 percent of person trips. For the office use, it is assumed that auto drivers represent 68.7 percent of person trips. The resulting person trip generation is shown in Table 4.

Table 4 – Person Trip Generation

<table>
<tr><th colspan="8">Person Trip Generation</th></tr>
<tr><th rowspan="2">Description</th><th rowspan="2" colspan="2">Quantity</th><th colspan="2">Two-Way Vehicle Trips</th><th rowspan="2">Auto Driver %</th><th colspan="2">Two-Way Person Trips</th></tr>
<tr><th>AM Peak Hour</th><th>PM Peak Hour</th><th>AM Peak Hour</th><th>PM Peak Hour</th></tr>
<tr><td>Shopping Center</td><td>85</td><td>KSF</td><td>175</td><td>434</td><td>65.7%</td><td>266</td><td>661</td></tr>
<tr><td>General Office Building (Existing)</td><td>20</td><td>KSF</td><td>19</td><td>16</td><td>68.7%</td><td>28</td><td>23</td></tr>
<tr><td colspan="6">Gross Person Trips</td><td>294</td><td>684</td></tr>
<tr><td>General Office Building (Existing)</td><td>87.9</td><td>KSF</td><td>92</td><td>91</td><td>68.7%</td><td>134</td><td>132</td></tr>
<tr><td colspan="6">Net Person Trips</td><td>160</td><td>552</td></tr>
</table>

These calculations show that the proposed development will result in the following increases in external vehicle trips and in person trips.

Table 5 – Net Difference in Trips

	AM Peak Hour	PM Peak Hour
Net New Vehicle Trips	102	359
Net New Person Trips	160	552

Summary of Findings

The proposed development consists of up to 105,000 square feet of commercial space consisting of 85,000 square feet retail and 20,000 square feet of office. An existing vacant office building that has 87,900 square feet of gross floor area will be demolished.

Using the LATIP trip generation rates, the development will result in a net increase of 174 vehicle trips. Thus, the LATIP fee for this proposed development will be $871,740.

Using the methodology contained in the Planning Board's LATR Guidelines, the proposed development will result in vehicle trip increases of 102 in the AM peak hour and 359 in the PM peak hour. The external person trip increases will be 160 in the AM peak hour and 552 in the PM peak hour.

Based on the LATR Guidelines, this memorandum satisfies the transportation submittal requirements for Preliminary Plan applications in the White Oak Policy Area.

WELLS + ASSOCIATES

1420 Spring Hill Road,
Suite 610,
Tysons, VA 22102
703-917-6620
WellsandAssociates.com

January 21, 2022

Elwyn Gonzalez
Mid-County Planning
Montgomery County Planning Department
2425 Reedie Dr
Silver Spring, MD 20902

RE: **Sketch Plan No.: 320220050**
Preliminary Plan No.: 120220060
Site Plan No.: 820220110

LATR Exemption Statement for 2220 Broadbirch Drive
White Oak – Montgomery County, Maryland

Dear Mr. Gonzalez:

White Oak Apartments, LLC, the "Applicant", is seeking concurrent review and approval of Sketch Plan, Preliminary Plan and Site Plan applications for the property located at 2220 Broadbirch Drive within the White Oak Policy Area of Montgomery County, Maryland. The subject property was rezoned from the CR-0.75, C-0.75, R-0.25, H-75 zone to the CRF-1.25, C-0.25, R-1.25, H-85 zone by LMA H-141.

The property is currently occupied by an office building of 66,150 S.F. The development plan proposes a total of 387 residential units, consisting of 359 high rise units and 28 low rise (2 over 2) units.

Per Section 59-7.3.4 (Site Plan application requirements) of the Montgomery County Zoning Ordinance, the Site Plan application is to include the following additional information:

> *"Traffic Statement or Study accepted by the Planning Director, if not submitted with a previous or concurrent application" (See Section 59-7.3.4.B.i.)*

Also, per Section 50-4.3(J) (Preliminary Plan required findings) of the Montgomery County Subdivision Regulations, the Planning Board must find that public facilities will be adequate to serve the proposed development. This Adequate Public Facilities finding requires forecasting travel demand generated by proposed development and comparing it to the capacity of existing and programmed roads and transit. Typically, an applicant for proposed development must analyze the anticipated impact of the proposed development on roadway and intersection performance as well as quality of travel and determine whether the development can satisfy the requirements for transportation adequacy. Following the standards of the 2020-2024 Growth and Infrastructure Policy, the Planning Board must not approve a development if local area transportation conditions are deemed inadequate.

A summary of the trip generation estimates based on the development plan pursuant to LMA H-141 is provided below and summarized on Table 1. It is based on the trip generation rates provided in the Local Area Transportation Review (LATR) guidelines for the White Oak Policy Area.

Table 1
2220 Broadbirch Drive
Site Trip Generation [1, 2]

Land Use	Amount	Unit	Peak Hour Trip Generation	Mode Split Adjustment White Oak Policy Area					
				Auto Driver	Auto Passenger	Transit	Non-Motorized	Pedestrian	Total Person Trips
Proposed Development Plan									
Residential - High Rise Residential	359	DU	123	110	49	15	16	31	190
Residential - Low Rise Residential	28	DU	15	14	6	2	2	4	24
Total Development Plan	**387**	**DU**	**138**	**124**	**55**	**17**	**18**	**35**	**214**
Existing Use									
General Office	66,150	DU	80	72	24	3	5	8	105
Net Site Trips (Development Plan vs. Existing Use)			58	52	31	14	13	27	109

Note:
1. Trip generation based on LATR provided rates for the White Oak Policy Area: Retail: 3.0 trips/1,000 SF, Office = 1.2 trips/1,000 SF, Multi Family High Rise = 0.34 trips/DU & Multi Family Low Rise= 0.52 trips/DU.
2. White Oak Policy Area

As shown on Table 1, the development plan would generate 138 peak hour vehicle trips while the existing office building would generate 80 peak hour vehicle trips. Thus, the development plan would generate 58 net new peak hour vehicle trips.

Further, the subject property's location within the White Oak Policy Area exempts it from the typical LATR study requirements, and rather subjects it to the "White Oak Local Area Transportation Improvement Program Mitigation Payments (LATIP)" criteria, as outlined in Appendix 4 of the LATR guidelines (Attachment I). The LATIP is $5,010 per peak hour vehicle trip.

In accordance with the 2020-2024 Growth and Infrastructure Policy and the LATR guidelines, it is our opinion that this project is exempt from preparing an LATR traffic study.

If you have any questions, please contact me (703) 676-3603 or by email at mjworkosky@wellsandassociates.com

Sincerely,

Michael J. Workosky, PTP, TOPS, TSOS
President

o:\projects\8001-8500\8110b - nrp group white oak\documents\correspondence\2220 broadbirch drive latr exemption letter (w+a draft 1.21.2022)(1).docx

Appendix 4: White Oak Local Area Transportation Improvement Program Mitigation Payments

Introduction

This appendix provides information pertaining to the mitigation fee payment schedule requirements for the White Oak Local Area Transportation Improvement Program (LATIP). These fees are paid by applicants to the Department of Permitting Services (DPS) at the same time and in the same manner as the transportation impact tax for new development in the White Oak policy area.

Discussion

Under County Code 52-51(a), an applicant for a building permit for any building must pay to the Department of Finance a Mitigation Payment if this payment is required for a building included in a preliminary plan of subdivision that was approved under the Local Area Transportation Review provisions in the county Subdivision Staging Policy (SSP).

The 2016-2020 SSP adopted in Council Resolution 18-671 on November 15, 2016 states that the Planning Board may approve a subdivision in the White Oak Policy Area conditioned on the applicant paying a fee to the county commensurate with the applicant's proportion of the cost of a White Oak Local Area Transportation Improvement Program, including the costs of design, land acquisition, construction, site improvements and utility relocation. The proportion is based on a subdivision's share of net additional peak-hour vehicle trips generated by all master-planned development in the White Oak Policy Area approved after January 1, 2016.

Council Resolution 18-726, adopted on February 14, 2017, established the fee described above at $5,010 per peak hour vehicle trip. This fee, the Local Area Transportation Improvement Program (LATIP) fee, was calculated as follows:

LATIP fee = Total Infrastructure Costs in the Plan Area/Total Number of New P.M. Peak-Hour Vehicle Trips

The *Total Infrastructure Costs in the Plan Area* were determined by a forecast estimate of the local area transportation needs and associated costs approved by the County Council. The *Total Number of New P.M. Peak-Hour Vehicle Trips* was determined by a forecast estimate of the travel demand associated with the full build-out of the White Oak Science Gateway (WOSG) Master Plan.

The fee must be paid at a time and manner consistent with Local Area Transportation Mitigation Payments as prescribed in Section 52-51 of the County Code. The Department of Finance must retain funds collected from this fee in an account to be appropriated for transportation improvements that result in transportation capacity and mobility for the specific projects in the White Oak (LATIP).

The trip generation rates used in support of the White Oak LATIP calculation is provided in the chart below. The trip generation rates are based on the peak-hour trip rates used in support of the WOSG Master Plan local area traffic analysis which are customized to reflect existing conditions and future changes in both land use and travel behavior. These trip rates have been disaggregated relative to those applied in the master plan to match the impact tax land use categories. Development resulting in increments of less than a trip will have the fee applied proportionally (no rounding). The resultant fees are paid at the same time and in the same manner as the transportation impact tax and apply to new applications for residential and commercial development in the White Oak policy area.

The process by which applicants may receive a credit against the LATIP is described in Bill 51-16 found here:

http://www.montgomerycountymd.gov/COUNCIL/Resources/Files/bill/2016/20170214_51-16.pdf

White Oak Local Area Transportation Improvement Program (LATIP)

Trip Generation Rate Schedule

Effective January 1, 2016

White Oak Local Area Model Trip Generation Rates		
Land Use	**Trips per Unit of Development**	**Units**
Office	1.20	1,000 SF
Retail	3.00	1,000 SF
Industrial	1.00	1,000 SF
BioScience	0.99	1,000 SF
Hospital	1.07	1,000 SF
Other Non-residential	0.92	1,000 SF
Single Family Detached	1.28	Dwelling Unit
Single Family Attached	0.65	Dwelling Unit
Multi Family Low Rise	0.52	Dwelling Unit
Multi Family High Rise	0.34	Dwelling Unit

Appendix F

Signal Warrant Analysis

Summary of Traffic Signal Warrant Analysis

Intersection: **Old Columbia Pike at Stewart Lane**
Location: **Montgomery County**
Study Date: **05/17/2022**

Warrant Analysis:

SHA is mandated to follow the nationally accepted *Manual on Uniform Traffic Control Devices* (MUTCD) as the guideline for the installation of the Traffic Signal. In a signal warrant analysis, numerous factors are evaluated including traffic volumes, delay, accident history, and pedestrian volumes. A signal warrant analysis was conducted on May 17, 2022, to evaluate if a traffic signal is warranted at the intersection of Old Columbia Pike at Stewart Lane to address the need of a signalized intersection.

A 13-hour volume count conducted on Tuesday, March 8, 2022 was used for the analysis. According to the warrant analysis, the warrants for a signal have not been satisfied.

☐	1	Eight-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	2	Four-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	3	Peak Hour	☐ **YES**	☐ **NO**	☒ **N/A**
☐	4	Pedestrian Volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	5	School Crossing	☐ **YES**	☒ **NO**	☐ **N/A**
☐	6	Coordinated Signal System	☐ **YES**	☒ **NO**	☐ **N/A**
☐	7	Crash Experience	☐ **YES**	☒ **NO**	☐ **N/A**
☐	8	Roadway Network	☐ **YES**	☒ **NO**	☐ **N/A**
☐	9	Intersection Near a Grade Crossing	☐ **YES**	☒ **NO**	☐ **N/A**

☐ Location warrants signalization.

☒ **Location does not warrant signalization.**

Traffic Signal Warrant Analysis

Source: Maryland Manual on Uniform Traffic Control Devices, 2011.

YEAR ANALYZED 2022

Does the 85th percentile speed of the major street traffic exceed 40 mph? yes ☐ no ☒

Does the intersection lie within the built-up area of an isolated community having a population of less than 10,000? yes ☐ no ☒

Major Street: **Stewart Lane**
Number of lanes of moving traffic on each major street approach: 1
Posted speed limit along Stewart Lane: 30
Minor Street**: Old Columbia Pike**
Number of lanes of moving traffic on each minor street approach: 1

Warrants for Traffic Signal Installation

Traffic control signal may be justified at an intersection, driveway or mid block pedestrian crossing, if one or more of the following warrants are satisfied:

Warrant1, Eight-Hour Vehicular Volume WARRANT SATISFIED: yes ☐ no ☒

This warrant is satisfied when one of the following apply:

Condition satisfied:

A. Minimum Vehicular Volume yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **500 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.
Minor Street: **150 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Stewart Lane	**316**	Old Columbia Pike	**117**	yes ☐	no ☒
07:00 AM – 08:00 AM	Stewart Lane	**438**	Old Columbia Pike	**147**	yes ☐	no ☒
08:00 AM – 09:00 AM	Stewart Lane	**625**	Old Columbia Pike	**129**	yes ☐	no ☒
09:00 AM – 10:00 AM	Stewart Lane	**503**	Old Columbia Pike	**84**	yes ☐	no ☒
10:00 AM – 11:00 AM	Stewart Lane	**483**	Old Columbia Pike	**98**	yes ☐	no ☒
11:00 AM – 12:00 AM	Stewart Lane	**457**	Old Columbia Pike	**101**	yes ☐	no ☒
12:00 AM – 01:00 AM	Stewart Lane	**541**	Old Columbia Pike	**116**	yes ☐	no ☒
01:00 PM – 02:00 PM	Stewart Lane	**508**	Old Columbia Pike	**109**	yes ☐	no ☒
02:00 PM – 03:00 PM	Stewart Lane	**612**	Old Columbia Pike	**119**	yes ☐	no ☒
03:00 PM – 04:00 PM	Stewart Lane	**764**	Old Columbia Pike	**132**	yes ☐	no ☒
04:00 PM – 05:00 PM	Stewart Lane	**783**	Old Columbia Pike	**140**	yes ☐	no ☒
05:00 PM – 06:00 PM	Stewart Lane	**802**	Old Columbia Pike	**144**	yes ☐	no ☒
06:00 PM – 07:00 PM	Stewart Lane	**731**	Old Columbia Pike	**148**	yes ☐	no ☒

B. The Interruption of Continuous Traffic Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **750 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.
Minor Street: **75 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Stewart Lane	**316**	Old Columbia Pike	**117**	yes ☐	no ☒
07:00 AM – 08:00 AM	Stewart Lane	**438**	Old Columbia Pike	**147**	yes ☐	no ☒
08:00 AM – 09:00 AM	Stewart Lane	**625**	Old Columbia Pike	**129**	yes ☐	no ☒
09:00 AM – 10:00 AM	Stewart Lane	**503**	Old Columbia Pike	**84**	yes ☐	no ☒
10:00 AM – 11:00 AM	Stewart Lane	**483**	Old Columbia Pike	**98**	yes ☐	no ☒
11:00 AM – 12:00 AM	Stewart Lane	**457**	Old Columbia Pike	**101**	yes ☐	no ☒
12:00 AM – 01:00 AM	Stewart Lane	**541**	Old Columbia Pike	**116**	yes ☐	no ☒
01:00 PM – 02:00 PM	Stewart Lane	**508**	Old Columbia Pike	**109**	yes ☐	no ☒
02:00 PM – 03:00 PM	Stewart Lane	**612**	Old Columbia Pike	**119**	yes ☐	no ☒
03:00 PM – 04:00 PM	Stewart Lane	**764**	Old Columbia Pike	**132**	yes ☒	no ☐
04:00 PM – 05:00 PM	Stewart Lane	**783**	Old Columbia Pike	**140**	yes ☒	no ☐
05:00 PM – 06:00 PM	Stewart Lane	**802**	Old Columbia Pike	**144**	yes ☒	no ☐
06:00 PM – 07:00 PM	Stewart Lane	**731**	Old Columbia Pike	**148**	yes ☐	no ☒

Combination of Condition A and B Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **400 vph (Cond.-A) and 600 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.
Minor Street: **120 vph (Cond.-A) and 60 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Stewart Lane	**316**	Old Columbia Pike	**117**	yes ☐	no ☒
07:00 AM – 08:00 AM	Stewart Lane	**438**	Old Columbia Pike	**147**	yes ☐	no ☒
08:00 AM – 09:00 AM	Stewart Lane	**625**	Old Columbia Pike	**129**	yes ☒	no ☐
09:00 AM – 10:00 AM	Stewart Lane	**503**	Old Columbia Pike	**84**	yes ☐	no ☒
10:00 AM – 11:00 AM	Stewart Lane	**483**	Old Columbia Pike	**98**	yes ☐	no ☒
11:00 AM – 12:00 AM	Stewart Lane	**457**	Old Columbia Pike	**101**	yes ☐	no ☒
12:00 AM – 01:00 AM	Stewart Lane	**541**	Old Columbia Pike	**116**	yes ☐	no ☒
01:00 PM – 02:00 PM	Stewart Lane	**508**	Old Columbia Pike	**109**	yes ☐	no ☒
02:00 PM – 03:00 PM	Stewart Lane	**612**	Old Columbia Pike	**119**	yes ☐	no ☒
03:00 PM – 04:00 PM	Stewart Lane	**764**	Old Columbia Pike	**132**	yes ☒	no ☐
04:00 PM – 05:00 PM	Stewart Lane	**783**	Old Columbia Pike	**140**	yes ☒	no ☐
05:00 PM – 06:00 PM	Stewart Lane	**802**	Old Columbia Pike	**144**	yes ☒	no ☐
06:00 PM – 07:00 PM	Stewart Lane	**731**	Old Columbia Pike	**148**	yes ☒	no ☐

Warrant 1 is not satisfied, including for the combination conditions.

Warrant 2, Four-Hour Vehicular Volume	WARRANT SATISFIED:	yes ☐	no ☒

The Four-Hour Volume Warrant is satisfied when for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major-street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor-street (one direction only) all fall above the curve in Figure 4C-1.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Stewart Lane	**316**	Old Columbia Pike	**117**	yes ☐	no ☒
07:00 AM – 08:00 AM	Stewart Lane	**438**	Old Columbia Pike	**147**	yes ☐	no ☒
08:00 AM – 09:00 AM	Stewart Lane	**625**	Old Columbia Pike	**129**	yes ☐	no ☒
09:00 AM – 10:00 AM	Stewart Lane	**503**	Old Columbia Pike	**84**	yes ☐	no ☒
10:00 AM – 11:00 AM	Stewart Lane	**483**	Old Columbia Pike	**98**	yes ☐	no ☒
11:00 AM – 12:00 AM	Stewart Lane	**457**	Old Columbia Pike	**101**	yes ☐	no ☒
12:00 AM – 01:00 AM	Stewart Lane	**541**	Old Columbia Pike	**116**	yes ☐	no ☒
01:00 PM – 02:00 PM	Stewart Lane	**508**	Old Columbia Pike	**109**	yes ☐	no ☒
02:00 PM – 03:00 PM	Stewart Lane	**612**	Old Columbia Pike	**119**	yes ☐	no ☒
03:00 PM – 04:00 PM	Stewart Lane	**764**	Old Columbia Pike	**132**	yes ☐	no ☒
04:00 PM – 05:00 PM	Stewart Lane	**783**	Old Columbia Pike	**140**	yes ☐	no ☒
05:00 PM – 06:00 PM	Stewart Lane	**802**	Old Columbia Pike	**144**	yes ☐	no ☒
06:00 PM – 07:00 PM	Stewart Lane	**731**	Old Columbia Pike	**148**	yes ☐	no ☒

Warrant 2 is not satisfied.

Warrant 3, Peak Hour	WARRANT SATISFIED:	yes ☐	N/A ☒

According to Section 4C.04, paragraph 2 in the MUTCD, Warrant 3 shall be applied only in unusual cases.

This location is not considered an unusual case.

This warrant is satisfied when either of the following two categories apply:

Condition satisfied:

A. If all of the following conditions exist for the same 1 hour of an average day: yes ☐ no ☐

1. The total delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceeds: four vehicle-hours for one lane approach; and five vehicles –hours for two--lane approach, and yes ☐ no ☐

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes of traffic, and yes ☐ no ☐

3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches. yes ☐ no ☐

B. The plot of vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for 1 hour of average day falls above the applicable curve in Figure 4C-3 for the combination of approach lanes. yes ☐ no ☐

Warrant 3 is not applicable. This location is not considered unusual.

Warrant 4, Pedestrian Volume	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when either of the following apply:

Condition satisfied:

A. Pedestrian volume crossing the major-street during an average day is 107 or more for each of any four (4) hours (Figure 4C-5) or yes ☐ no ☒

B. Pedestrian volume crossing the major-street during an average day is 133 or more for any one (1) hour (Figure 4C-7). yes ☐ no ☒

Warrant 4 is not satisfied.

Warrant 5, School Crossing	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when the study of the frequency and adequacy of gaps in vehicular traffic stream as related to number and size of groups of school children at an established school crossing across a major street shows that the number of adequate gaps in the traffic stream during the period when children are using the crossing is less than the number of minutes in the same period and that there are a minimum of twenty (20) students during the highest crossing hour.

Warrant 5 is not satisfied. There is less than 20 pedestrians in each hour.

Warrant 6, Coordinated Signal System	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when one of the following applies.

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning or

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of vehicular platooning and the proposed and adjacent traffic control signal will collectively provide a progressive operation.

Warrant 6 is not satisfied.

Warrant 7, Crash Experience	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when all of the following apply:

Review of two-year accident report shows a total of one (3) reported collision at this intersection.

		Condition satisfied:	
1.	Adequate trial of alternatives, with satisfactory observance and enforcement has failed to reduce the crash frequency and	yes ☐	no ☒
2.	Five or more reported crashes, of types susceptible to correction by traffic control signal; have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for reportable crashes and	yes ☐	no ☒
3.	There exists a volume of vehicle and pedestrian traffic not less than 80% Of the requirements specified in Warrant 1, or Warrant 5.	yes ☐	no ☒

Warrant 7 is not satisfied.

Warrant 8, Roadway Network	WARRANT SATISFIED:	yes ☐	no ☒

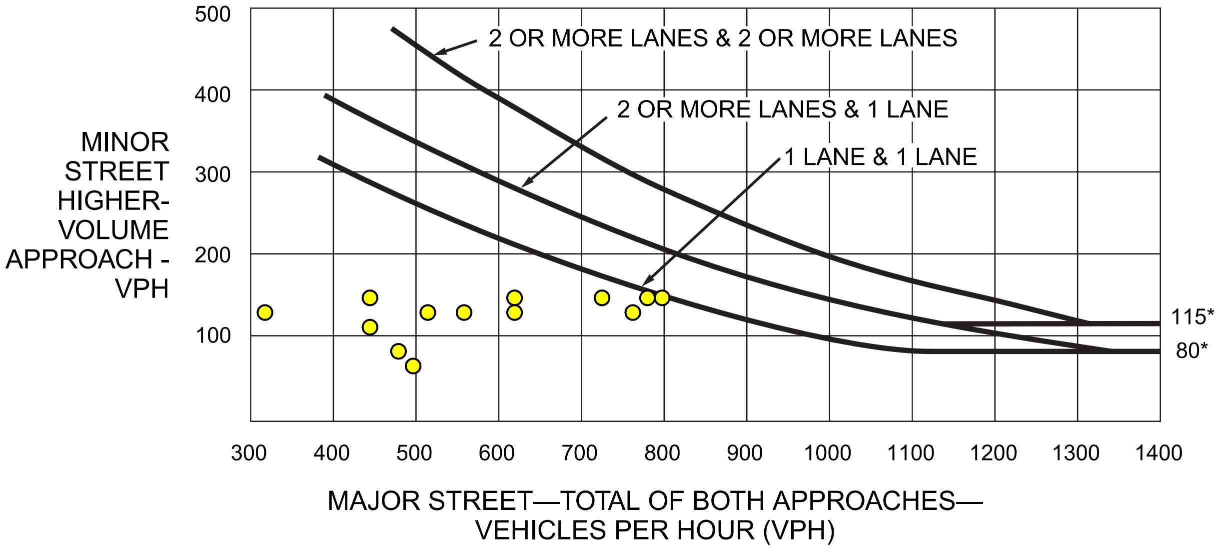
This warrant is satisfied when the common intersection of two or more major routes meet either criterion A or B.

Warrant 8 is not satisfied. The intersection does not include two or more major routes.

Warrant 9, Intersection Near a Grade Crossing	WARRANT SATISFIED:	yes ☐	no ☒

Warrant 9 is not satisfied. The intersection is not near a grade crossing.

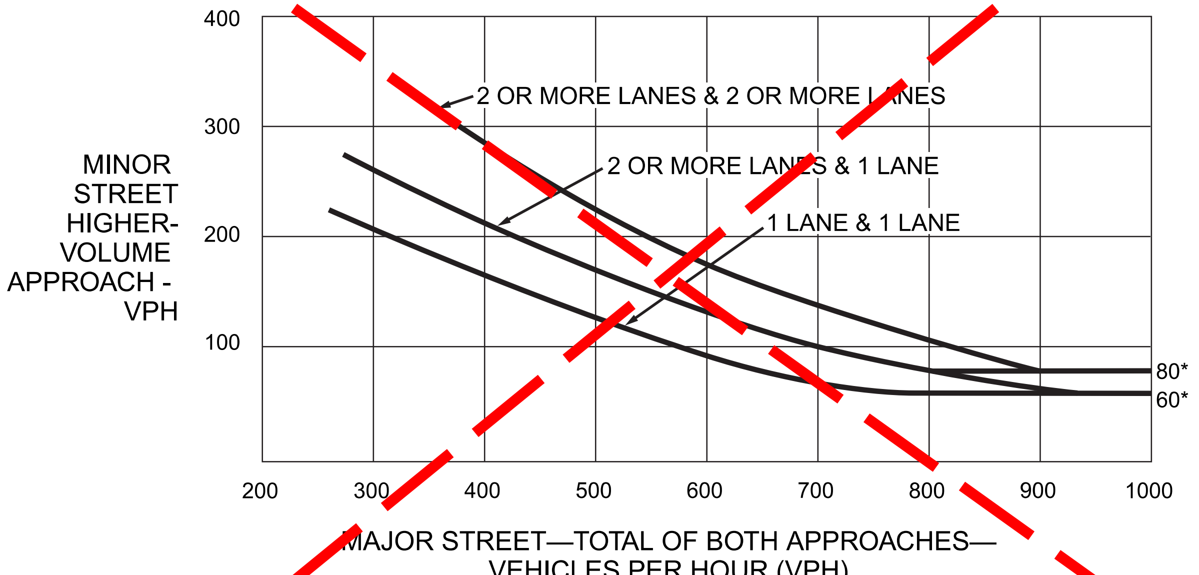
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

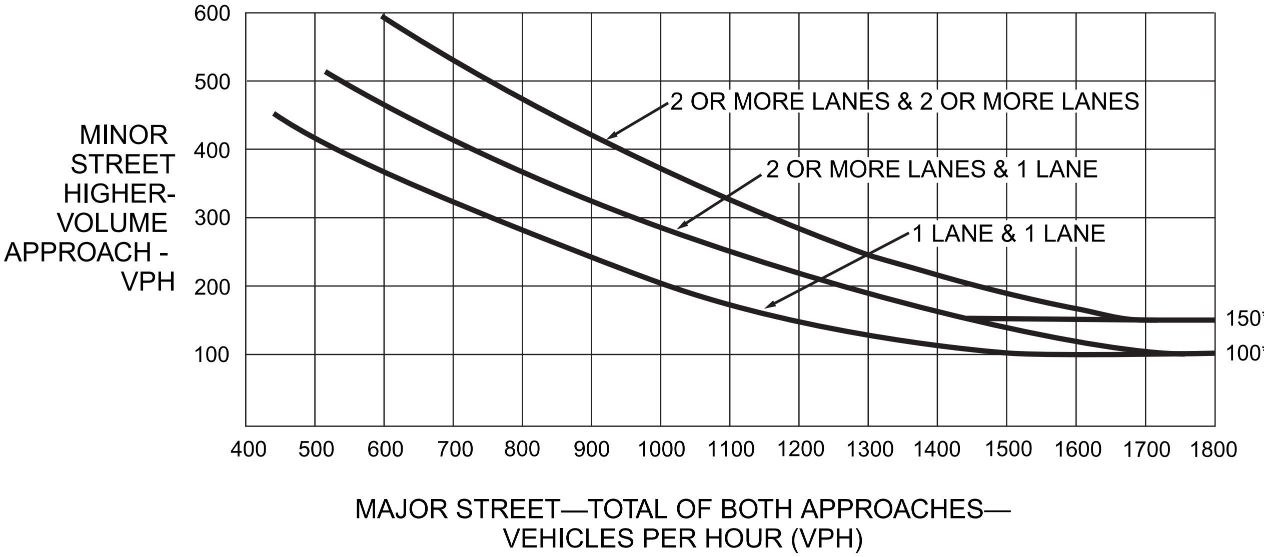
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

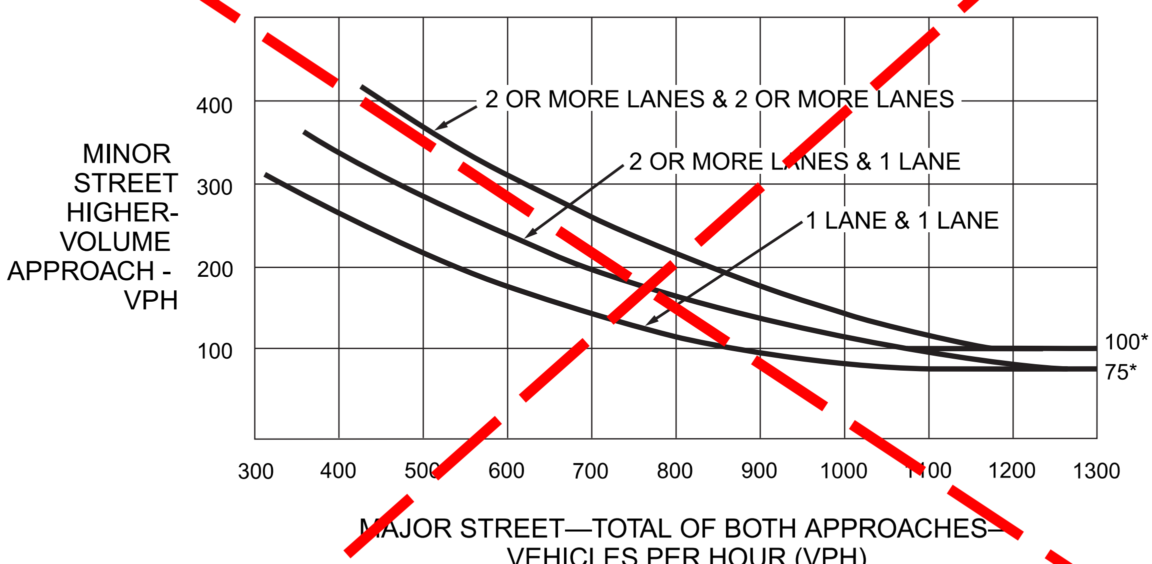
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

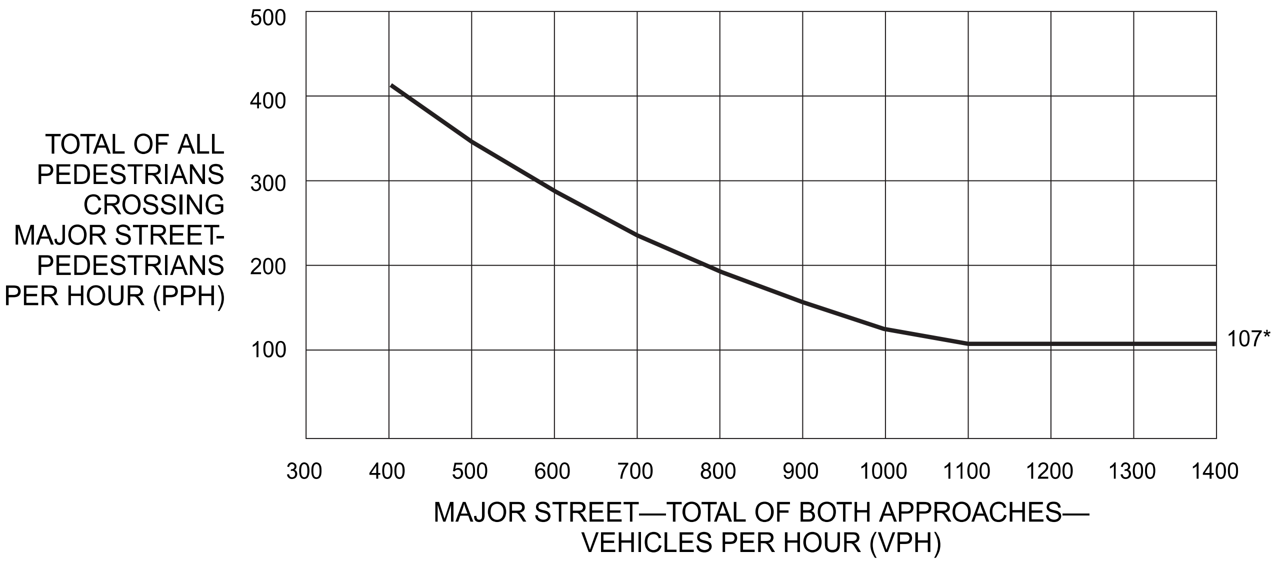
~~Figure 4C-4. Warrant 3, Peak Hour (70% Factor)~~

~~(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)~~



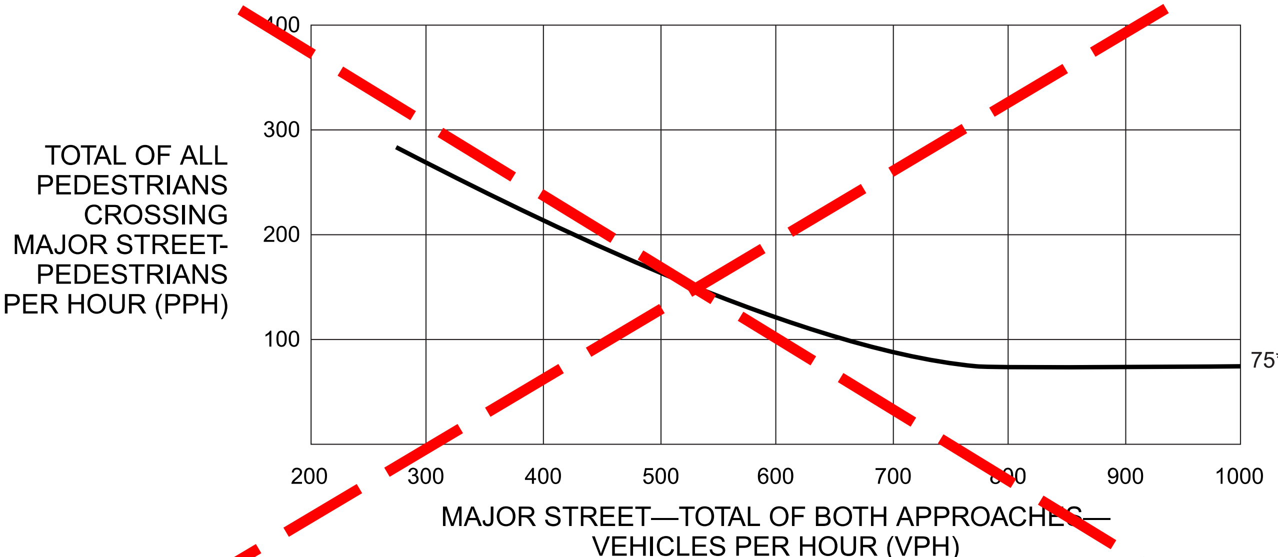
~~*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.~~

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



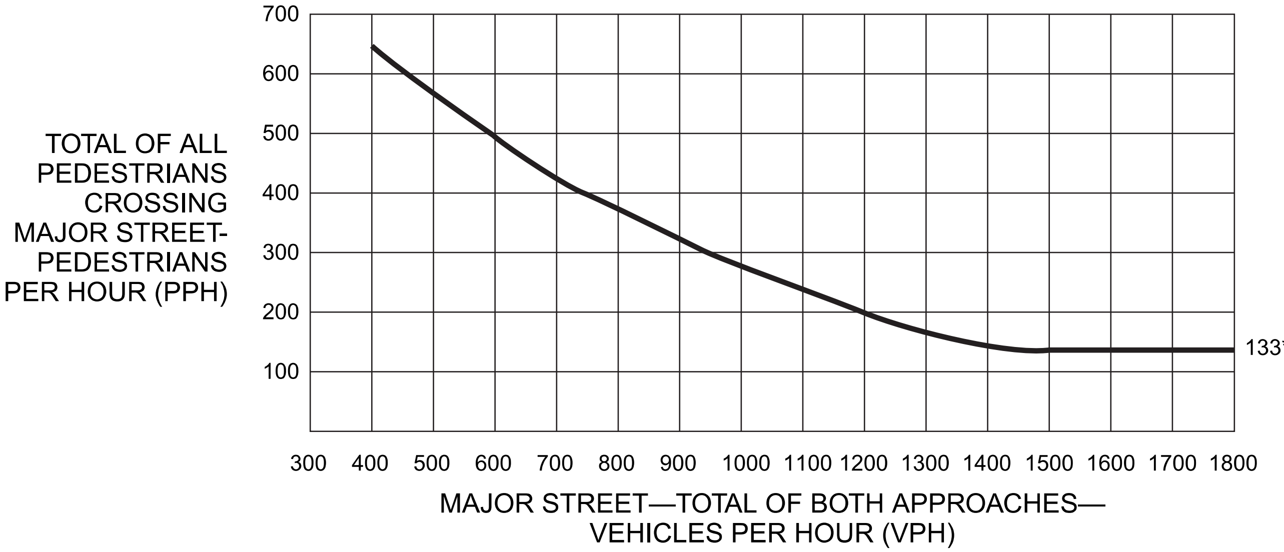
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



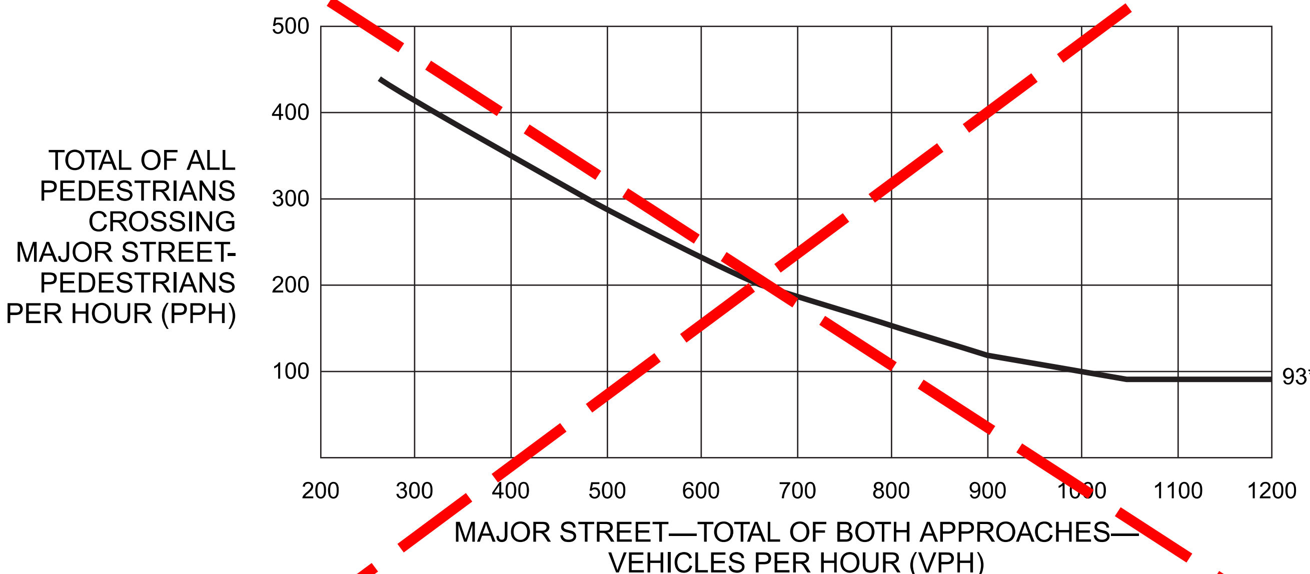
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

Summary of Traffic Signal Warrant Analysis

Intersection: **Old Columbia Pike at Industrial Parkway**
Location: **Montgomery County**
Study Date: **05/18/2022**

Warrant Analysis:

SHA is mandated to follow the nationally accepted *Manual on Uniform Traffic Control Devices* (MUTCD) as the guideline for the installation of the Traffic Signal. In a signal warrant analysis, numerous factors are evaluated including traffic volumes, delay, accident history, and pedestrian volumes. A signal warrant analysis was conducted on May 18, 2022, to evaluate if a traffic signal is warranted at the intersection of Old Columbia Pike at Industrial Parkway to address the need of a signalized intersection.

A 13-hour volume count conducted on Tuesday, March 8, 2022 used for the analysis. According to the warrant analysis, the warrants for a signal have not been satisfied.

☐	1	Eight-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	2	Four-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	3	Peak Hour	☐ **YES**	☐ **NO**	☒ **N/A**
☐	4	Pedestrian Volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	5	School Crossing	☐ **YES**	☒ **NO**	☐ **N/A**
☐	6	Coordinated Signal System	☐ **YES**	☒ **NO**	☐ **N/A**
☐	7	Crash Experience	☐ **YES**	☒ **NO**	☐ **N/A**
☐	8	Roadway Network	☐ **YES**	☒ **NO**	☐ **N/A**
☐	9	Intersection Near a Grade Crossing	☐ **YES**	☒ **NO**	☐ **N/A**

☐ Location warrants signalization.

☒ **Location does not warrant signalization.**

Traffic Signal Warrant Analysis

Source: Maryland Manual on Uniform Traffic Control Devices, 2011.

YEAR ANALYZED 2022

Does the 85th percentile speed of the major street traffic exceed 40 mph? yes ☐ no ☒

Does the intersection lie within the built-up area of an isolated community having a population of less than 10,000? yes ☐ no ☒

Major Street: **Industrial Parkway**
Number of lanes of moving traffic on each major street approach: 3
Posted speed limit along Industrial Parkway: 30

Minor Street**: Old Columbia Pike**
Number of lanes of moving traffic on each minor street approach: 1

Warrants for Traffic Signal Installation

Traffic control signal may be justified at an intersection, driveway or mid block pedestrian crossing, if one or more of the following warrants are satisfied:

Warrant 1, Eight-Hour Vehicular Volume **WARRANT SATISFIED:** **yes** ☐ **no** ☒

This warrant is satisfied when one of the following apply:

Condition satisfied:

A. **Minimum Vehicular Volume** yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **600 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.
Minor Street: **150 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Industrial Parkway	**251**	Old Columbia Pike	**80**	yes ☐	no ☒
07:00 AM – 08:00 AM	Industrial Parkway	**360**	Old Columbia Pike	**142**	yes ☐	no ☒
08:00 AM – 09:00 AM	Industrial Parkway	**564**	Old Columbia Pike	**108**	yes ☐	no ☒
09:00 AM – 10:00 AM	Industrial Parkway	**616**	Old Columbia Pike	**117**	yes ☐	no ☒
10:00 AM – 11:00 AM	Industrial Parkway	**645**	Old Columbia Pike	**66**	yes ☐	no ☒
11:00 AM – 12:00 AM	Industrial Parkway	**600**	Old Columbia Pike	**93**	yes ☐	no ☒
12:00 AM – 01:00 AM	Industrial Parkway	**649**	Old Columbia Pike	**61**	yes ☐	no ☒
01:00 PM – 02:00 PM	Industrial Parkway	**589**	Old Columbia Pike	**41**	yes ☐	no ☒
02:00 PM – 03:00 PM	Industrial Parkway	**658**	Old Columbia Pike	**77**	yes ☐	no ☒
03:00 PM – 04:00 PM	Industrial Parkway	**697**	Old Columbia Pike	**77**	yes ☐	no ☒
04:00 PM – 05:00 PM	Industrial Parkway	**753**	Old Columbia Pike	**87**	yes ☐	no ☒
05:00 PM – 06:00 PM	Industrial Parkway	**807**	Old Columbia Pike	**89**	yes ☐	no ☒
06:00 PM – 07:00 PM	Industrial Parkway	**580**	Old Columbia Pike	**81**	yes ☐	no ☒

B. The Interruption of Continuous Traffic Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **900 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Minor Street: **75 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Industrial Parkway	**251**	Old Columbia Pike	**80**	yes ☐	no ☒
07:00 AM – 08:00 AM	Industrial Parkway	**360**	Old Columbia Pike	**142**	yes ☐	no ☒
08:00 AM – 09:00 AM	Industrial Parkway	**564**	Old Columbia Pike	**108**	yes ☐	no ☒
09:00 AM – 10:00 AM	Industrial Parkway	**616**	Old Columbia Pike	**117**	yes ☐	no ☒
10:00 AM – 11:00 AM	Industrial Parkway	**645**	Old Columbia Pike	**66**	yes ☐	no ☒
11:00 AM – 12:00 AM	Industrial Parkway	**600**	Old Columbia Pike	**93**	yes ☐	no ☒
12:00 AM – 01:00 AM	Industrial Parkway	**649**	Old Columbia Pike	**61**	yes ☐	no ☒
01:00 PM – 02:00 PM	Industrial Parkway	**589**	Old Columbia Pike	**41**	yes ☐	no ☒
02:00 PM – 03:00 PM	Industrial Parkway	**658**	Old Columbia Pike	**77**	yes ☐	no ☒
03:00 PM – 04:00 PM	Industrial Parkway	**697**	Old Columbia Pike	**77**	yes ☐	no ☒
04:00 PM – 05:00 PM	Industrial Parkway	**753**	Old Columbia Pike	**87**	yes ☐	no ☒
05:00 PM – 06:00 PM	Industrial Parkway	**807**	Old Columbia Pike	**89**	yes ☐	no ☒
06:00 PM – 07:00 PM	Industrial Parkway	**580**	Old Columbia Pike	**81**	yes ☐	no ☒

Combination of Condition A and B Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **480 vph (Cond.-A) and 720 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Minor Street: **120 vph (Cond.-A) and 60 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Industrial Parkway	**251**	Old Columbia Pike	**80**	yes ☐	no ☒
07:00 AM – 08:00 AM	Industrial Parkway	**360**	Old Columbia Pike	**142**	yes ☐	no ☒
08:00 AM – 09:00 AM	Industrial Parkway	**564**	Old Columbia Pike	**108**	yes ☐	no ☒
09:00 AM – 10:00 AM	Industrial Parkway	**616**	Old Columbia Pike	**117**	yes ☐	no ☒
10:00 AM – 11:00 AM	Industrial Parkway	**645**	Old Columbia Pike	**66**	yes ☐	no ☒
11:00 AM – 12:00 AM	Industrial Parkway	**600**	Old Columbia Pike	**93**	yes ☐	no ☒
12:00 AM – 01:00 AM	Industrial Parkway	**649**	Old Columbia Pike	**61**	yes ☐	no ☒
01:00 PM – 02:00 PM	Industrial Parkway	**589**	Old Columbia Pike	**41**	yes ☐	no ☒
02:00 PM – 03:00 PM	Industrial Parkway	**658**	Old Columbia Pike	**77**	yes ☐	no ☒
03:00 PM – 04:00 PM	Industrial Parkway	**697**	Old Columbia Pike	**77**	yes ☐	no ☒
04:00 PM – 05:00 PM	Industrial Parkway	**753**	Old Columbia Pike	**87**	yes ☐	no ☒
05:00 PM – 06:00 PM	Industrial Parkway	**807**	Old Columbia Pike	**89**	yes ☐	no ☒
06:00 PM – 07:00 PM	Industrial Parkway	**580**	Old Columbia Pike	**81**	yes ☐	no ☒

Warrant 1 is not satisfied, including for the combination conditions.

Warrant 2, Four-Hour Vehicular Volume	WARRANT SATISFIED:	yes ☐	no ☒

The Four-Hour Volume Warrant is satisfied when for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major-street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor-street (one direction only) all fall above the curve in Figure 4C-1.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Industrial Parkway	**251**	Old Columbia Pike	**80**	yes ☐	no ☒
07:00 AM – 08:00 AM	Industrial Parkway	**360**	Old Columbia Pike	**142**	yes ☐	no ☒
08:00 AM – 09:00 AM	Industrial Parkway	**564**	Old Columbia Pike	**108**	yes ☐	no ☒
09:00 AM – 10:00 AM	Industrial Parkway	**616**	Old Columbia Pike	**117**	yes ☐	no ☒
10:00 AM – 11:00 AM	Industrial Parkway	**645**	Old Columbia Pike	**66**	yes ☐	no ☒
11:00 AM – 12:00 AM	Industrial Parkway	**600**	Old Columbia Pike	**93**	yes ☐	no ☒
12:00 AM – 01:00 AM	Industrial Parkway	**649**	Old Columbia Pike	**61**	yes ☐	no ☒
01:00 PM – 02:00 PM	Industrial Parkway	**589**	Old Columbia Pike	**41**	yes ☐	no ☒
02:00 PM – 03:00 PM	Industrial Parkway	**658**	Old Columbia Pike	**77**	yes ☐	no ☒
03:00 PM – 04:00 PM	Industrial Parkway	**697**	Old Columbia Pike	**77**	yes ☐	no ☒
04:00 PM – 05:00 PM	Industrial Parkway	**753**	Old Columbia Pike	**87**	yes ☐	no ☒
05:00 PM – 06:00 PM	Industrial Parkway	**807**	Old Columbia Pike	**89**	yes ☐	no ☒
06:00 PM – 07:00 PM	Industrial Parkway	**580**	Old Columbia Pike	**81**	yes ☐	no ☒

Warrant 2 is not satisfied.

Warrant 3, Peak Hour	WARRANT SATISFIED:	yes ☐	N/A ☒

According to Section 4C.04, paragraph 2 in the MUTCD, Warrant 3 shall be applied only in unusual cases.

This location is not considered an unusual case.

This warrant is satisfied when either of the following two categories apply:

Condition satisfied:

A. If all of the following conditions exist for the same 1 hour of an average day: yes ☐ no ☐

1. The total delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceeds: four vehicle-hours for one lane approach; and five vehicles –hours for two--lane approach, and — yes ☐ no ☐

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes of traffic, and — yes ☐ no ☐

3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches. — yes ☐ no ☐

B. The plot of vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for 1 hour of average day falls above the applicable curve in Figure 4C-3 for the combination of approach lanes. — yes ☐ no ☐

Warrant 3 is not applicable. This location is not considered unusual.

Warrant 4, Pedestrian Volume	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when either of the following apply:

Condition satisfied:

A. Pedestrian volume crossing the major-street during an average day is 107 or more for each of any four (4) hours (Figure 4C-6) or — yes ☐ no ☒

B. Pedestrian volume crossing the major-street during an average day is 133 or more for any one (1) hour (Figure 4C-8). — yes ☐ no ☒

Warrant 4 is not satisfied.

Warrant 5, School Crossing	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when the study of the frequency and adequacy of gaps in vehicular traffic stream as related to number and size of groups of school children at an established school crossing across a major street shows that the number of adequate gaps in the traffic stream during the period when children are using the crossing is less than the number of minutes in the same period and that there are a minimum of twenty (20) students during the highest crossing hour.

Warrant 5 is not satisfied. There is no school crossing nearby, and less than 20 school children in max hour.

Warrant 6, Coordinated Signal System	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when one of the following applies.

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning or

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of vehicular platooning and the proposed and adjacent traffic control signal will collectively provide a progressive operation.

Warrant 6 is not satisfied.

Warrant 7, Crash Experience	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when all of the following apply:

Review of two-year accident report shows a total of one (1) reported collision at this intersection.

		Condition satisfied:	
1.	Adequate trial of alternatives, with satisfactory observance and enforcement has failed to reduce the crash frequency and	yes ☐	no ☒
2.	Five or more reported crashes, of types susceptible to correction by traffic control signal; have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for reportable crashes and	yes ☐	no ☒
3.	There exists a volume of vehicle and pedestrian traffic not less than 80% Of the requirements specified in Warrant 1, or Warrant 5.	yes ☐	no ☒

Warrant 7 is not satisfied.

Warrant 8, Roadway Network	WARRANT SATISFIED:	yes ☐	no ☒

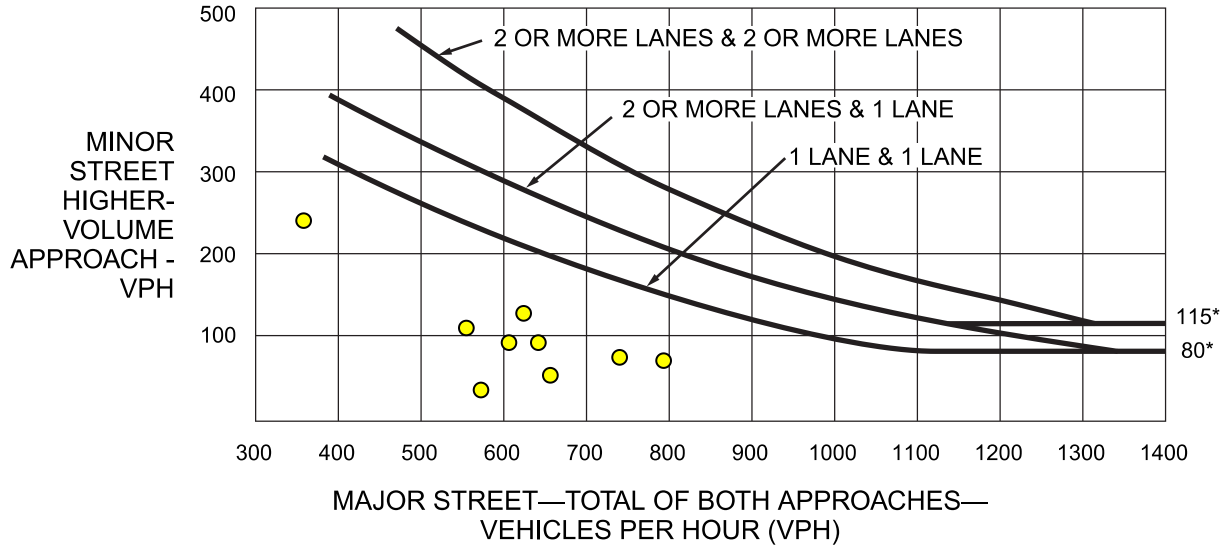
This warrant is satisfied when the common intersection of two or more major routes meet either criterion A or B.

Warrant 8 is not satisfied. The intersection does not include two or more major routes.

Warrant 9, Intersection Near a Grade Crossing	WARRANT SATISFIED:	yes ☐	no ☒

Warrant 9 is not satisfied. The intersection is not near a grade crossing.

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



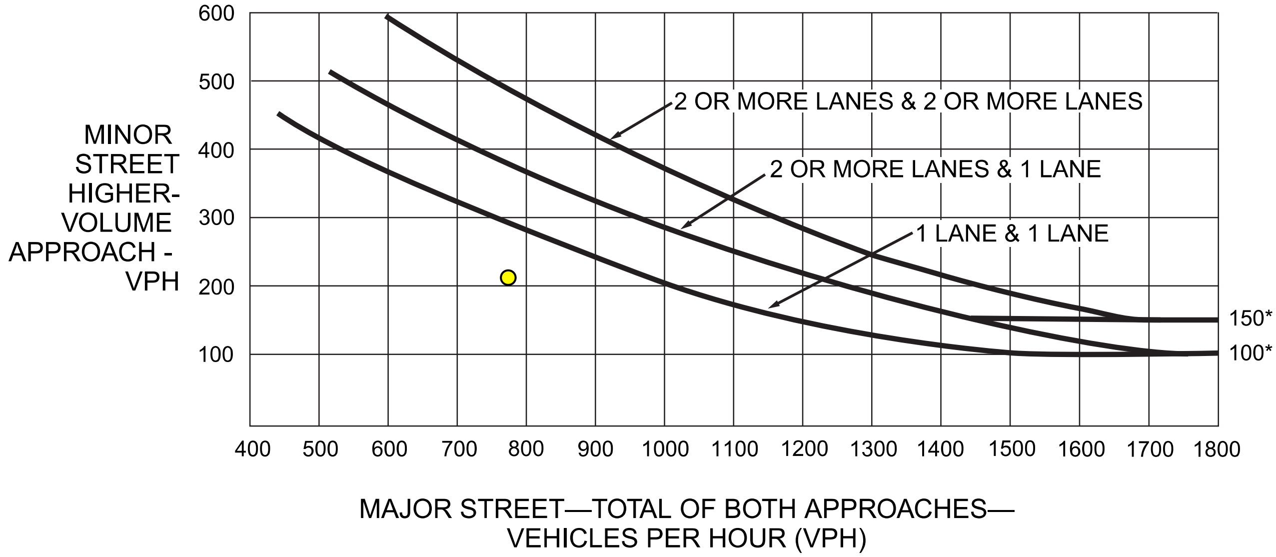
*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

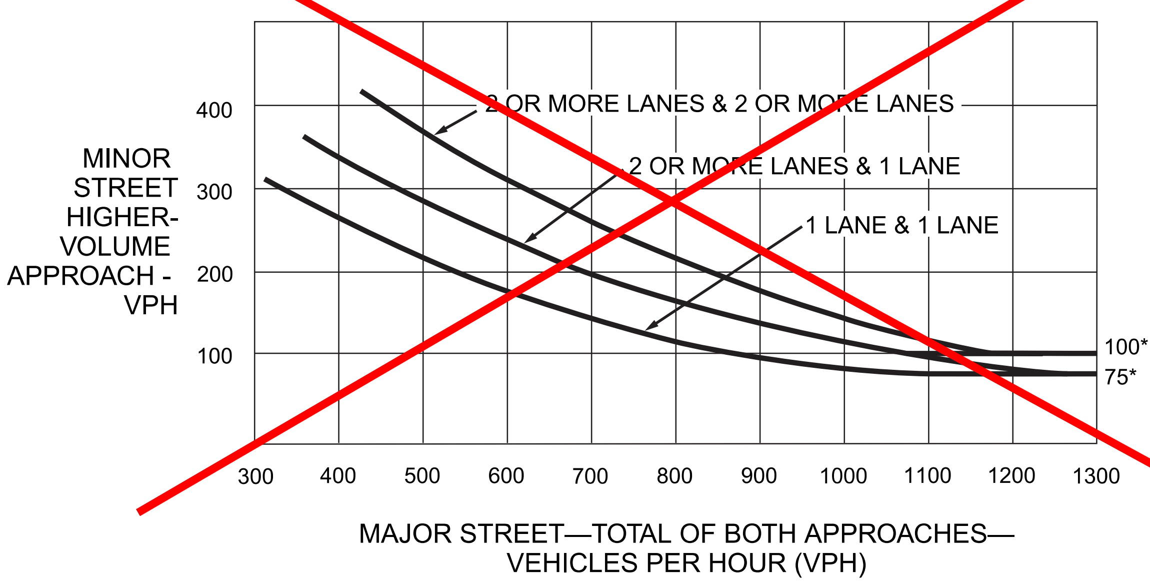
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

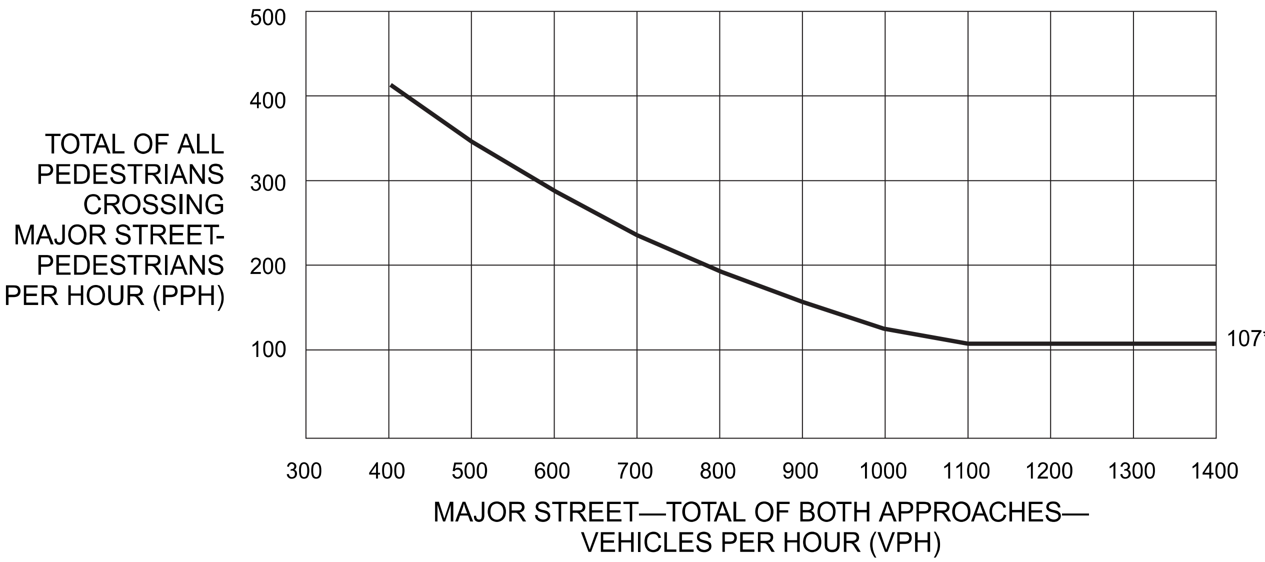
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



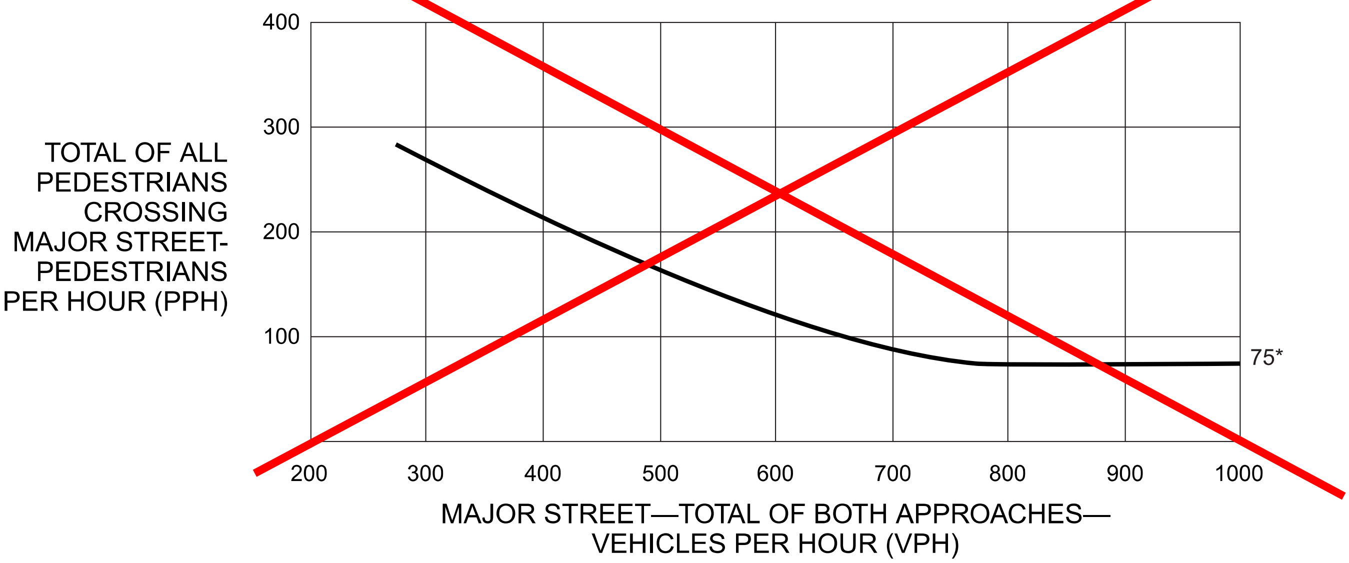
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



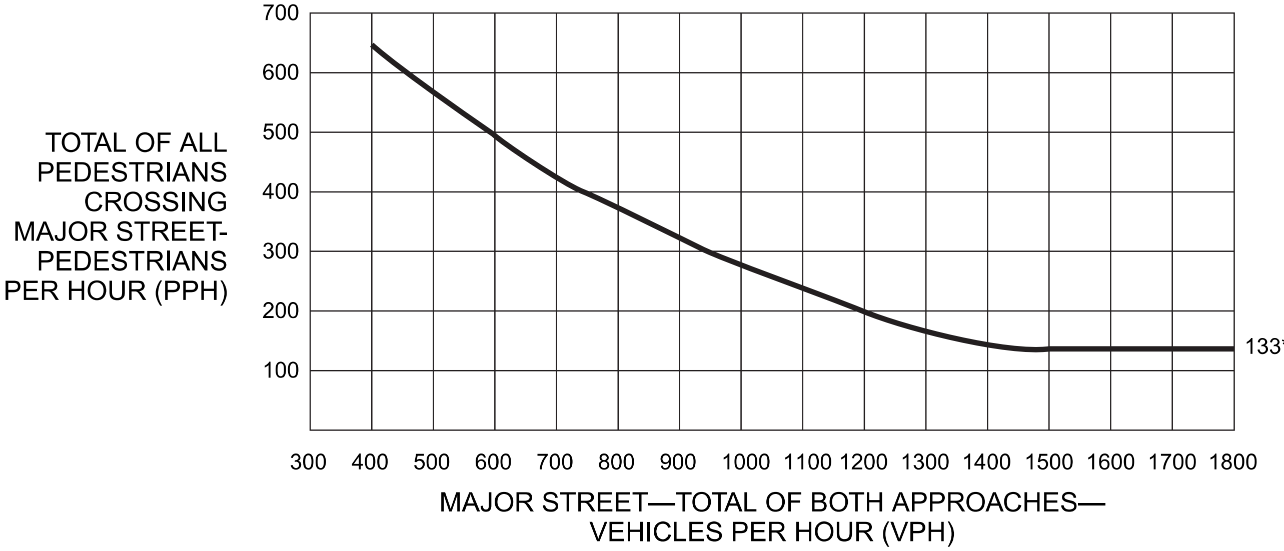
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



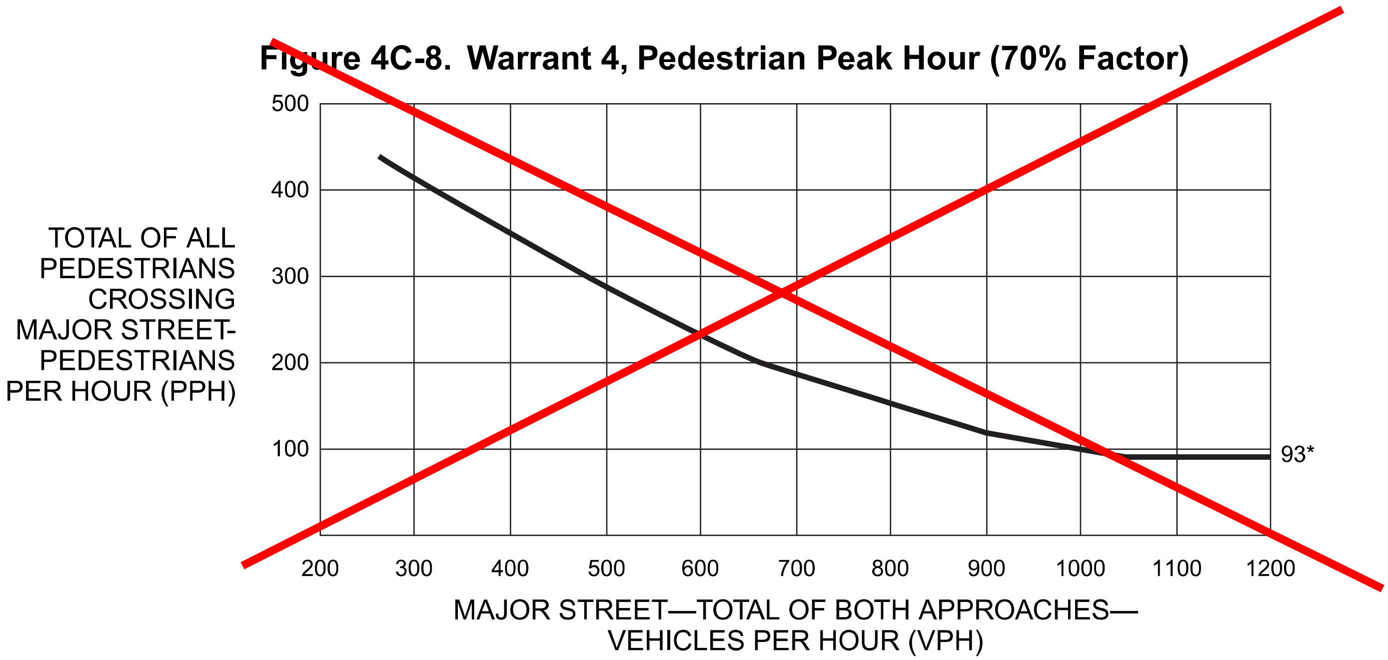
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

Summary of Traffic Signal Warrant Analysis

Intersection: **Old Columbia Pike / Prosperity Drive at Tech Road**
Location: **Montgomery County**
Study Date: **05/18/2022**

<u>Warrant Analysis:</u>

SHA is mandated to follow the nationally accepted *Manual on Uniform Traffic Control Devices* (MUTCD) as the guideline for the installation of the Traffic Signal. In a signal warrant analysis, numerous factors are evaluated including traffic volumes, delay, accident history, and pedestrian volumes. A signal warrant analysis was conducted on May 18, 2022, to evaluate if a traffic signal is warranted at the intersection of Old Columbia Pike / Prosperity Drive at Tech Road to address the need of a signalized intersection.

A 13-hour volume count conducted on Tuesday, March 8, 2022 was used for the analysis. According to the warrant analysis, the warrants for a signal <u>have</u> been satisfied.

☒	1	Eight-Hour vehicular volume	☒ **YES**	☐ **NO**	☐ **N/A**
☐	2	Four-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	3	Peak Hour	☐ **YES**	☒ **NO**	☐ **N/A**
☐	4	Pedestrian Volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	5	School Crossing	☐ **YES**	☒ **NO**	☐ **N/A**
☐	6	Coordinated Signal System	☐ **YES**	☒ **NO**	☐ **N/A**
☐	7	Crash Experience	☐ **YES**	☒ **NO**	☐ **N/A**
☐	8	Roadway Network	☐ **YES**	☒ **NO**	☐ **N/A**
☐	9	Intersection Near a Grade Crossing	☐ **YES**	☒ **NO**	☐ **N/A**

☒ **Location warrants signalization. Warrant 1 (Eight-Hour Vehicular Volume), Condition B is met.**

☐ Location does not warrant signalization.

Traffic Signal Warrant Analysis

Source: Maryland Manual on Uniform Traffic Control Devices, 2011.

YEAR ANALYZED 2022

Does the 85th percentile speed of the major street traffic exceed 40 mph? yes ☐ no ☒

Does the intersection lie within the built-up area of an isolated community having a population of less than 10,000? yes ☐ no ☒

Major Street: **Tech Road**
Number of lanes of moving traffic on each major street approach: 3
Posted speed limit along Tech Road: 30

Minor Street**: Old Columbia Pike / Prosperity Drive**
Number of lanes of moving traffic on each minor street approach: 1

Warrants for Traffic Signal Installation

Traffic control signal may be justified at an intersection, driveway or mid block pedestrian crossing, if one or more of the following warrants are satisfied:

Warrant 1, Eight-Hour Vehicular Volume WARRANT SATISFIED: yes ☒ no ☐

This warrant is satisfied when one of the following apply:

Condition satisfied:

A. <u>Minimum Vehicular Volume</u> yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **600 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Minor Street: **150 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Tech Road	**639**	Prosperity Drive	**48**	yes ☐	no ☒
07:00 AM – 08:00 AM	Tech Road	**711**	Prosperity Drive	**56**	yes ☐	no ☒
08:00 AM – 09:00 AM	Tech Road	**829**	Prosperity Drive	**76**	yes ☐	no ☒
09:00 AM – 10:00 AM	Tech Road	**1080**	Prosperity Drive	**92**	yes ☐	no ☒
10:00 AM – 11:00 AM	Tech Road	**909**	Prosperity Drive	**109**	yes ☐	no ☒
11:00 AM – 12:00 AM	Tech Road	**1026**	Prosperity Drive	**86**	yes ☐	no ☒
12:00 AM – 01:00 AM	Tech Road	**1160**	Prosperity Drive	**132**	yes ☐	no ☒
01:00 PM – 02:00 PM	Tech Road	**1120**	Prosperity Drive	**92**	yes ☐	no ☒
02:00 PM – 03:00 PM	Tech Road	**1143**	Prosperity Drive	**94**	yes ☐	no ☒
03:00 PM – 04:00 PM	Tech Road	**1044**	Prosperity Drive	**96**	yes ☐	no ☒
04:00 PM – 05:00 PM	Tech Road	**1133**	Prosperity Drive	**98**	yes ☐	no ☒
05:00 PM – 06:00 PM	Tech Road	**1174**	Prosperity Drive	**100**	yes ☐	no ☒
06:00 PM – 07:00 PM	Tech Road	**1052**	Prosperity Drive	**84**	yes ☐	no ☒

B. The Interruption of Continuous Traffic Condition Satisfied: yes ☒ no ☐

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **900 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Minor Street: **75 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 3 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Tech Road	**639**	Prosperity Drive	**48**	yes ☐	no ☒
07:00 AM – 08:00 AM	Tech Road	**711**	Prosperity Drive	**56**	yes ☐	no ☒
08:00 AM – 09:00 AM	Tech Road	**829**	Prosperity Drive	**76**	yes ☐	no ☒
09:00 AM – 10:00 AM	Tech Road	**1080**	Prosperity Drive	**92**	yes ☒	no ☐
10:00 AM – 11:00 AM	Tech Road	**909**	Prosperity Drive	**109**	yes ☒	no ☐
11:00 AM – 12:00 AM	Tech Road	**1026**	Prosperity Drive	**86**	yes ☒	no ☐
12:00 AM – 01:00 AM	Tech Road	**1160**	Prosperity Drive	**132**	yes ☒	no ☐
01:00 PM – 02:00 PM	Tech Road	**1120**	Prosperity Drive	**92**	yes ☒	no ☐
02:00 PM – 03:00 PM	Tech Road	**1143**	Prosperity Drive	**94**	yes ☒	no ☐
03:00 PM – 04:00 PM	Tech Road	**1044**	Prosperity Drive	**96**	yes ☒	no ☐
04:00 PM – 05:00 PM	Tech Road	**1133**	Prosperity Drive	**98**	yes ☒	no ☐
05:00 PM – 06:00 PM	Tech Road	**1174**	Prosperity Drive	**100**	yes ☒	no ☐
06:00 PM – 07:00 PM	Tech Road	**1052**	Prosperity Drive	**84**	yes ☒	no ☐

Combination of Condition A and B Condition Satisfied: yes ☐ N/A ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Condition B is met, so combination is not needed.

Warrant 1 is satisfied, Condition B is met.

Warrant 2, Four-Hour Vehicular Volume	WARRANT SATISFIED:	yes ☐	no ☒

The Four-Hour Volume Warrant is satisfied when for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major-street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor-street (one direction only) all fall above the curve in Figure 4C-1.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Tech Road	**639**	Prosperity Drive	**48**	yes ☐	no ☒
07:00 AM – 08:00 AM	Tech Road	**711**	Prosperity Drive	**56**	yes ☐	no ☒
08:00 AM – 09:00 AM	Tech Road	**829**	Prosperity Drive	**76**	yes ☐	no ☒
09:00 AM – 10:00 AM	Tech Road	**1080**	Prosperity Drive	**92**	yes ☐	no ☒
10:00 AM – 11:00 AM	Tech Road	**909**	Prosperity Drive	**109**	yes ☐	no ☒
11:00 AM – 12:00 AM	Tech Road	**1026**	Prosperity Drive	**86**	yes ☐	no ☒
12:00 AM – 01:00 AM	Tech Road	**1160**	Prosperity Drive	**132**	yes ☒	no ☐
01:00 PM – 02:00 PM	Tech Road	**1120**	Prosperity Drive	**92**	yes ☐	no ☒
02:00 PM – 03:00 PM	Tech Road	**1143**	Prosperity Drive	**94**	yes ☐	no ☒
03:00 PM – 04:00 PM	Tech Road	**1044**	Prosperity Drive	**96**	yes ☐	no ☒
04:00 PM – 05:00 PM	Tech Road	**1133**	Prosperity Drive	**98**	yes ☐	no ☒
05:00 PM – 06:00 PM	Tech Road	**1174**	Prosperity Drive	**100**	yes ☐	no ☒
06:00 PM – 07:00 PM	Tech Road	**1052**	Prosperity Drive	**84**	yes ☐	no ☒

Warrant 2 is not satisfied.

Warrant 3, Peak Hour	WARRANT SATISFIED:	yes ☐	no ☒

According to Section 4C.04, paragraph 2 in the MUTCD, Warrant 3 shall be applied only in unusual cases.

This location is considered an unusual condition, due to all the nearby restaurants.

This warrant is satisfied when either of the following two categories apply:

		Condition satisfied:	
A.	If all of the following conditions exist for the same 1 hour of an average day:	yes ☐	no ☒
1.	The total delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceeds: four vehicle-hours for one lane approach; and five vehicles –hours for two--lane approach, and	yes ☐	no ☒
2.	The volume on the same minor-street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes of traffic, and	yes ☒	no ☐
3.	The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches.	yes ☒	no ☐
B.	The plot of vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for 1 hour of average day falls above the applicable curve in Figure 4C-3 for the combination of approach lanes.	yes ☐	no ☒

Warrant 3 is not satisfied.

Warrant 4, Pedestrian Volume	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when either of the following apply:

		Condition satisfied:	
A.	Pedestrian volume crossing the major-street during an average day is 107 or more for each of any four (4) hours (Figure 4C-5) or	yes ☐	no ☒
B.	Pedestrian volume crossing the major-street during an average day is 133 or more for any one (1) hour (Figure 4C-7).	yes ☐	no ☒

Warrant 4 is not satisfied.

Warrant 5, School Crossing	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when the study of the frequency and adequacy of gaps in vehicular traffic stream as related to number and size of groups of school children at an established school crossing across a major street shows that the number of adequate gaps in the traffic stream during the period when children are using the crossing is less than the number of minutes in the same period and that there are a minimum of twenty (20) students during the highest crossing hour.

Warrant 5 is not satisfied. There is no school crossing nearby.

Warrant 6, Coordinated Signal System	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when one of the following applies.

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning or

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of vehicular platooning and the proposed and adjacent traffic control signal will collectively provide a progressive operation.

Warrant 6 is not satisfied.

Warrant 7, Crash Experience	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when all of the following apply:

Review of two-year accident report shows a total of one (3) reported collision at this intersection.

		Condition satisfied:	
1.	Adequate trial of alternatives, with satisfactory observance and enforcement has failed to reduce the crash frequency and	yes ☐	no ☒
2.	Five or more reported crashes, of types susceptible to correction by traffic control signal; have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for reportable crashes and	yes ☐	no ☒
3.	There exists a volume of vehicle and pedestrian traffic not less than 80% Of the requirements specified in Warrant 1, or Warrant 5.	yes ☐	no ☒

Warrant 7 is not satisfied.

Warrant 8, Roadway Network	WARRANT SATISFIED:	yes ☐	no ☒

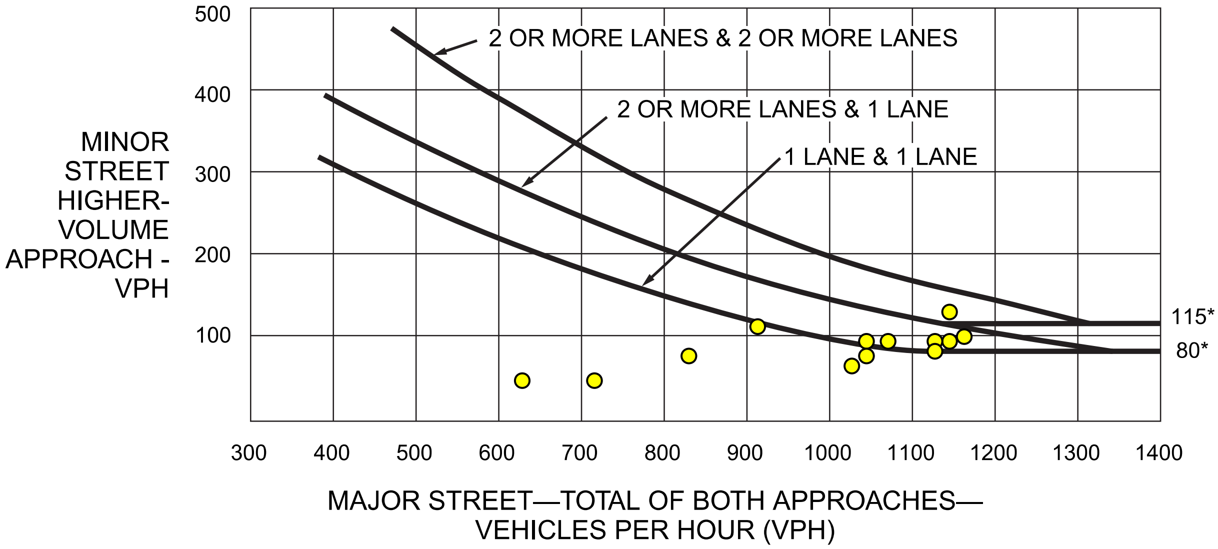
This warrant is satisfied when the common intersection of two or more major routes meet either criterion A or B.

Warrant 8 is not satisfied. The intersection does not include two or more major routes.

Warrant 9, Intersection Near a Grade Crossing	WARRANT SATISFIED:	yes ☐	no ☒

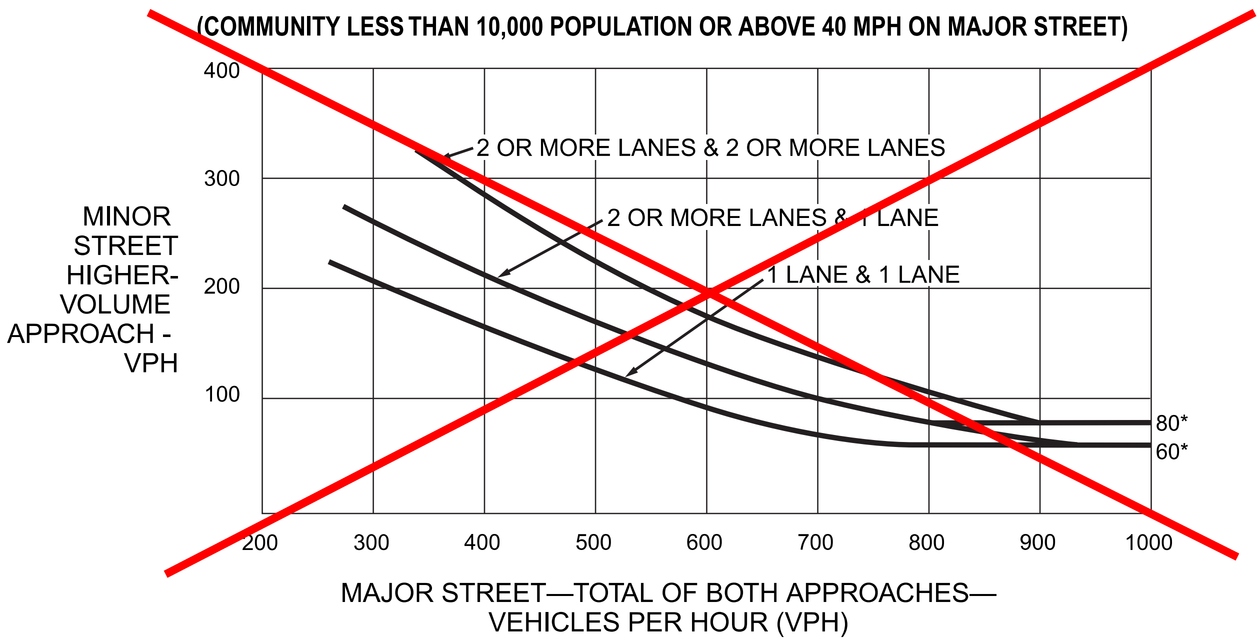
Warrant 9 is not satisfied. The intersection is not near a grade crossing.

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



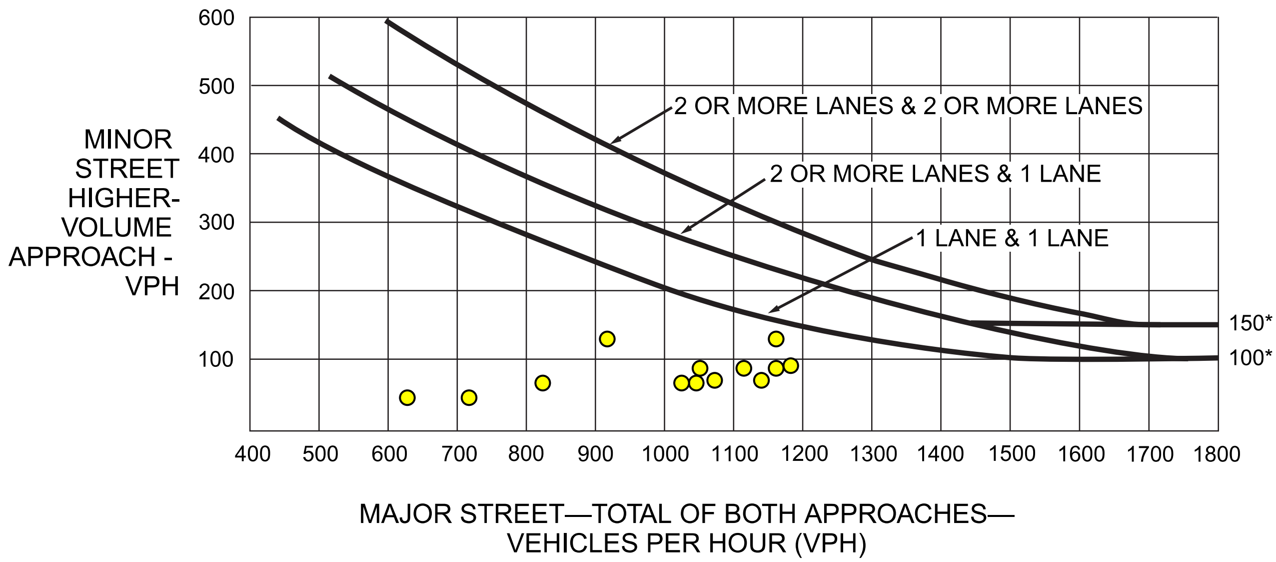
*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

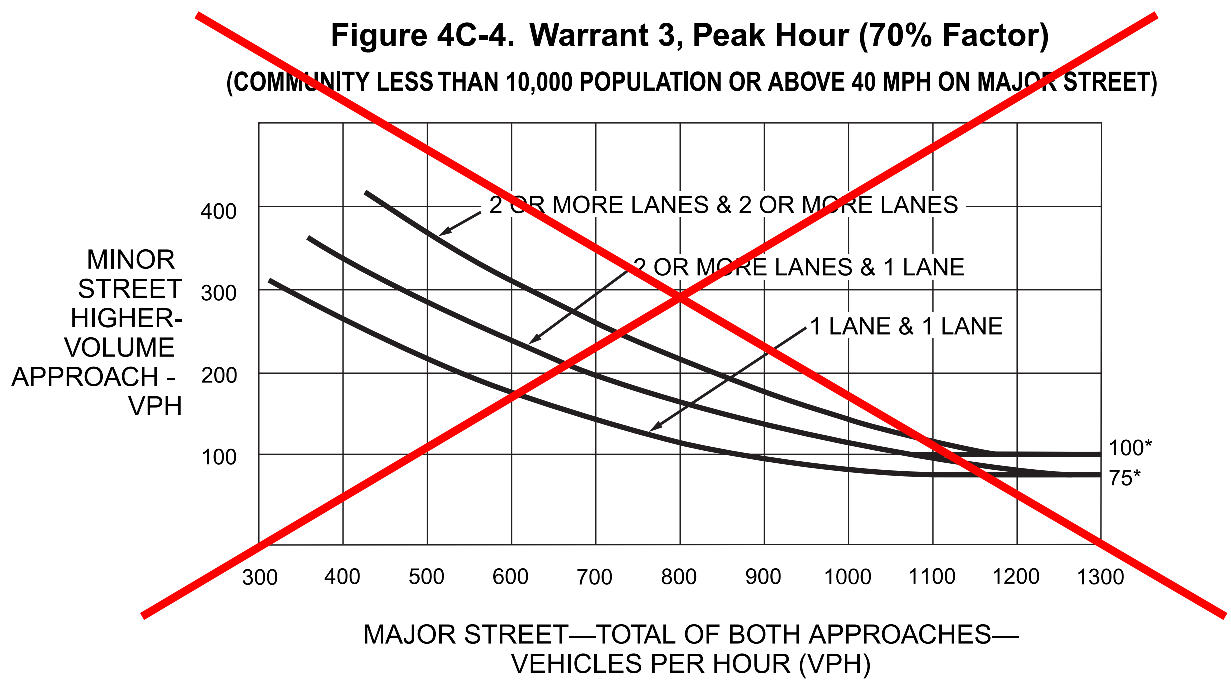
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

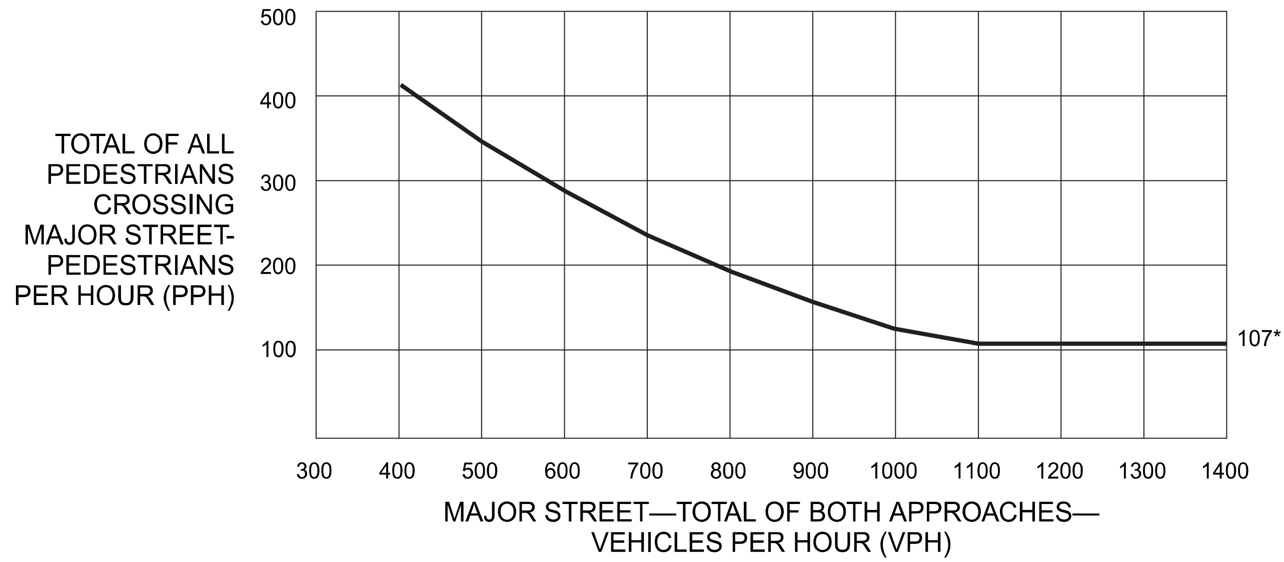
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



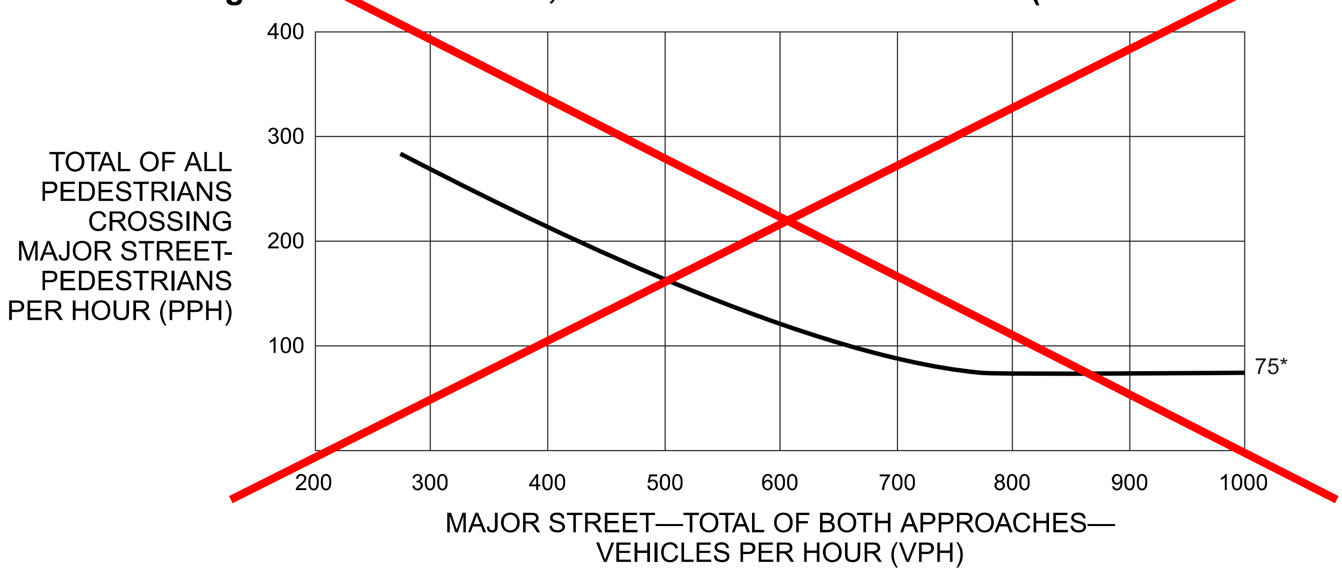
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



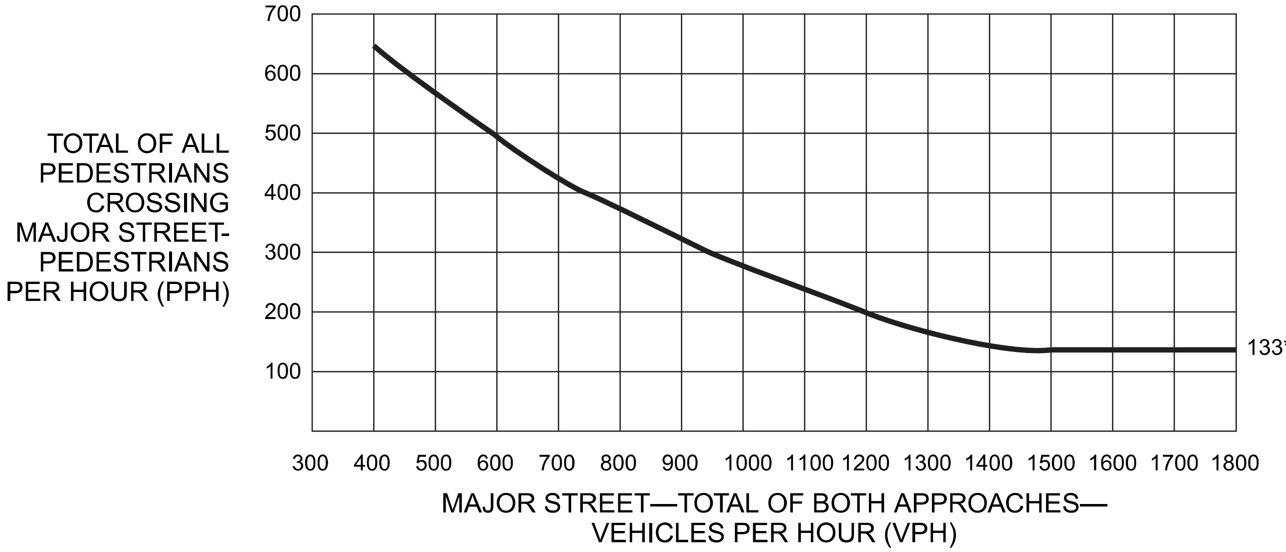
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



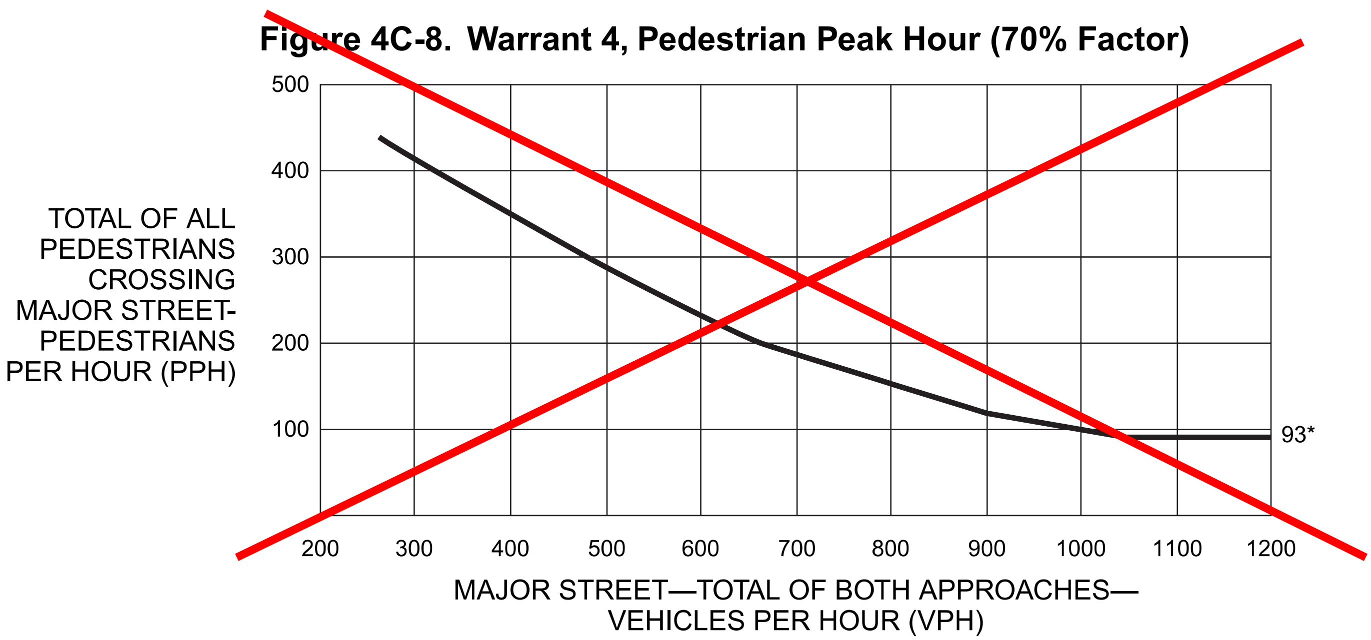
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

Summary of Traffic Signal Warrant Analysis

Intersection: **Prosperity Drive at Whitethorn Ct**
Location: **Montgomery County**
Study Date: **05/20/2022**

Warrant Analysis:

SHA is mandated to follow the nationally accepted *Manual on Uniform Traffic Control Devices* (MUTCD) as the guideline for the installation of the Traffic Signal. In a signal warrant analysis, numerous factors are evaluated including traffic volumes, delay, accident history, and pedestrian volumes. A signal warrant analysis was conducted on May 20, 2022, to evaluate if a traffic signal is warranted at the intersection of Old Columbia Pike at Whitethorn Court to address the need of a signalized intersection.

A 13-hour volume count conducted on Tuesday, March 8, 2022 was used for the analysis. According to the warrant analysis, the warrants for a signal have not been satisfied.

☐	1	Eight-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	2	Four-Hour vehicular volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	3	Peak Hour	☐ **YES**	☐ **NO**	☒ **N/A**
☐	4	Pedestrian Volume	☐ **YES**	☒ **NO**	☐ **N/A**
☐	5	School Crossing	☐ **YES**	☒ **NO**	☐ **N/A**
☐	6	Coordinated Signal System	☐ **YES**	☒ **NO**	☐ **N/A**
☐	7	Crash Experience	☐ **YES**	☒ **NO**	☐ **N/A**
☐	8	Roadway Network	☐ **YES**	☒ **NO**	☐ **N/A**
☐	9	Intersection Near a Grade Crossing	☐ **YES**	☒ **NO**	☐ **N/A**

☐ Location warrants signalization.

☒ **Location does not warrant signalization.**

Traffic Signal Warrant Analysis

Source: Maryland Manual on Uniform Traffic Control Devices, 2011.

YEAR ANALYZED 2022

Does the 85th percentile speed of the major street traffic exceed 40 mph? yes ☐ no ☒

Does the intersection lie within the built-up area of an isolated community having a population of less than 10,000? yes ☐ no ☒

Major Street: **Prosperity Drive**
Number of lanes of moving traffic on each major street approach: 1
Posted speed limit along Prosperity Drive: 30

Minor Street**: Whitethorn Court and Bank Parking Lot**
Number of lanes of moving traffic on each minor street approach: 1

Warrants for Traffic Signal Installation

Traffic control signal may be justified at an intersection, driveway or mid block pedestrian crossing, if one or more of the following warrants are satisfied:

Warrant 1, Eight-Hour Vehicular Volume WARRANT SATISFIED: yes ☐ no ☒

This warrant is satisfied when one of the following apply:

Condition satisfied:

A. Minimum Vehicular Volume yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **500 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.
Minor Street: **150 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**132**	Whitethorn Court	**40**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**219**	Whitethorn Court	**90**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**323**	Whitethorn Court	**135**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**373**	Whitethorn Court	**148**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**356**	Whitethorn Court	**180**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**371**	Whitethorn Court	**199**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**387**	Whitethorn Court	**220**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**384**	Whitethorn Court	**189**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**346**	Whitethorn Court	**203**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**364**	Whitethorn Court	**182**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**333**	Whitethorn Court	**172**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**360**	Whitethorn Court	**199**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**273**	Whitethorn Court	**150**	yes ☐	no ☒

B. The Interruption of Continuous Traffic Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **750 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Minor Street: **75 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**132**	Whitethorn Court	**40**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**219**	Whitethorn Court	**90**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**323**	Whitethorn Court	**135**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**373**	Whitethorn Court	**148**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**356**	Whitethorn Court	**180**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**371**	Whitethorn Court	**199**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**387**	Whitethorn Court	**220**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**384**	Whitethorn Court	**189**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**346**	Whitethorn Court	**203**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**364**	Whitethorn Court	**182**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**333**	Whitethorn Court	**172**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**360**	Whitethorn Court	**199**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**273**	Whitethorn Court	**150**	yes ☐	no ☒

Combination of Condition A and B Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **400 vph (Cond.-A) and 600 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Minor Street: **120 vph (Cond.-A) and 60 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 1 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**132**	Whitethorn Court	**40**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**219**	Whitethorn Court	**90**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**323**	Whitethorn Court	**135**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**373**	Whitethorn Court	**148**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**356**	Whitethorn Court	**180**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**371**	Whitethorn Court	**199**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**387**	Whitethorn Court	**220**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**384**	Whitethorn Court	**189**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**346**	Whitethorn Court	**203**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**364**	Whitethorn Court	**182**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**333**	Whitethorn Court	**172**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**360**	Whitethorn Court	**199**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**273**	Whitethorn Court	**150**	yes ☐	no ☒

Warrant 1 is not satisfied, including for the combination conditions.

Warrant 2, Four-Hour Vehicular Volume	WARRANT SATISFIED:	yes ☐	no ☒

The Four-Hour Volume Warrant is satisfied when for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major-street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor-street (one direction only) all fall above the curve in Figure 4C-1.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**132**	Whitethorn Court	**40**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**219**	Whitethorn Court	**90**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**323**	Whitethorn Court	**135**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**373**	Whitethorn Court	**148**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**356**	Whitethorn Court	**180**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**371**	Whitethorn Court	**199**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**387**	Whitethorn Court	**220**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**384**	Whitethorn Court	**189**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**346**	Whitethorn Court	**203**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**364**	Whitethorn Court	**182**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**333**	Whitethorn Court	**172**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**360**	Whitethorn Court	**199**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**273**	Whitethorn Court	**150**	yes ☐	no ☒

Warrant 2 is not satisfied.

Warrant 3, Peak Hour	WARRANT SATISFIED:	yes ☐	N/A ☒

According to Section 4C.04, paragraph 2 in the MUTCD, Warrant 3 shall be applied only in <u>unusual</u> cases.

This location <u>is not</u> considered an unusual case.

This warrant is satisfied when either of the following two categories apply:

Condition satisfied:

A. If all of the following conditions exist for the same 1 hour of an average day: yes ☐ no ☐

1. The total delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceeds: four vehicle-hours for one lane approach; and five vehicles –hours for two--lane approach, and yes ☐ no ☐

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes of traffic, and yes ☐ no ☐

3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches. yes ☐ no ☐

B. The plot of vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for 1 hour of average day falls above the applicable curve in Figure 4C-3 for the combination of approach lanes. yes ☐ no ☐

Warrant 3 is not applicable. This location is not considered unusual.

Warrant 4, Pedestrian Volume	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when either of the following apply:

Condition satisfied:

A. Pedestrian volume crossing the major-street during an average day is 107 or more for each of any four (4) hours (Figure 4C-5) or yes ☐ no ☒

B. Pedestrian volume crossing the major-street during an average day is 133 or more for any one (1) hour (Figure 4C-7). yes ☐ no ☒

Warrant 4 is not satisfied.

Warrant 5, School Crossing	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when the study of the frequency and adequacy of gaps in vehicular traffic stream as related to number and size of groups of school children at an established school crossing across a major street shows that the number of adequate gaps in the traffic stream during the period when children are using the crossing is less than the number of minutes in the same period and that there are a minimum of twenty (20) students during the highest crossing hour.

Warrant 5 is not satisfied. There is no school crossing nearby, and less than 20 school children in max hour.

Warrant 6, Coordinated Signal System	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when one of the following applies.

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning or

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of vehicular platooning and the proposed and adjacent traffic control signal will collectively provide a progressive operation.

Warrant 6 is not satisfied.

Warrant 7, Crash Experience	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when all of the following apply:

Review of two-year accident report shows a total of one (1) reported collision at this intersection.

		Condition satisfied:	
1.	Adequate trial of alternatives, with satisfactory observance and enforcement has failed to reduce the crash frequency and	yes ☐	no ☒
2.	Five or more reported crashes, of types susceptible to correction by traffic control signal; have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for reportable crashes and	yes ☐	no ☒
3.	There exists a volume of vehicle and pedestrian traffic not less than 80% Of the requirements specified in Warrant 1, or Warrant 5.	yes ☐	no ☒

Warrant 7 is not satisfied.

Warrant 8, Roadway Network	WARRANT SATISFIED:	yes ☐	no ☒

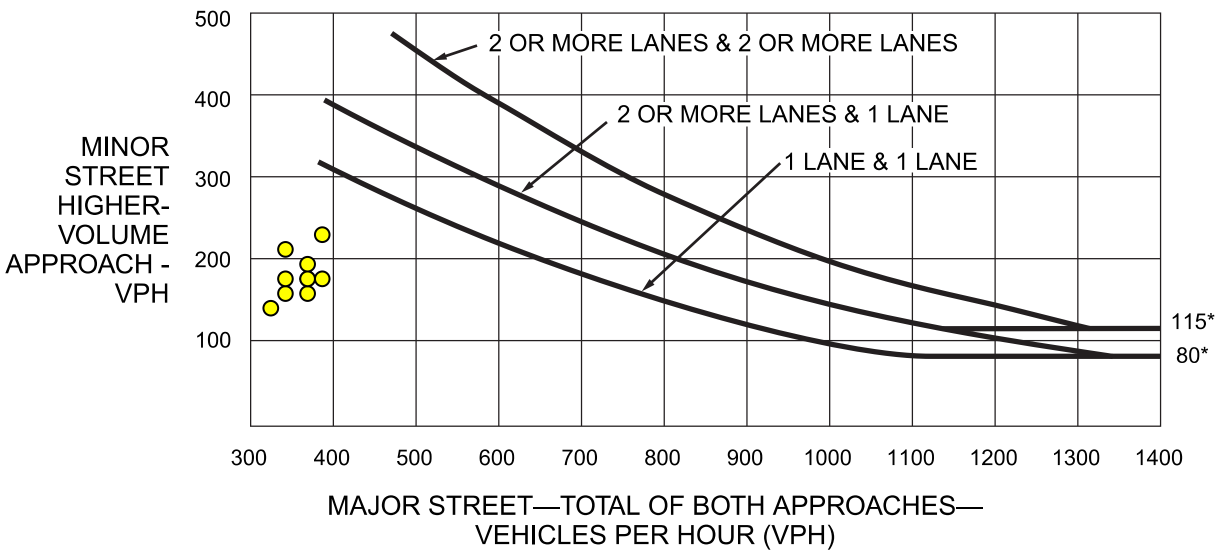
This warrant is satisfied when the common intersection of two or more major routes meet either criterion A or B.

Warrant 8 is not satisfied. The intersection does not include two or more major routes.

Warrant 9, Intersection Near a Grade Crossing	WARRANT SATISFIED:	yes ☐	no ☒

Warrant 9 is not satisfied. The intersection is not near a grade crossing.

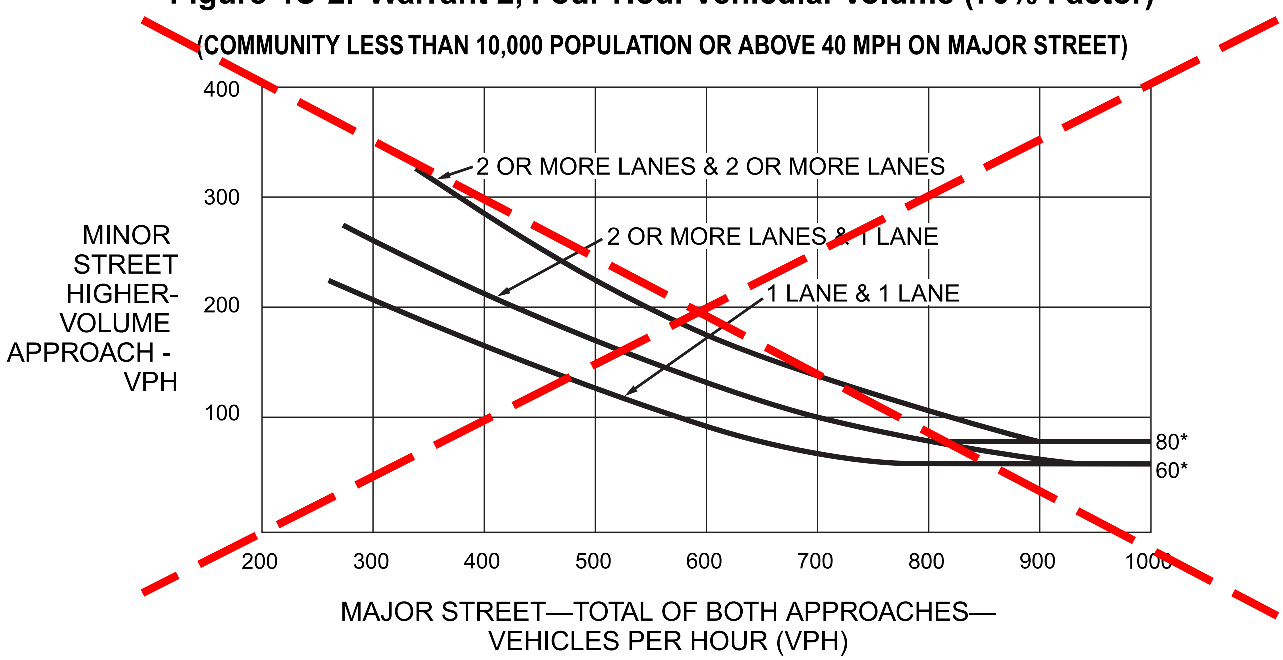
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

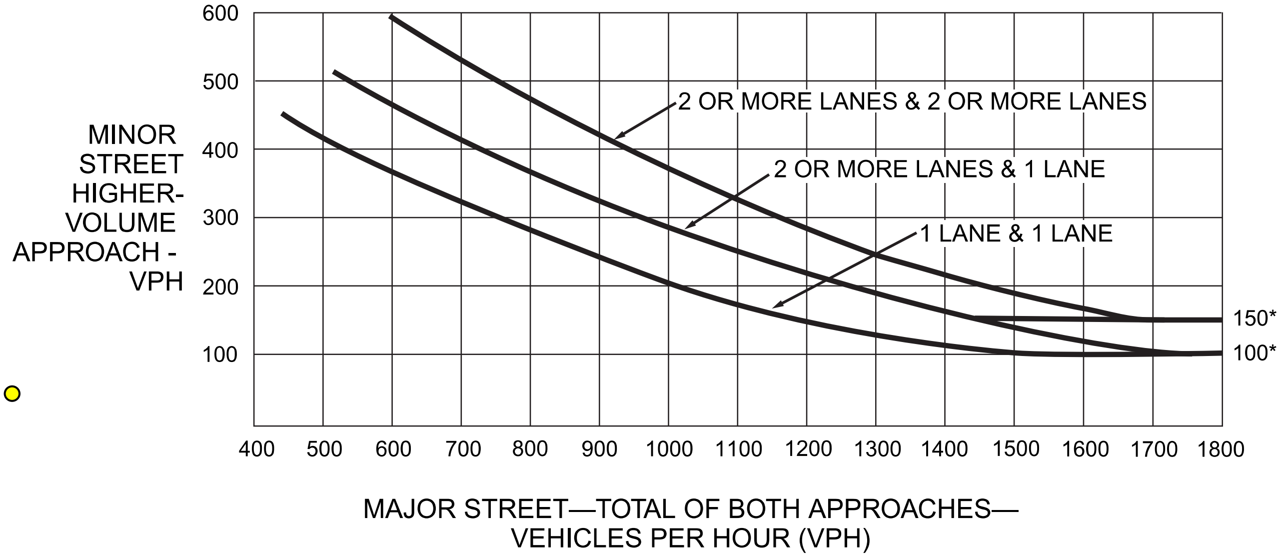
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

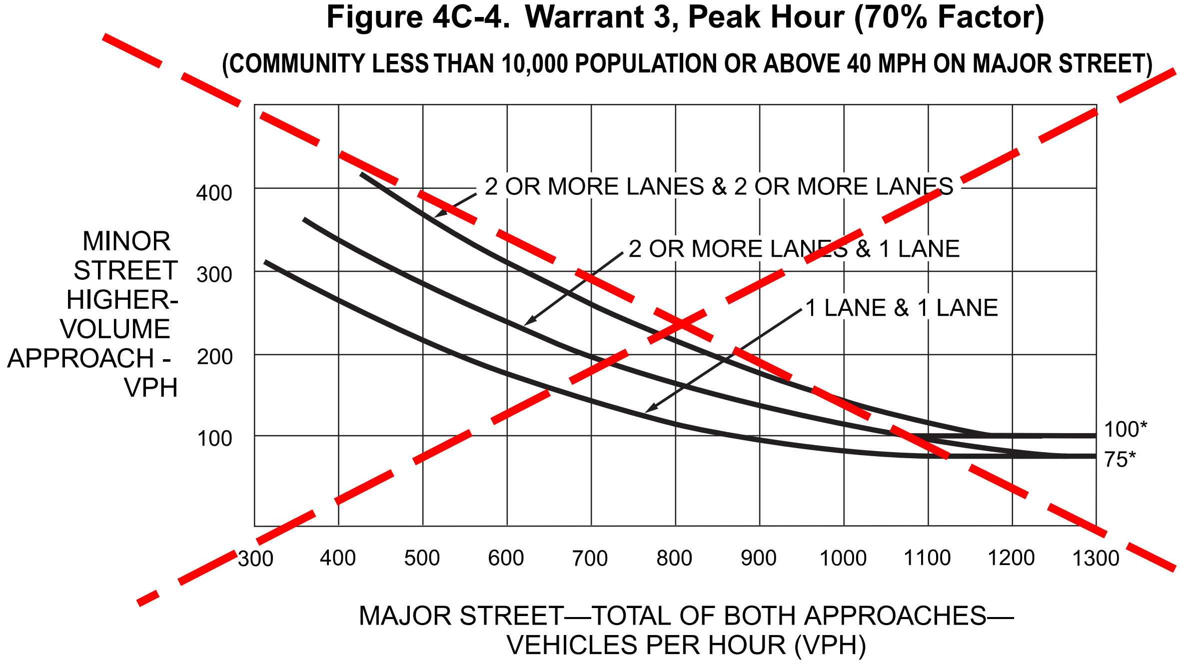
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

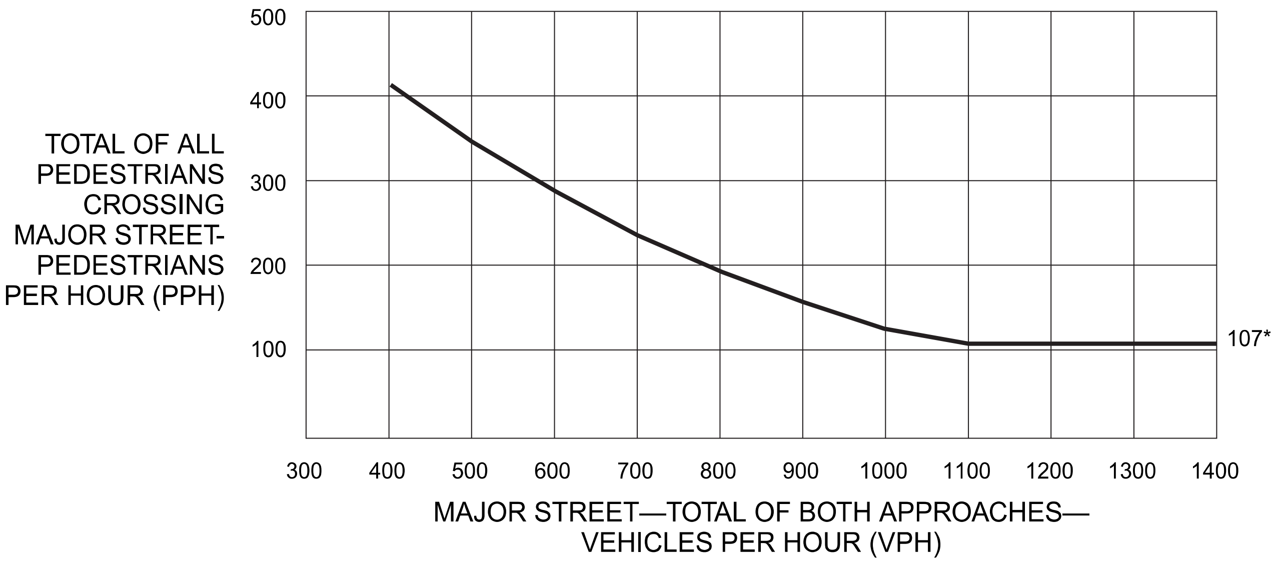
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



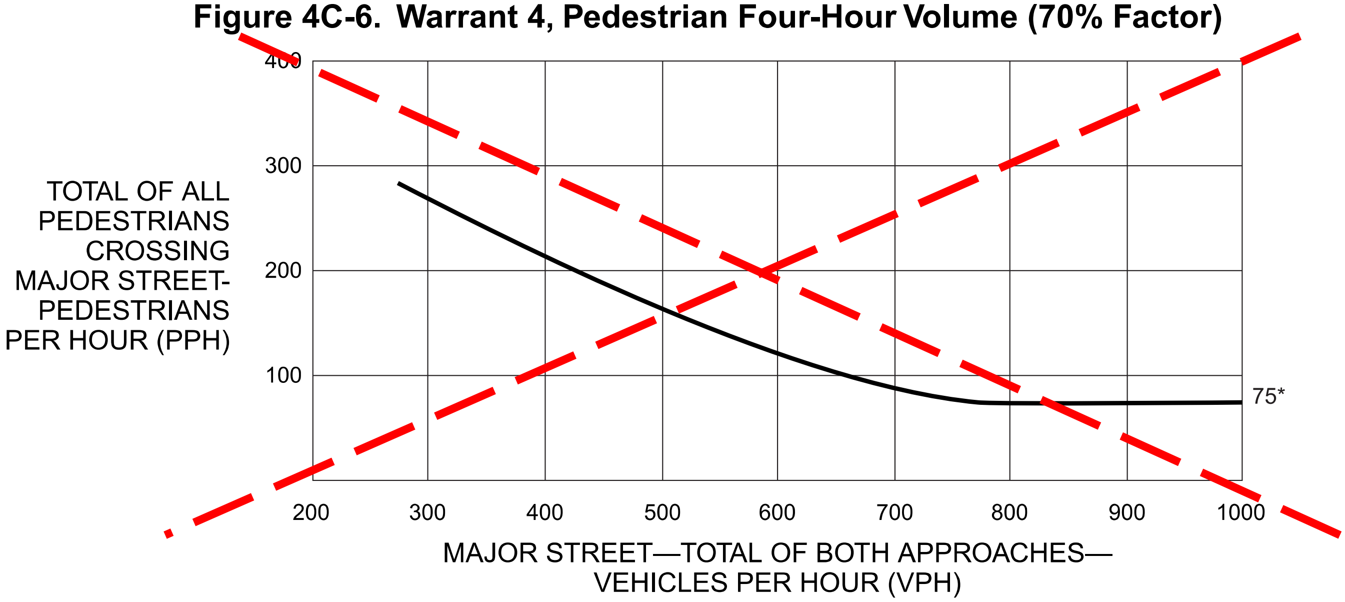
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



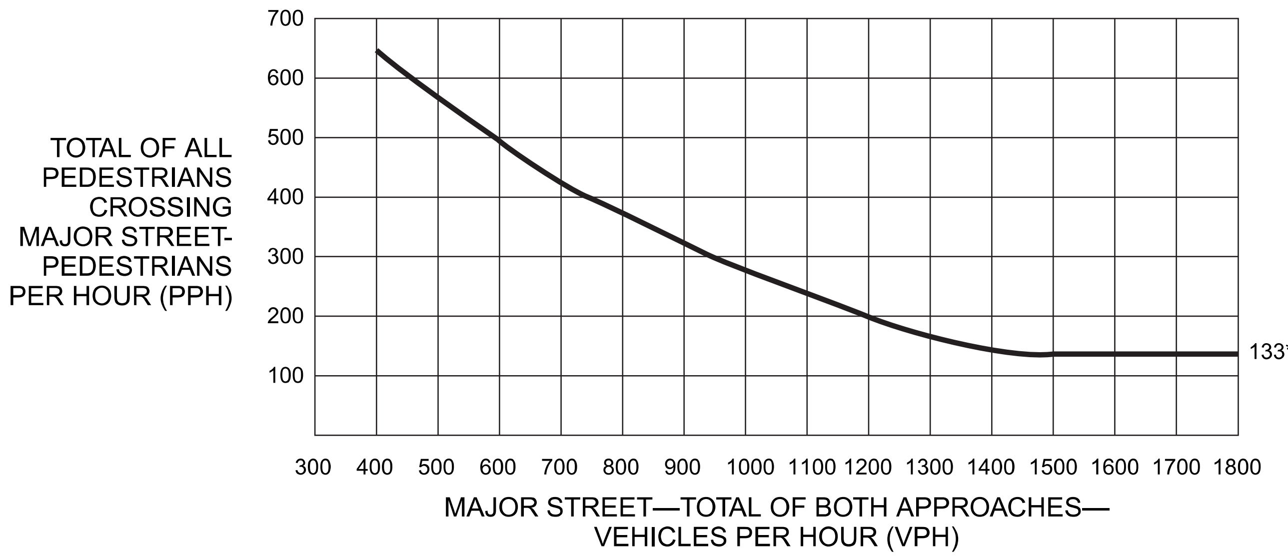
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



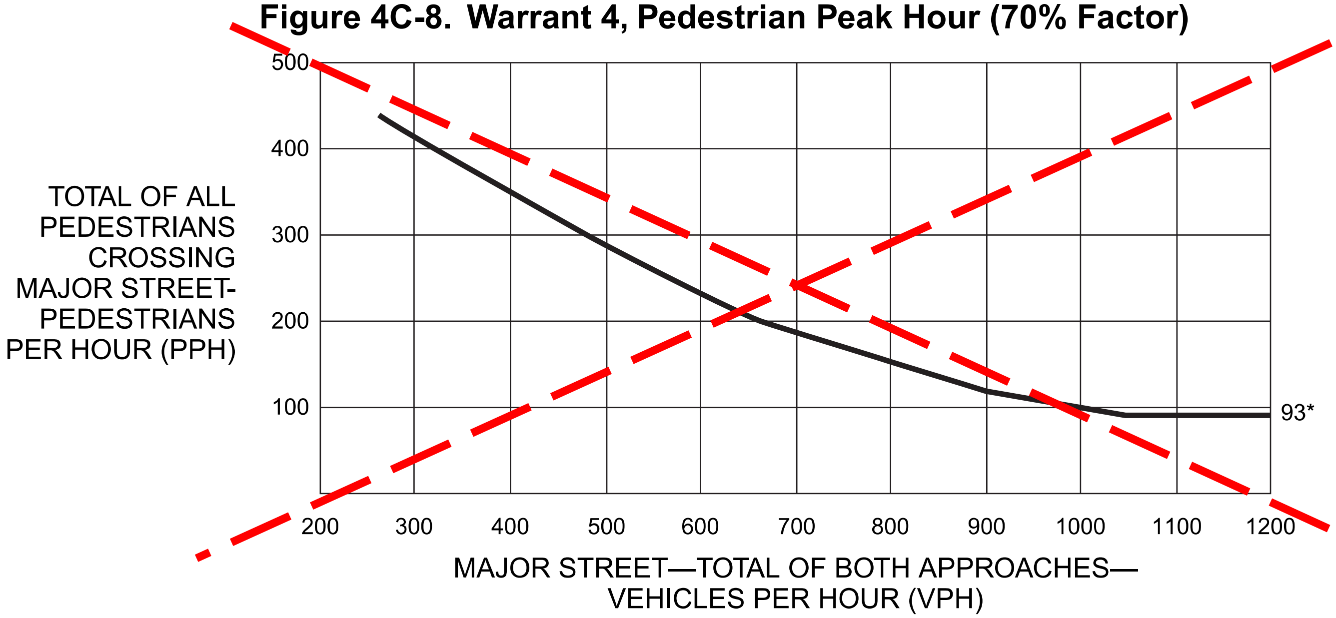
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

Summary of Traffic Signal Warrant Analysis

Intersection: **Prosperity Drive at Prosperity Terrace**
Location: **Montgomery County**
Study Date: **05/20/2022**

Warrant Analysis:

SHA is mandated to follow the nationally accepted *Manual on Uniform Traffic Control Devices* (MUTCD) as the guideline for the installation of the Traffic Signal. In a signal warrant analysis, numerous factors are evaluated including traffic volumes, delay, accident history, and pedestrian volumes. A signal warrant analysis was conducted on May 20, 2022, to evaluate if a traffic signal is warranted at the intersection of Prosperity Drive at Prosperity Terrace to address the need of a signalized intersection.

A 13-hour volume count conducted on Tuesday, March 15, 2022 was used for the analysis. According to the warrant analysis, the warrants for a signal have not been satisfied.

			YES	NO	N/A
☐	1	Eight-Hour vehicular volume	☐	☒	☐
☐	2	Four-Hour vehicular volume	☐	☒	☐
☐	3	Peak Hour	☐	☒	☐
☐	4	Pedestrian Volume	☐	☒	☐
☐	5	School Crossing	☐	☒	☐
☐	6	Coordinated Signal System	☐	☒	☐
☐	7	Crash Experience	☐	☒	☐
☐	8	Roadway Network	☐	☒	☐
☐	9	Intersection Near a Grade Crossing	☐	☒	☐

☐ Location warrants signalization.

☒ **Location does not warrant signalization.**

Traffic Signal Warrant Analysis

Source: Maryland Manual on Uniform Traffic Control Devices, 2011.

YEAR ANALYZED 2022

Does the 85th percentile speed of the major street traffic exceed 40 mph? yes ☐ no ☒

Does the intersection lie within the built-up area of an isolated community having a population of less than 10,000? yes ☐ no ☒

Major Street: **Prosperity Drive**
Number of lanes of moving traffic on each major street approach: 2
Posted speed limit along Prosperity Drive: 30

Minor Street**: Prosperity Terrace and Parking lot**
Number of lanes of moving traffic on each minor street approach: 1

Warrants for Traffic Signal Installation

Traffic control signal may be justified at an intersection, driveway or mid block pedestrian crossing, if one or more of the following warrants are satisfied:

Warrant 1, Eight-Hour Vehicular Volume WARRANT SATISFIED: yes ☐ no ☒

This warrant is satisfied when one of the following apply:

Condition satisfied:

A. **Minimum Vehicular Volume** yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **600 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 2 lane for major street approach and 1 lane for minor street approach.
Minor Street: **150 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 2 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**397**	Prosperity Terrace	**33**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**575**	Prosperity Terrace	**47**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**580**	Prosperity Terrace	**60**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**602**	Prosperity Terrace	**105**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**590**	Prosperity Terrace	**87**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**617**	Prosperity Terrace	**100**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**643**	Prosperity Terrace	**100**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**617**	Prosperity Terrace	**95**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**524**	Prosperity Terrace	**78**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**562**	Prosperity Terrace	**85**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**564**	Prosperity Terrace	**110**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**444**	Prosperity Terrace	**82**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**312**	Prosperity Terrace	**68**	yes ☐	no ☒

B. **The Interruption of Continuous Traffic** Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **900 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 2 lane for major street approach and 1 lane for minor street approach.

Minor Street: **75 vph** (MUTCD Table 4C-1 100% column for speeds below 40 MPH) for 2 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**397**	Prosperity Terrace	**33**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**575**	Prosperity Terrace	**47**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**580**	Prosperity Terrace	**60**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**602**	Prosperity Terrace	**105**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**590**	Prosperity Terrace	**87**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**617**	Prosperity Terrace	**100**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**643**	Prosperity Terrace	**100**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**617**	Prosperity Terrace	**95**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**524**	Prosperity Terrace	**78**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**562**	Prosperity Terrace	**85**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**564**	Prosperity Terrace	**110**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**444**	Prosperity Terrace	**82**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**312**	Prosperity Terrace	**68**	yes ☐	no ☒

Combination of Condition A and B Condition Satisfied: yes ☐ no ☒

For each of any 8 hours of an average day, the vehicles per hour on the major street and on the higher-volume minor street or driveway approach to the intersection equal or exceed the following:

Major Street: **480 vph (Cond.-A) and 720 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 2 lane for major street approach and 1 lane for minor street approach.

Minor Street: **120 vph (Cond.-A) and 60 vph (Cond.-B)** (MUTCD Table 4C-1 80% column for speeds below 40 MPH) for 2 lane for major street approach and 1 lane for minor street approach.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**397**	Prosperity Terrace	**33**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**575**	Prosperity Terrace	**47**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**580**	Prosperity Terrace	**60**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**602**	Prosperity Terrace	**105**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**590**	Prosperity Terrace	**87**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**617**	Prosperity Terrace	**100**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**643**	Prosperity Terrace	**100**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**617**	Prosperity Terrace	**95**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**524**	Prosperity Terrace	**78**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**562**	Prosperity Terrace	**85**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**564**	Prosperity Terrace	**110**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**444**	Prosperity Terrace	**82**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**312**	Prosperity Terrace	**68**	yes ☐	no ☒

Warrant 1 is not satisfied, including for the combination conditions.

Warrant 2, Four-Hour Vehicular Volume	WARRANT SATISFIED:	yes ☐	no ☒

The Four-Hour Volume Warrant is satisfied when for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major-street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor-street (one direction only) all fall above the curve in Figure 4C-1.

Time	Major Street	Volume	Minor Street	Volume	Requirement Satisfied	
06:00 AM – 07:00 AM	Prosperity Drive	**397**	Prosperity Terrace	**33**	yes ☐	no ☒
07:00 AM – 08:00 AM	Prosperity Drive	**575**	Prosperity Terrace	**47**	yes ☐	no ☒
08:00 AM – 09:00 AM	Prosperity Drive	**580**	Prosperity Terrace	**60**	yes ☐	no ☒
09:00 AM – 10:00 AM	Prosperity Drive	**602**	Prosperity Terrace	**105**	yes ☐	no ☒
10:00 AM – 11:00 AM	Prosperity Drive	**590**	Prosperity Terrace	**87**	yes ☐	no ☒
11:00 AM – 12:00 AM	Prosperity Drive	**617**	Prosperity Terrace	**100**	yes ☐	no ☒
12:00 AM – 01:00 AM	Prosperity Drive	**643**	Prosperity Terrace	**100**	yes ☐	no ☒
01:00 PM – 02:00 PM	Prosperity Drive	**617**	Prosperity Terrace	**95**	yes ☐	no ☒
02:00 PM – 03:00 PM	Prosperity Drive	**524**	Prosperity Terrace	**78**	yes ☐	no ☒
03:00 PM – 04:00 PM	Prosperity Drive	**562**	Prosperity Terrace	**85**	yes ☐	no ☒
04:00 PM – 05:00 PM	Prosperity Drive	**564**	Prosperity Terrace	**110**	yes ☐	no ☒
05:00 PM – 06:00 PM	Prosperity Drive	**444**	Prosperity Terrace	**82**	yes ☐	no ☒
06:00 PM – 07:00 PM	Prosperity Drive	**312**	Prosperity Terrace	**68**	yes ☐	no ☒

Warrant 2 is not satisfied.

Warrant 3, Peak Hour	WARRANT SATISFIED:	yes ☐	no ☒

According to Section 4C.04, paragraph 2 in the MUTCD, Warrant 3 shall be applied only in unusual cases.

This location is considered an unusual case, due to the peak hours when workers leave work (around 5:00 PM).

This warrant is satisfied when either of the following two categories apply:

Condition satisfied:

A. If all of the following conditions exist for the same 1 hour of an average day: yes ☐ no ☒

1. The total delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceeds: four vehicle-hours for one lane approach; and five vehicles –hours for two--lane approach, and yes ☐ no ☒

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes of traffic, and yes ☒ no ☐

3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four or more approaches. yes ☐ no ☒

B. The plot of vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for 1 hour of average day falls above the applicable curve in Figure 4C-3 for the combination of approach lanes. yes ☐ no ☒

Warrant 3 is not satisfied. Neither conditions are met.

Warrant 4, Pedestrian Volume	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when either of the following apply:

Condition satisfied:

A. Pedestrian volume crossing the major-street during an average day is 107 or more for each of any four (4) hours (Figure 4C-5) or yes ☐ no ☒

B. Pedestrian volume crossing the major-street during an average day is 133 or more for any one (1) hour (Figure 4C-7). yes ☐ no ☒

Warrant 4 is not satisfied.

Warrant 5, School Crossing	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when the study of the frequency and adequacy of gaps in vehicular traffic stream as related to number and size of groups of school children at an established school crossing across a major street shows that the number of adequate gaps in the traffic stream during the period when children are using the crossing is less than the number of minutes in the same period and that there are a minimum of twenty (20) students during the highest crossing hour.

Warrant 5 is not satisfied. There is no school crossing nearby, and less than 20 school children in max hour.

Warrant 6, Coordinated Signal System	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when one of the following applies.

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning or

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of vehicular platooning and the proposed and adjacent traffic control signal will collectively provide a progressive operation.

Warrant 6 is not satisfied.

Warrant 7, Crash Experience	WARRANT SATISFIED:	yes ☐	no ☒

This warrant is satisfied when all of the following apply:

Review of two-year accident report shows a total of zero (0) reported collision at this intersection.

		Condition satisfied:	
1.	Adequate trial of alternatives, with satisfactory observance and enforcement has failed to reduce the crash frequency and	yes ☐	no ☒
2.	Five or more reported crashes, of types susceptible to correction by traffic control signal; have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for reportable crashes and	yes ☐	no ☒
3.	There exists a volume of vehicle and pedestrian traffic not less than 80% Of the requirements specified in Warrant 1, or Warrant 5.	yes ☐	no ☒

Warrant 7 is not satisfied.

Warrant 8, Roadway Network	WARRANT SATISFIED:	yes ☐	no ☒

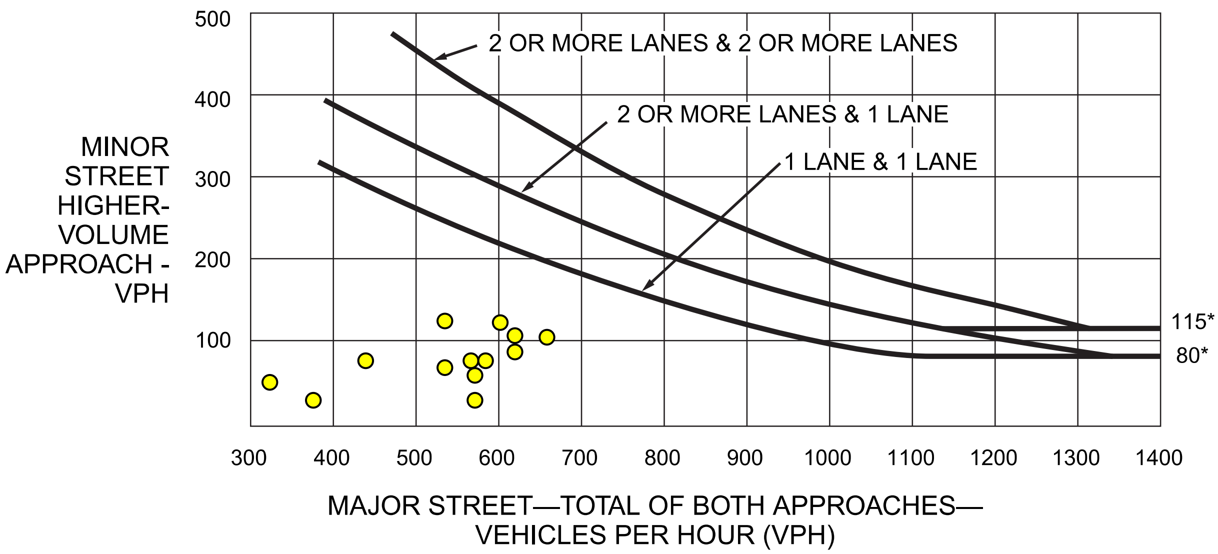
This warrant is satisfied when the common intersection of two or more major routes meet either criterion A or B.

Warrant 8 is not satisfied. The intersection does not include two or more major routes.

Warrant 9, Intersection Near a Grade Crossing	WARRANT SATISFIED:	yes ☐	no ☒

Warrant 9 is not satisfied. The intersection is not near a grade crossing.

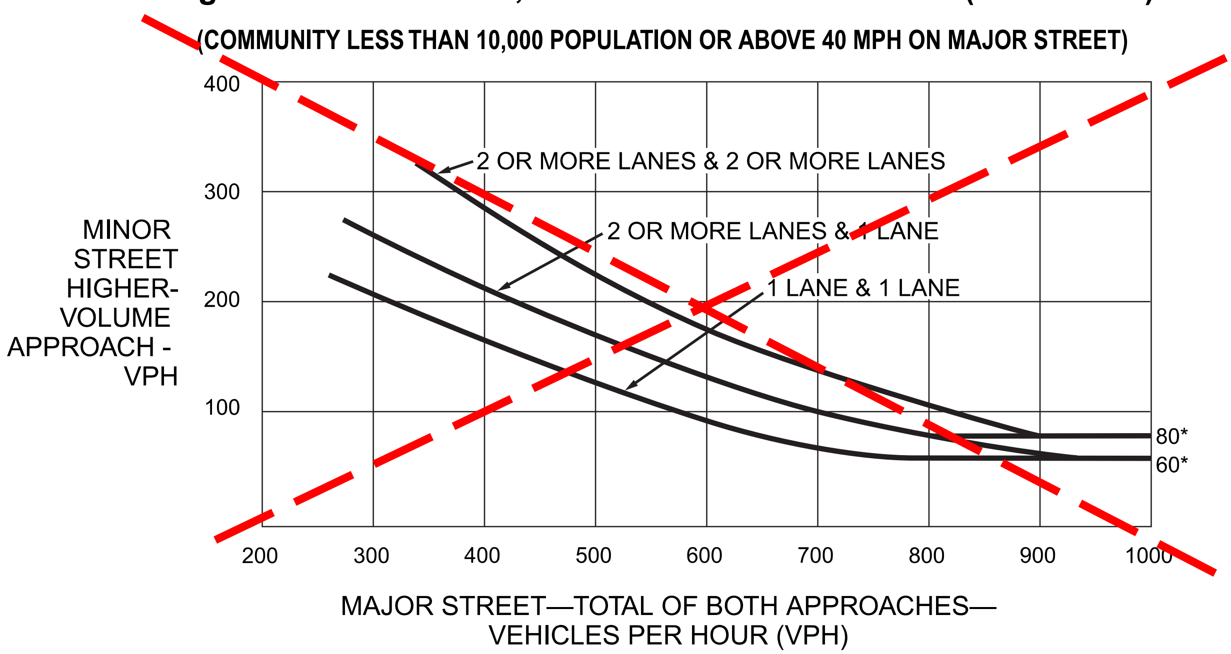
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

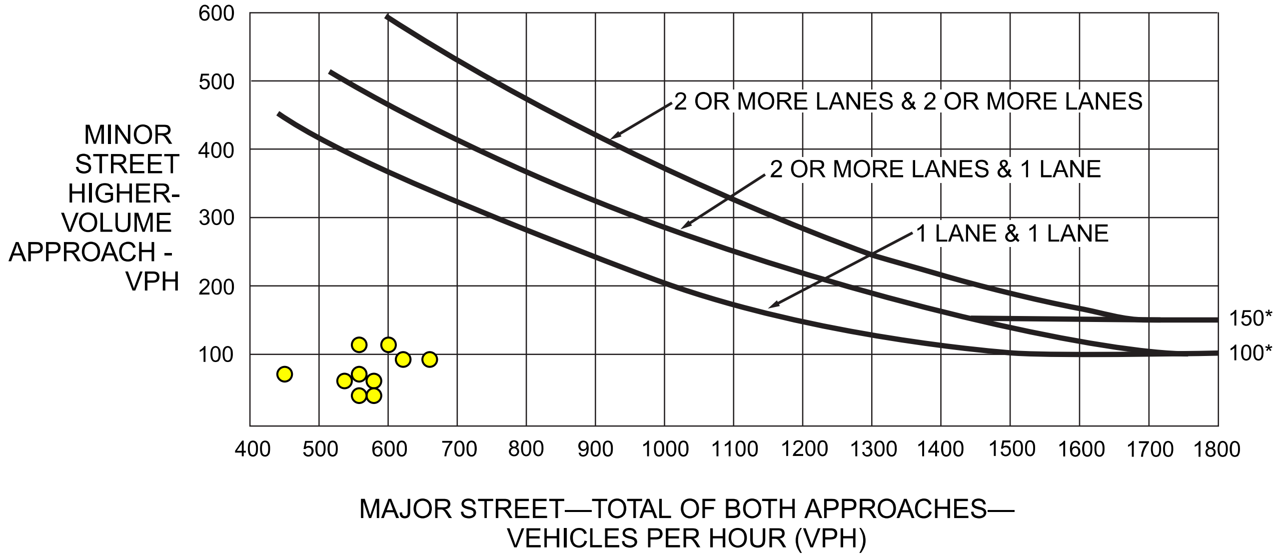
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

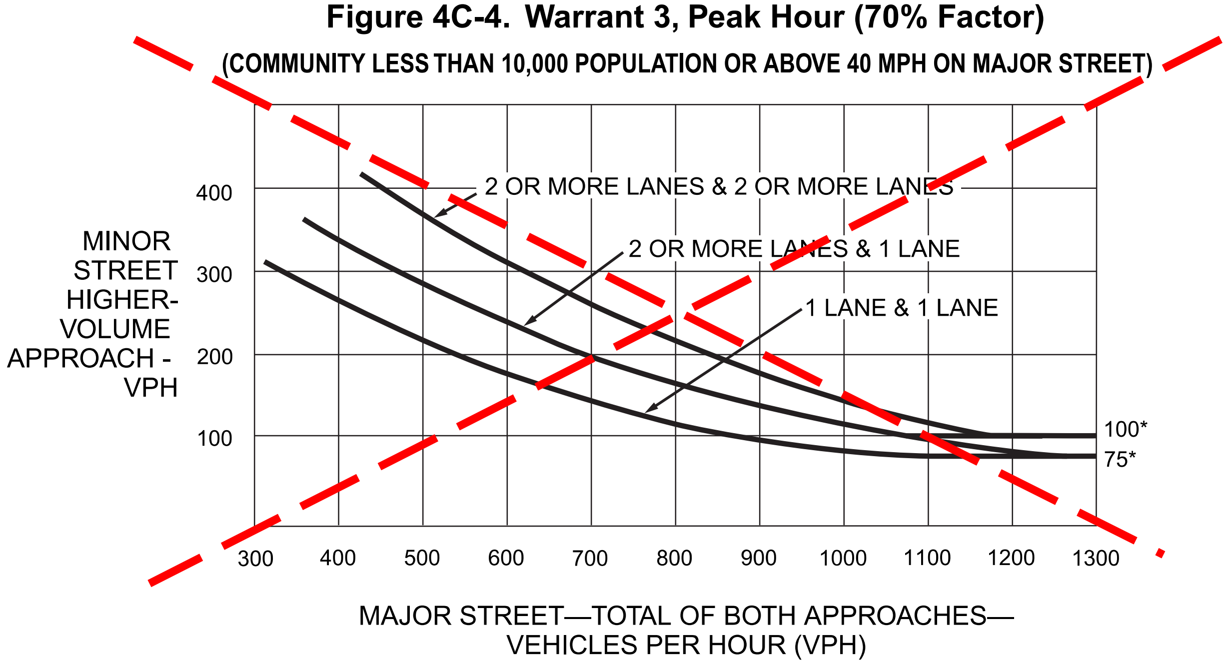
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

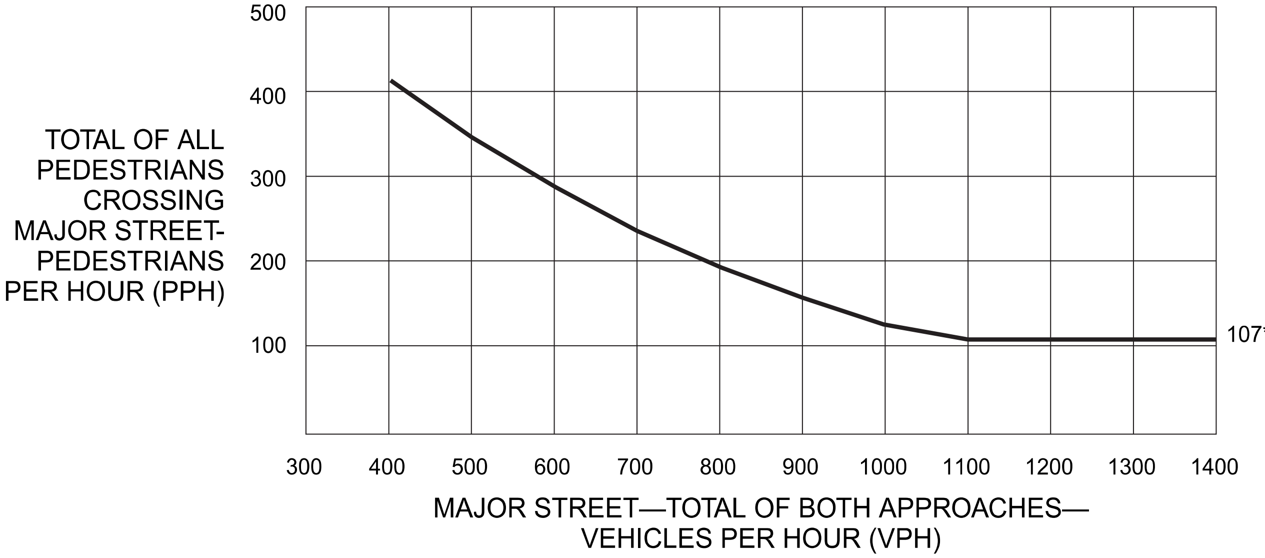
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



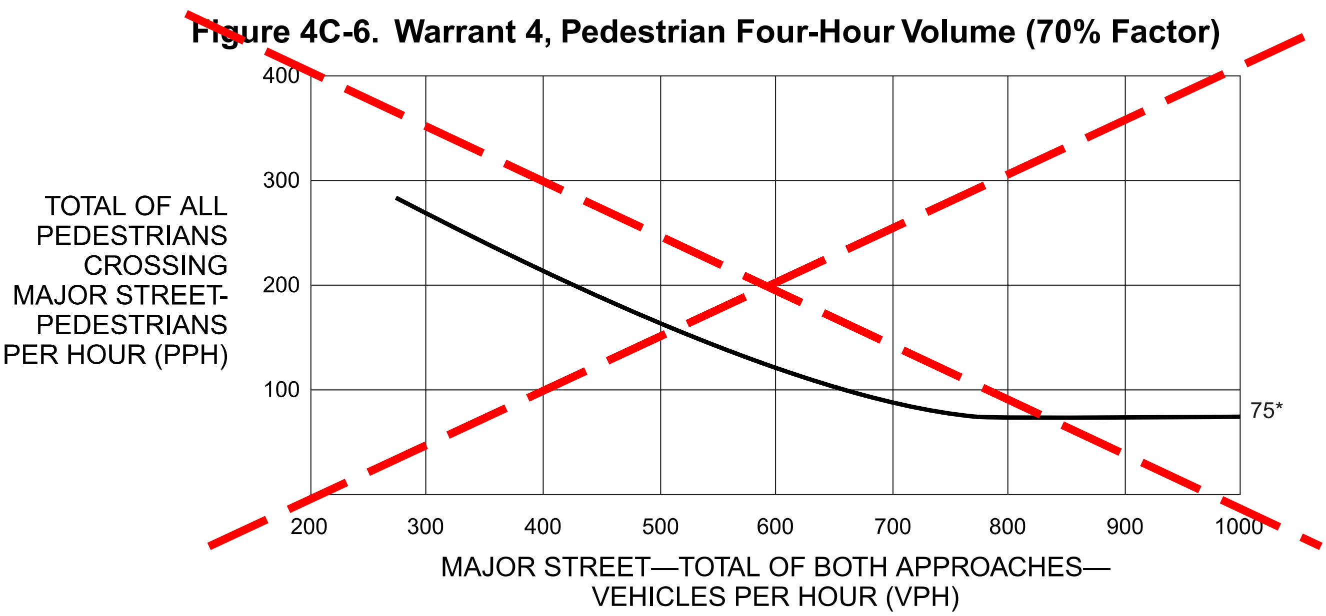
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



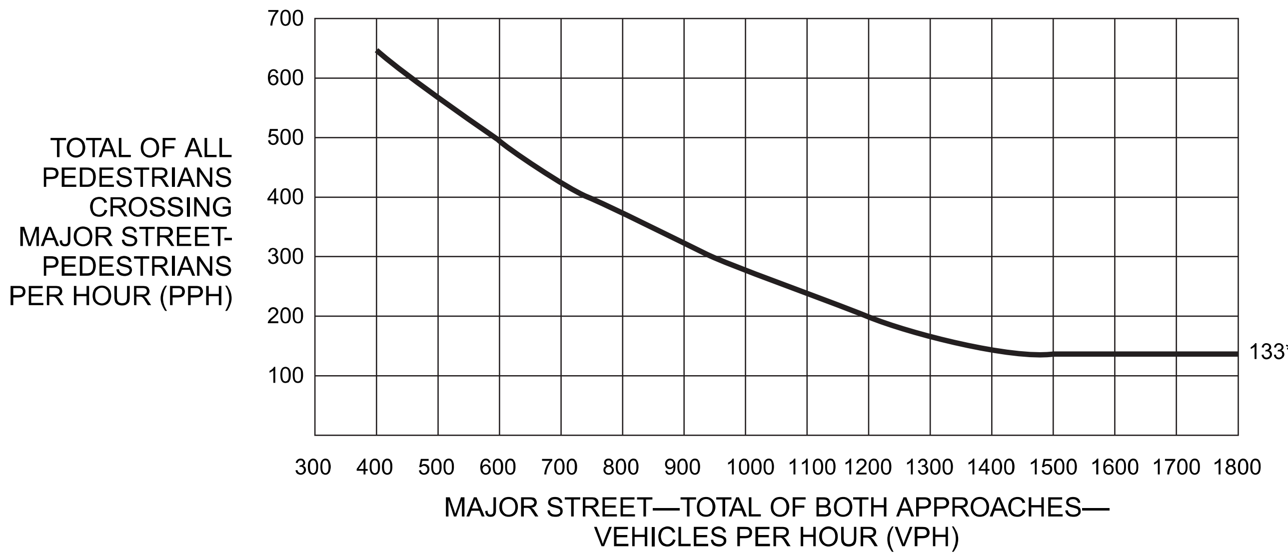
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



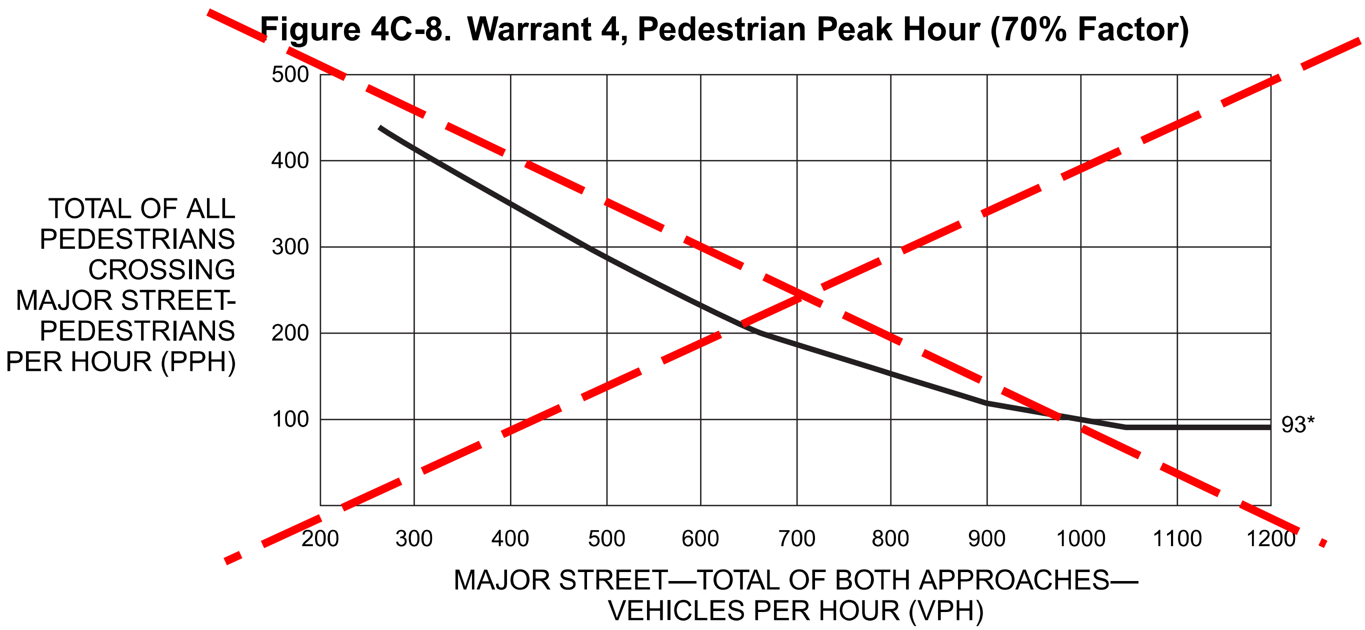
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

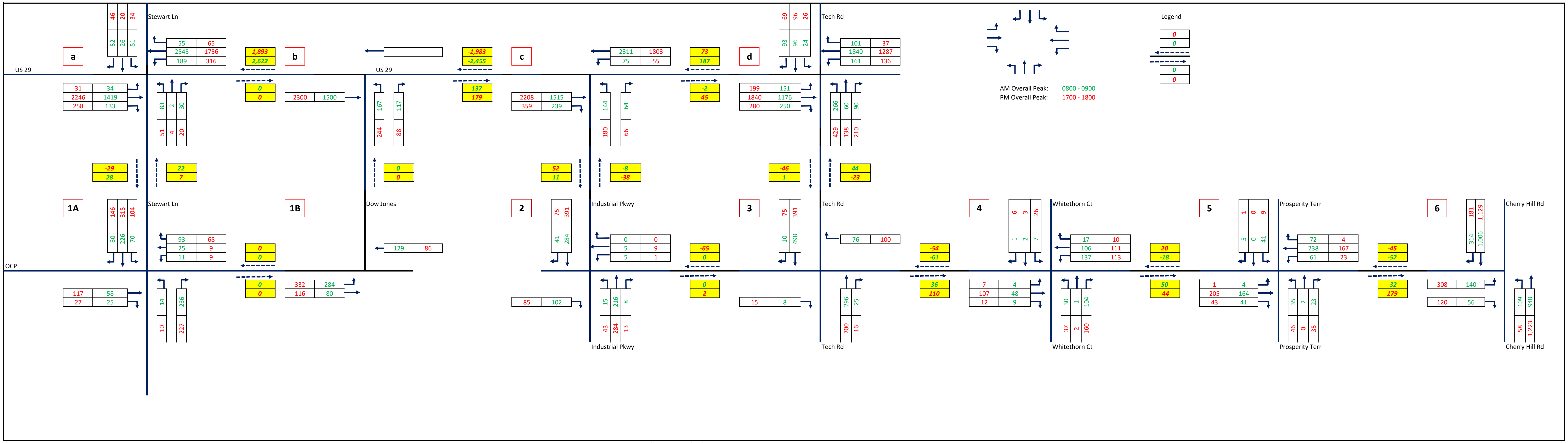
Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



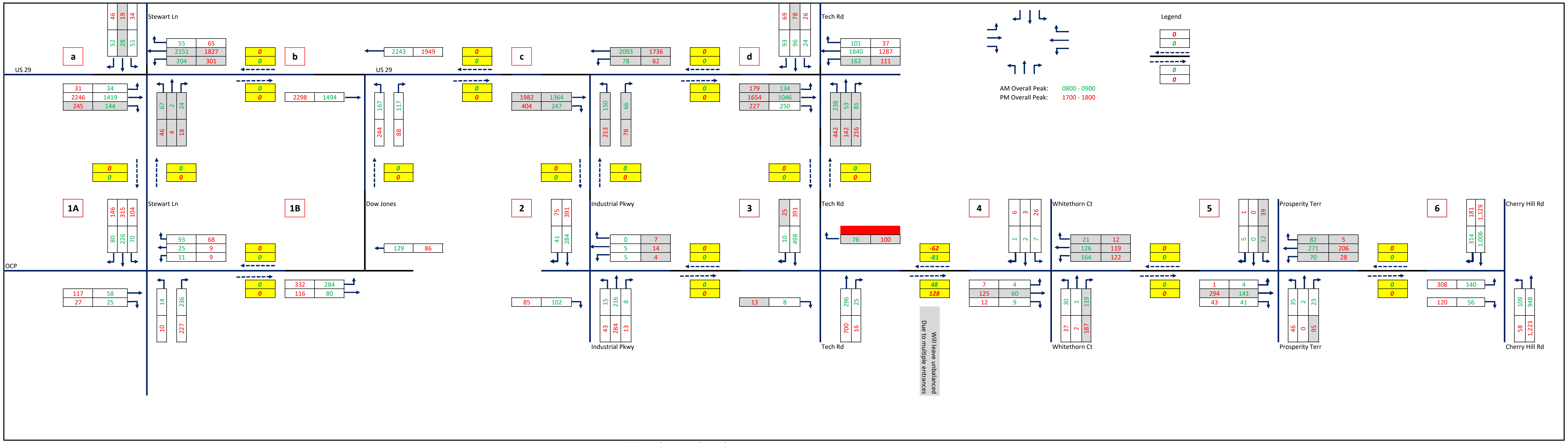
*Note: 93 pph applies as the lower threshold volume.

Appendix G

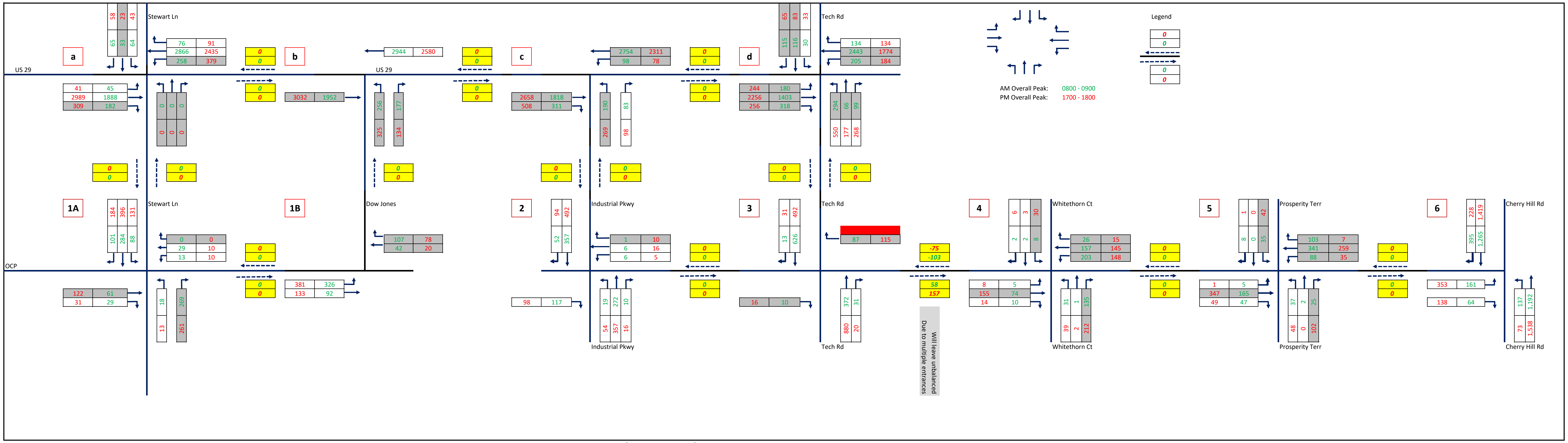
Volume Development



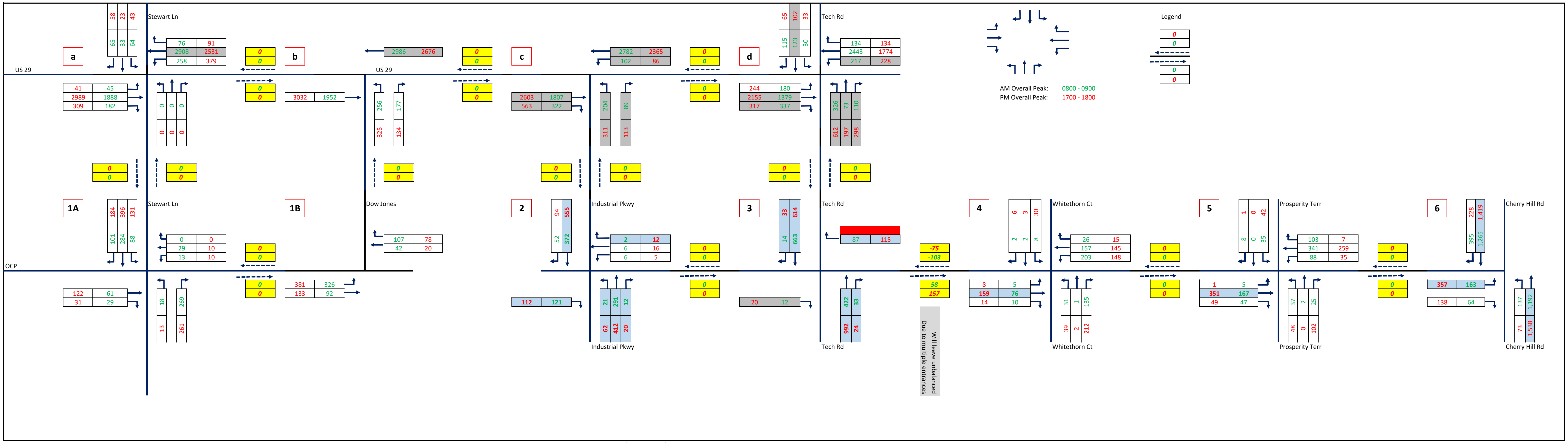
2022 Existing Volume - Unbalanced



2022 Existing Volume - Balanced

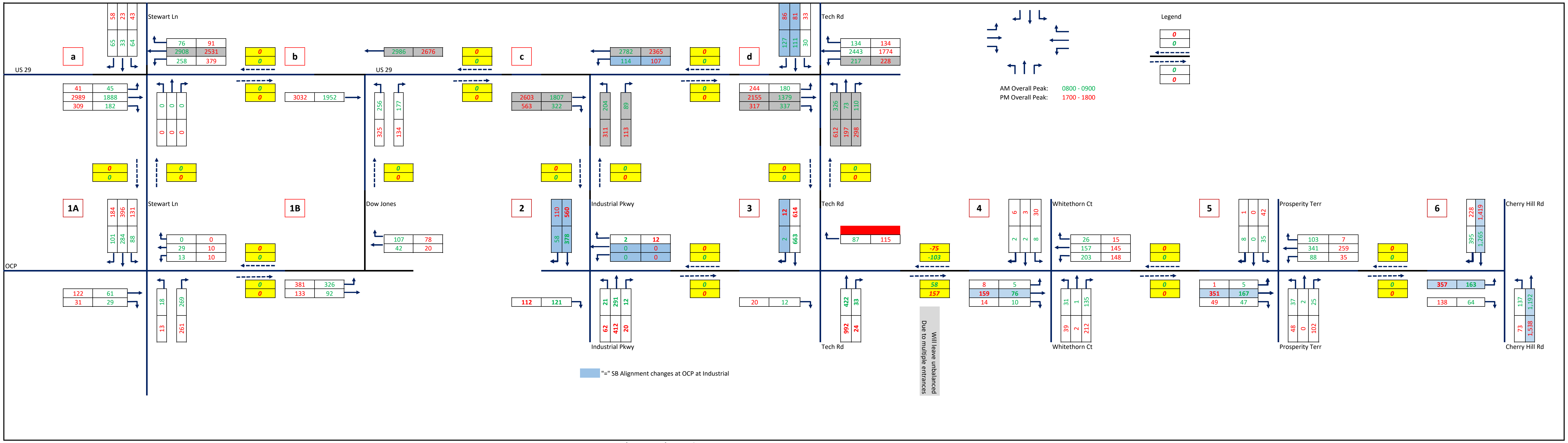


2045 Volumes - No Developments

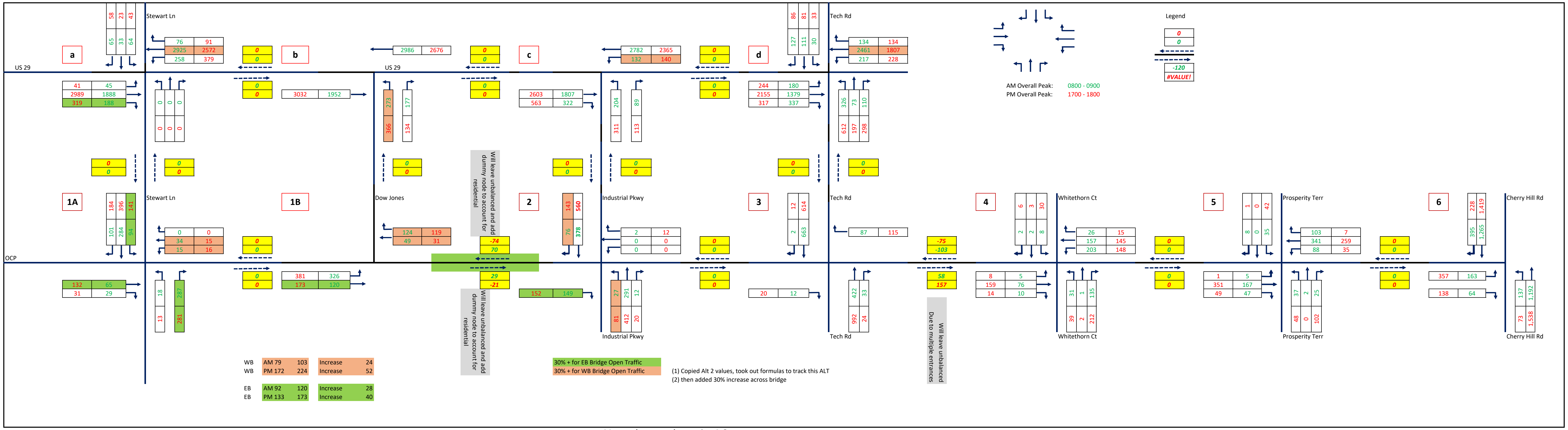


2045 Volumes - Alternative 1

No Build with Developments



2045 Volumes - Alternative 2



2045 Volumes - Alternative 3 & 4

Appendix H

Synchro LOS Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	247	85	15	0	232	0	55	23	6	26	90
Future Volume (vph)	59	247	85	15	0	232	0	55	23	6	26	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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			0.850		0.960			0.901	
Flt Protected		0.990		0.950							0.997	
Satd. Flow (prot)	0	1844	1794	1770	0	1583	0	1788	0	0	1673	0
Flt Permitted		0.990		0.950							0.997	
Satd. Flow (perm)	0	1844	1794	1770	0	1583	0	1788	0	0	1673	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			375	
Travel Time (s)		2.4			11.2			10.2			7.3	
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
Adj. Flow (vph)	64	268	92	16	0	252	0	60	25	7	28	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	332	92	16	0	252	0	85	0	0	133	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 44.9% ICU Level of Service A

Analysis Period (min) 15

Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	273	73	122	0	0	0
Future Volume (vph)	273	73	122	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	0	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1863	0	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1863	0	0	0
Link Speed (mph)		30	35		30	
Link Distance (ft)		375	331		147	
Travel Time (s)		8.5	6.4		3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	79	133	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	297	79	133	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	8		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20			9	20	9
Sign Control		Free	Yield		Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 28.2%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	358	28	14	200	13	0	0	88	3	3	1
Future Volume (vph)	0	358	28	14	200	13	0	0	88	3	3	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	16	12	16	12
Storage Length (ft)	0		0	50		150	0		0	0		0
Storage Lanes	0		0	1		2	0		1	0		0
Taper Length (ft)	75			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.991				0.865		0.981	
Flt Protected				0.950							0.979	
Satd. Flow (prot)	0	1844	0	1770	5040	0	0	0	1826	0	2028	0
Flt Permitted				0.950							0.979	
Satd. Flow (perm)	0	1844	0	1770	5040	0	0	0	1826	0	2028	0
Link Speed (mph)		35			35			40			35	
Link Distance (ft)		177			904			765			991	
Travel Time (s)		3.4			17.6			13.0			19.3	
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
Adj. Flow (vph)	0	389	30	15	217	14	0	0	96	3	3	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	419	0	15	231	0	0	0	96	0	7	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)		16			18			0			0	
Link Offset(ft)		0			0			10			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	0.85	1.00	0.85	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Yield			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.3%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	592	8	0	451	26	0	0	15	0	0	99
Future Volume (vph)	0	592	8	0	451	26	0	0	15	0	0	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	16	12	16	16
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	75			125			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	*1.00	*0.40	1.00	1.00	1.00	*0.20	1.00	1.00
Frt		0.998			0.992				0.865			*0.920
Flt Protected												
Satd. Flow (prot)	0	1859	0	0	5544	0	0	0	1826	0	0	1942
Flt Permitted												
Satd. Flow (perm)	0	1859	0	0	5544	0	0	0	1826	0	0	1942
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		165			489			991			1827	
Travel Time (s)		3.2			9.5			19.3			35.6	
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
Adj. Flow (vph)	0	643	9	0	490	28	0	0	16	0	0	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	652	0	0	518	0	0	0	16	0	0	108
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	2 veh
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			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	0.85	1.00	0.85	*0.40
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Yield			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 41.6% ICU Level of Service A

Analysis Period (min) 15

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	6	7	41	3	95	5	60	14	214	142	19
Future Volume (Veh/h)	11	6	7	41	3	95	5	60	14	214	142	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	12	7	8	45	3	103	5	65	15	233	154	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1002	
pX, platoon unblocked												
vC, conflicting volume	818	720	164	724	724	72	175			80		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	818	720	164	724	724	72	175			80		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	99	85	99	90	100			85		
cM capacity (veh/h)	231	298	880	292	297	990	1401			1518		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	27	151	85	408
Volume Left	12	45	5	233
Volume Right	8	103	15	21
cSH	319	563	1401	1518
Volume to Capacity	0.08	0.27	0.00	0.15
Queue Length 95th (ft)	7	27	0	14
Control Delay (s)	17.3	13.7	0.5	5.0
Lane LOS	C	B	A	A
Approach Delay (s)	17.3	13.7	0.5	5.0
Approach LOS	C	B		

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	7	46	0	34	3	114	49	49	322	55
Future Volume (Veh/h)	11	0	7	46	0	34	3	114	49	49	322	55
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	12	0	8	50	0	37	3	124	53	53	350	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											416	
pX, platoon unblocked												
vC, conflicting volume	680	669	205	446	672	150	410			177		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	680	669	205	446	672	150	410			177		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	99	89	100	96	100			96		
cM capacity (veh/h)	313	362	802	476	360	869	1145			1396		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	20	87	180	228	235
Volume Left	12	50	3	53	0
Volume Right	8	37	53	0	60
cSH	414	589	1145	1396	1700
Volume to Capacity	0.05	0.15	0.00	0.04	0.14
Queue Length 95th (ft)	4	13	0	3	0
Control Delay (s)	14.1	12.2	0.2	2.0	0.0
Lane LOS	B	B	A	A	
Approach Delay (s)	14.1	12.2	0.2	1.0	
Approach LOS	B	B			

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1013	309	117	1037	116	43
Future Volume (vph)	1013	309	117	1037	116	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	13
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (prot)	3539	1583	1770	3539	3233	
Flt Permitted	1.00	1.00	0.23	1.00	0.96	
Satd. Flow (perm)	3539	1583	425	3539	3233	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1101	336	127	1127	126	47
RTOR Reduction (vph)	0	90	0	0	28	0
Lane Group Flow (vph)	1101	246	127	1127	145	0
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	108.6	108.6	123.6	123.6	13.9	
Effective Green, g (s)	109.6	109.6	124.6	124.6	14.9	
Actuated g/C Ratio	0.73	0.73	0.83	0.83	0.10	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2585	1156	438	2939	321	
v/s Ratio Prot	c0.31		0.02	c0.32	c0.04	
v/s Ratio Perm		0.16	0.22			
v/c Ratio	0.43	0.21	0.29	0.38	0.45	
Uniform Delay, d1	7.9	6.4	6.9	3.2	63.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.4	0.8	0.4	2.1	
Delay (s)	8.4	6.9	7.7	3.5	65.8	
Level of Service	A	A	A	A	E	
Approach Delay (s)	8.1			4.0	65.8	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	284	101	18	0	269	0	61	29	13	29	0
Future Volume (vph)	88	284	101	18	0	269	0	61	29	13	29	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.948				
Flt Protected		0.986		0.950							0.981	
Satd. Flow (prot)	0	1811	1830	1805	0	1599	0	1801	0	0	1864	0
Flt Permitted		0.986		0.950							0.981	
Satd. Flow (perm)	0	1811	1830	1805	0	1599	0	1801	0	0	1864	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	0%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	144	359	113	29	0	374	0	71	45	26	40	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	503	113	29	0	374	0	116	0	0	66	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 54.2% ICU Level of Service A

Analysis Period (min) 15

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	326	92	42	107
Future Volume (vph)	0	0	326	92	42	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	30	
Link Distance (ft)	138			733	575	
Travel Time (s)	3.1			16.7	13.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	354	100	46	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	354	100	46	116
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	8	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 31.4%	ICU Level of Service A
Analysis Period (min) 15	

Intersection												
Int Delay, s/veh	3.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	372	52	21	291	12	0	0	121	6	6	2
Future Vol, veh/h	0	372	52	21	291	12	0	0	121	6	6	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	50	-	150	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	1080434688		-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	88	78	70	82	81	92	92	61	38	75	25
Heavy Vehicles, %	0	1	4	0	2	0	2	2	1	0	0	0
Mvmt Flow	0	423	67	30	355	15	0	0	198	16	8	8

Major/Minor	Major1						Minor1			Minor2		
Conflicting Flow All	-	0	0				-	-	459	558	490	0
Stage 1	-	-	-				-	-	-	0	0	-
Stage 2	-	-	-				-	-	-	558	490	-
Critical Hdwy	-	-	-				-	-	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-				-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-				-	-	-	6.1	5.5	-
Follow-up Hdwy	-	-	-				-	-	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	0	-	-				0	0	604	443	482	-
Stage 1	0	-	-				0	0	-	-	-	-
Stage 2	0	-	-				0	0	-	518	552	-
Platoon blocked, %		-	-									
Mov Cap-1 Maneuver	-	-	-				-	-	604	298	482	-
Mov Cap-2 Maneuver	-	-	-				-	-	-	298	482	-
Stage 1	-	-	-				-	-	-	-	-	-
Stage 2	-	-	-				-	-	-	348	552	-

Approach	EB	NB	SB
HCM Control Delay, s	0	13.8	
HCM LOS		B	-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	604	-	-	-
HCM Lane V/C Ratio	0.328	-	-	-
HCM Control Delay (s)	13.8	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	1.4	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	663	14	0	422	33	0	0	12	0	0	87
Future Vol, veh/h	0	663	14	0	422	33	0	0	12	0	0	87
Conflicting Peds, #/hr	0	0	0	0	0	5	1	0	1	0	0	0
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	90	67	92	90	65	92	92	62	92	92	82
Heavy Vehicles, %	2	3	0	2	1	0	2	2	0	2	2	1
Mvmt Flow	0	737	21	0	469	51	0	0	19	0	0	106

Major/Minor	Major1						Minor1			Minor2		
Conflicting Flow All	-	0	0				-	-	749	-	-	0
Stage 1	-	-	-				-	-	-	-	-	-
Stage 2	-	-	-				-	-	-	-	-	-
Critical Hdwy	-	-	-				-	-	6.2	-	-	6.21
Critical Hdwy Stg 1	-	-	-				-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-				-	-	-	-	-	-
Follow-up Hdwy	-	-	-				-	-	3.3	-	-	3.309
Pot Cap-1 Maneuver	0	-	-				0	0	415	0	0	-
Stage 1	0	-	-				0	0	-	0	0	-
Stage 2	0	-	-				0	0	-	0	0	-
Platoon blocked, %		-	-									
Mov Cap-1 Maneuver	-	-	-				-	-	415	-	-	-
Mov Cap-2 Maneuver	-	-	-				-	-	-	-	-	-
Stage 1	-	-	-				-	-	-	-	-	-
Stage 2	-	-	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	14.1	
HCM LOS		B	-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	415	-	-	-
HCM Lane V/C Ratio	0.047	-	-	-
HCM Control Delay (s)	14.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Future Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	12	4	3	36	4	161	12	103	26	251	271	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1024	956	298	944	965	122	319	0	0	133	0	0
Stage 1	799	799	-	144	144	-	-	-	-	-	-	-
Stage 2	225	157	-	800	821	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	212	260	746	234	257	926	1252	-	-	1440	-	-
Stage 1	376	401	-	840	782	-	-	-	-	-	-	-
Stage 2	773	772	-	367	391	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	201	742	189	199	920	1246	-	-	1434	-	-
Mov Cap-2 Maneuver	142	201	-	189	199	-	-	-	-	-	-	-
Stage 1	371	314	-	828	771	-	-	-	-	-	-	-
Stage 2	627	761	-	284	307	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.7	16.3	0.7	3.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	178	519	1434	-	-
HCM Lane V/C Ratio	0.01	-	-	0.111	0.388	0.175	-	-
HCM Control Delay (s)	7.9	0	-	27.7	16.3	8	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.8	0.6	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Future Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	92	0	10	46	2	30	7	182	56	124	371	178

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	960	278	661	1021	210	549	0	0	238	0	0
Stage 1	708	708	-	224	224	-	-	-	-	-	-	-
Stage 2	240	252	-	437	797	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.53	6.96	7.345	6.515	6.32	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.5	5.53	-	6.145	5.515	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.545	5.515	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.019	3.338	3.5285	4.0095	3.376	2.2	-	-	2.219	-	-
Pot Cap-1 Maneuver	230	256	715	360	237	813	1031	-	-	1327	-	-
Stage 1	396	437	-	775	720	-	-	-	-	-	-	-
Stage 2	768	698	-	567	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	195	219	713	315	203	813	1031	-	-	1327	-	-
Mov Cap-2 Maneuver	195	219	-	315	203	-	-	-	-	-	-	-
Stage 1	393	377	-	769	714	-	-	-	-	-	-	-
Stage 2	731	692	-	480	345	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.3	16.1	0.2	1.6
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1031	-	-	210	403	1327	-	-
HCM Lane V/C Ratio	0.007	-	-	0.485	0.195	0.093	-	-
HCM Control Delay (s)	8.5	0	-	37.3	16.1	8	0.3	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2.4	0.7	0.3	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1265	395	137	1192	163	64
Future Volume (vph)	1265	395	137	1192	163	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	13
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1543	1770	3539	3152	
Flt Permitted	1.00	1.00	0.16	1.00	0.97	
Satd. Flow (perm)	3574	1543	295	3539	3152	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1346	454	146	1242	214	96
RTOR Reduction (vph)	0	137	0	0	36	0
Lane Group Flow (vph)	1346	317	146	1242	274	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	103.6	103.6	118.6	118.6	18.9	
Effective Green, g (s)	104.6	104.6	119.6	119.6	19.9	
Actuated g/C Ratio	0.70	0.70	0.80	0.80	0.13	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2492	1075	328	2821	418	
v/s Ratio Prot	c0.38		0.03	c0.35	c0.09	
v/s Ratio Perm		0.21	0.33			
v/c Ratio	0.54	0.29	0.45	0.44	0.65	
Uniform Delay, d1	11.0	8.6	16.1	4.7	61.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.7	2.0	0.5	4.9	
Delay (s)	11.9	9.3	18.1	5.2	66.7	
Level of Service	B	A	B	A	E	
Approach Delay (s)	11.2			6.6	66.7	
Approach LOS	B			A	E	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	33	65	0	0	0	45	1888	182	258	2908	76
Future Volume (vph)	64	33	65	0	0	0	45	1888	182	258	2908	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.92					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1742					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1742					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	76	61	76	0	0	0	60	2275	204	304	3061	92
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	59	0	0	20
Lane Group Flow (vph)	76	106	0	0	0	0	60	2275	145	304	3061	72
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.0	14.0					8.5	92.0	92.0	29.0	112.5	112.5
Effective Green, g (s)	14.0	14.0					8.5	92.0	92.0	29.0	112.5	112.5
Actuated g/C Ratio	0.09	0.09					0.06	0.61	0.61	0.19	0.75	0.75
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	162					102	3150	970	345	3777	1211
v/s Ratio Prot	0.04	c0.06					0.03	0.44		c0.17	c0.61	
v/s Ratio Perm									0.09			0.04
v/c Ratio	0.45	0.66					0.59	0.72	0.15	0.88	0.81	0.06
Uniform Delay, d1	64.4	65.7					69.0	20.1	12.3	58.8	12.0	4.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	9.2					8.4	1.5	0.3	22.1	1.4	0.0
Delay (s)	66.3	74.8					77.4	21.6	12.7	80.9	13.3	4.9
Level of Service	E	E					E	C	B	F	B	A
Approach Delay (s)		71.8			0.0			22.2			19.1	
Approach LOS		E			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	204	89	1807	322	102	2782
Future Volume (vph)	204	89	1807	322	102	2782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	1.00	0.91	0.88	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	2814	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	2814	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	276	105	1943	362	165	2960
RTOR Reduction (vph)	0	94	0	0	0	0
Lane Group Flow (vph)	276	11	1943	362	165	2960
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	19.4	19.4	125.6	125.6	20.0	150.6
Effective Green, g (s)	19.4	19.4	125.6	125.6	20.0	150.6
Actuated g/C Ratio	0.11	0.11	0.70	0.70	0.11	0.84
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	370	170	3583	1963	194	4339
v/s Ratio Prot	c0.08		0.38		c0.09	c0.57
v/s Ratio Perm		0.01		0.13		
v/c Ratio	0.75	0.07	0.54	0.18	0.85	0.68
Uniform Delay, d1	77.9	72.2	13.2	9.4	78.5	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.04	0.10
Incremental Delay, d2	8.0	0.2	0.6	0.2	13.0	0.2
Delay (s)	85.9	72.3	13.8	9.6	94.9	0.7
Level of Service	F	E	B	A	F	A
Approach Delay (s)	82.1		13.2			5.7
Approach LOS	F		B			A

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	123	115	326	73	110	180	1379	337	217	2443	134
Future Volume (vph)	30	123	115	326	73	110	180	1379	337	217	2443	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91		0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1595	3155		3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1595	3155		3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	42	150	131	362	83	134	257	1532	370	301	2599	168
RTOR Reduction (vph)	0	0	118	0	35	0	0	0	197	0	0	38
Lane Group Flow (vph)	42	150	13	195	349	0	257	1532	173	301	2599	130
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8						2			6
Actuated Green, G (s)	17.5	17.5	17.5	28.0	28.0		19.0	84.0	84.0	30.5	95.5	95.5
Effective Green, g (s)	17.5	17.5	17.5	28.0	28.0		19.0	84.0	84.0	30.5	95.5	95.5
Actuated g/C Ratio	0.10	0.10	0.10	0.16	0.16		0.11	0.47	0.47	0.17	0.53	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	184	153	248	490		369	2396	746	299	2671	856
v/s Ratio Prot	0.02	c0.08		c0.12	0.11		0.07	c0.30		0.17	c0.52	
v/s Ratio Perm			0.01						0.11			0.08
v/c Ratio	0.24	0.82	0.08	0.79	0.71		0.70	0.64	0.23	1.01	0.97	0.15
Uniform Delay, d1	75.1	79.7	73.9	73.1	72.2		77.7	36.5	28.7	74.8	41.0	21.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.85	0.68	3.17	1.00	1.00	1.00
Incremental Delay, d2	0.7	23.4	0.2	21.8	8.6		9.2	1.2	0.6	53.7	12.2	0.4
Delay (s)	75.8	103.1	74.2	94.9	80.7		75.0	25.9	91.6	128.5	53.2	21.9
Level of Service	E	F	E	F	F		E	C	F	F	D	C
Approach Delay (s)		87.8			85.5			43.0			58.8	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	57.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	256	177	1952	0	0	2986
Future Volume (vph)	256	177	1952	0	0	2986
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	192	2122	0	0	3246
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	278	188	2122	0	0	3246
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.0	13.0	42.0			42.0
Effective Green, g (s)	13.0	13.0	42.0			42.0
Actuated g/C Ratio	0.20	0.20	0.65			0.65
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	686	316	3285			3285
v/s Ratio Prot	0.08		0.42			c0.64
v/s Ratio Perm		c0.12				
v/c Ratio	0.41	0.59	0.65			0.99
Uniform Delay, d1	22.6	23.6	7.0			11.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.4	3.0	1.0			13.2
Delay (s)	23.0	26.6	8.0			24.4
Level of Service	C	C	A			C
Approach Delay (s)	24.5		8.0			24.4
Approach LOS	C		A			C

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	284	101	18	0	269	0	61	29	13	29	0
Future Volume (vph)	88	284	101	18	0	269	0	61	29	13	29	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.948				
Flt Protected		0.986		0.950							0.981	
Satd. Flow (prot)	0	1811	1794	1805	0	1599	0	1801	0	0	1864	0
Flt Permitted		0.986		0.950							0.981	
Satd. Flow (perm)	0	1811	1794	1805	0	1599	0	1801	0	0	1864	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	144	359	113	29	0	374	0	71	45	26	40	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	503	113	29	0	374	0	116	0	0	66	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 54.2%		ICU Level of Service A
Analysis Period (min) 15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	326	92	42	107
Future Volume (vph)	0	0	326	92	42	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	575	
Travel Time (s)	3.1			16.7	11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	354	100	46	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	354	100	46	116
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	8	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 31.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	378	58	21	291	12	0	0	121	0	0	2
Future Volume (vph)	0	378	58	21	291	12	0	0	121	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				1.00			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.98		1.00	0.99				0.86			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1836		1805	5058				1844			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1836		1805	5058				1844			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	430	74	30	355	15	0	0	198	0	0	8
RTOR Reduction (vph)	0	2	0	0	3	0	0	0	173	0	0	0
Lane Group Flow (vph)	0	502	0	30	367	0	0	0	25	0	0	8
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		133.5		22.7	22.7				22.7			33.5
Effective Green, g (s)		127.0		22.7	22.7				22.7			33.5
Actuated g/C Ratio		0.71		0.13	0.13				0.13			0.19
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1295		227	637				232			346
v/s Ratio Prot		c0.27		0.02	c0.07				0.01			0.00
v/s Ratio Perm												
v/c Ratio		0.39		0.13	0.58				0.11			0.02
Uniform Delay, d1		10.7		69.9	74.1				69.7			59.9
Progression Factor		0.00		1.00	1.00				1.00			1.26
Incremental Delay, d2		0.2		0.3	1.3				0.2			0.0
Delay (s)		0.2		70.2	75.4				69.9			75.4
Level of Service		A		E	E				E			E
Approach Delay (s)		0.2			75.0			69.9			75.4	
Approach LOS		A			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Future Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		1.00			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.98			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			0.99				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		1844			5545				1834			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		1844			5545				1834			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	737	3	0	469	51	0	0	19	0	0	106
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	740	0	0	511	0	0	0	2	0	0	106
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		92.9			24.0				16.5			34.9
Effective Green, g (s)		72.9			24.0				16.5			34.9
Actuated g/C Ratio		0.41			0.13				0.09			0.19
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		746			739				168			380
v/s Ratio Prot		c0.40			0.09							0.05
v/s Ratio Perm									c0.00			
v/c Ratio		0.99			0.69				0.01			0.28
Uniform Delay, d1		53.3			74.5				74.3			61.8
Progression Factor		0.39			1.00				1.00			1.00
Incremental Delay, d2		21.9			2.8				0.0			0.4
Delay (s)		42.7			77.3				74.4			62.2
Level of Service		D			E				E			E
Approach Delay (s)		42.7			77.3			74.4			62.2	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	57.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Future Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	12	4	3	36	4	161	12	103	26	251	271	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1024	956	298	944	965	122	319	0	0	133	0	0
Stage 1	799	799	-	144	144	-	-	-	-	-	-	-
Stage 2	225	157	-	800	821	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	212	260	746	234	257	926	1252	-	-	1440	-	-
Stage 1	376	401	-	840	782	-	-	-	-	-	-	-
Stage 2	773	772	-	367	391	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	147	211	742	196	208	920	1246	-	-	1434	-	-
Mov Cap-2 Maneuver	147	211	-	196	208	-	-	-	-	-	-	-
Stage 1	371	330	-	828	771	-	-	-	-	-	-	-
Stage 2	627	761	-	297	321	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.9	15.9	0.7	3.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	184	529	1434	-	-
HCM Lane V/C Ratio	0.01	-	-	0.107	0.38	0.175	-	-
HCM Control Delay (s)	7.9	-	-	26.9	15.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.8	0.6	-	-

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Future Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	92	0	10	46	2	30	7	182	56	124	371	178

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	960	463	940	1021	210	549	0	0	238	0	0
Stage 1	708	708	-	224	224	-	-	-	-	-	-	-
Stage 2	240	252	-	716	797	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	243	257	595	243	237	815	1031	-	-	1329	-	-
Stage 1	429	438	-	776	720	-	-	-	-	-	-	-
Stage 2	768	698	-	420	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	215	232	594	220	214	815	1031	-	-	1329	-	-
Mov Cap-2 Maneuver	215	232	-	220	214	-	-	-	-	-	-	-
Stage 1	426	397	-	771	715	-	-	-	-	-	-	-
Stage 2	732	693	-	374	363	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.7	20.9	0.2	1.5
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1031	-	-	229	305	1329	-	-
HCM Lane V/C Ratio	0.007	-	-	0.445	0.258	0.093	-	-
HCM Control Delay (s)	8.5	-	-	32.7	20.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.1	1	0.3	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1265	395	137	1192	163	64
Future Volume (vph)	1265	395	137	1192	163	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4739	
Flt Permitted	1.00	1.00	0.15	1.00	0.97	
Satd. Flow (perm)	3574	1520	284	3539	4739	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1346	454	146	1242	214	96
RTOR Reduction (vph)	0	122	0	0	60	0
Lane Group Flow (vph)	1346	332	146	1242	250	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	106.0	106.0	122.5	122.5	15.0	
Effective Green, g (s)	107.0	107.0	123.5	123.5	16.0	
Actuated g/C Ratio	0.71	0.71	0.82	0.82	0.11	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2549	1084	342	2913	505	
v/s Ratio Prot	c0.38		0.03	c0.35	c0.05	
v/s Ratio Perm		0.22	0.32			
v/c Ratio	0.53	0.31	0.43	0.43	0.50	
Uniform Delay, d1	9.9	7.9	6.8	3.6	63.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.7	1.8	0.5	1.6	
Delay (s)	10.7	8.6	8.6	4.1	64.8	
Level of Service	B	A	A	A	E	
Approach Delay (s)	10.2			4.5	64.8	
Approach LOS	B			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	33	65	0	0	0	45	1888	182	258	2908	76
Future Volume (vph)	64	33	65	0	0	0	45	1888	182	258	2908	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.92					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1742					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1742					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	76	61	76	0	0	0	60	2275	204	304	3061	92
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	53	0	0	18
Lane Group Flow (vph)	76	106	0	0	0	0	60	2275	151	304	3061	74
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Effective Green, g (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Actuated g/C Ratio	0.09	0.09					0.06	0.60	0.60	0.20	0.75	0.75
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	162					101	3102	956	362	3780	1212
v/s Ratio Prot	0.04	c0.06					0.03	0.44		c0.17	c0.61	
v/s Ratio Perm									0.10			0.05
v/c Ratio	0.45	0.66					0.59	0.73	0.16	0.84	0.81	0.06
Uniform Delay, d1	64.4	65.7					69.1	21.1	13.0	57.5	11.9	4.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	9.2					9.0	1.6	0.4	15.6	1.4	0.0
Delay (s)	66.3	74.8					78.2	22.7	13.3	73.1	13.2	4.9
Level of Service	E	E					E	C	B	E	B	A
Approach Delay (s)		71.8			0.0			23.3			18.3	
Approach LOS		E			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	204	89	1807	322	114	2782
Future Volume (vph)	204	89	1807	322	114	2782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	276	105	1943	362	184	2960
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	276	105	1943	362	184	2960
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	22.7	66.7	99.3	93.5	33.5	143.3
Effective Green, g (s)	22.7	56.2	99.3	93.5	33.5	143.3
Actuated g/C Ratio	0.13	0.31	0.55	0.52	0.19	0.80
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	432	494	2833	830	326	4129
v/s Ratio Prot	c0.08	0.07	0.38	0.23	0.10	c0.57
v/s Ratio Perm						
v/c Ratio	0.64	0.21	0.69	0.44	0.56	0.72
Uniform Delay, d1	74.8	45.6	29.1	26.9	66.6	8.7
Progression Factor	0.11	0.12	1.00	1.00	0.87	0.18
Incremental Delay, d2	2.9	0.2	0.7	1.7	0.7	0.3
Delay (s)	11.1	5.5	29.8	28.5	58.4	1.9
Level of Service	B	A	C	C	E	A
Approach Delay (s)	9.6		29.6			5.2
Approach LOS	A		C			A

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2443	134
Future Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2443	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1717	1599	3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1717	1599	3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	42	135	144	362	83	134	257	1532	370	301	2599	168
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	250	0	0	73
Lane Group Flow (vph)	42	135	24	221	224	134	257	1532	120	301	2599	95
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	Over	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1						6
Actuated Green, G (s)	14.0	14.0	30.5	24.0	24.0	58.9	16.5	70.1	24.0	34.9	91.5	91.5
Effective Green, g (s)	14.0	14.0	30.5	24.0	24.0	58.9	16.5	70.1	24.0	34.9	91.5	91.5
Actuated g/C Ratio	0.08	0.08	0.17	0.13	0.13	0.33	0.09	0.39	0.13	0.19	0.51	0.51
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	334	222	228	612	321	2000	213	343	2559	820
v/s Ratio Prot	0.02	c0.07	0.01	c0.13	0.13	0.03	0.07	c0.30	0.07	0.17	c0.52	
v/s Ratio Perm			0.01			0.05						0.06
v/c Ratio	0.30	0.92	0.07	1.00	0.98	0.22	0.80	0.77	0.56	0.88	1.02	0.12
Uniform Delay, d1	78.4	82.4	62.9	77.9	77.8	43.9	80.1	47.8	73.1	70.5	44.2	23.1
Progression Factor	1.00	1.00	1.00	0.25	0.22	0.08	0.79	0.67	3.11	1.00	1.00	1.00
Incremental Delay, d2	1.2	50.0	0.1	49.9	46.6	0.2	11.0	2.3	2.7	21.4	21.8	0.3
Delay (s)	79.6	132.4	63.0	69.0	63.6	3.5	74.2	34.2	229.6	91.9	66.0	23.4
Level of Service	E	F	E	E	E	A	E	C	F	F	E	C
Approach Delay (s)		94.3			51.7			72.4			66.2	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	68.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	256	177	1952	0	0	2986
Future Volume (vph)	256	177	1952	0	0	2986
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	192	2122	0	0	3246
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	278	188	2122	0	0	3246
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.0	13.0	42.0			42.0
Effective Green, g (s)	13.0	13.0	42.0			42.0
Actuated g/C Ratio	0.20	0.20	0.65			0.65
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	686	316	3285			3285
v/s Ratio Prot	0.08		0.42			c0.64
v/s Ratio Perm		c0.12				
v/c Ratio	0.41	0.59	0.65			0.99
Uniform Delay, d1	22.6	23.6	7.0			11.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.4	3.0	1.0			13.2
Delay (s)	23.0	26.6	8.0			24.4
Level of Service	C	C	A			C
Approach Delay (s)	24.5		8.0			24.4
Approach LOS	C		A			C

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	284	101	18	0	287	0	65	29	15	34	0
Future Volume (vph)	94	284	101	18	0	287	0	65	29	15	34	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.950				
Flt Protected		0.985		0.950							0.981	
Satd. Flow (prot)	0	1808	1794	1805	0	1599	0	1805	0	0	1864	0
Flt Permitted		0.985		0.950							0.981	
Satd. Flow (perm)	0	1808	1794	1805	0	1599	0	1805	0	0	1864	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	154	359	113	29	0	399	0	76	45	30	47	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	113	29	0	399	0	121	0	0	77	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 55.8%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	326	120	49	124
Future Volume (vph)	0	0	326	120	49	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	1265	
Travel Time (s)	3.1			16.7	24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	354	130	53	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	354	130	53	135
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 32.4% ICU Level of Service A

Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	378	76	27	291	12	0	0	149	0	0	2
Future Volume (vph)	0	378	76	27	291	12	0	0	149	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				1.00			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.98		1.00	0.99				0.86			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1824		1805	5058				1844			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1824		1805	5058				1844			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	430	97	39	355	15	0	0	244	0	0	8
RTOR Reduction (vph)	0	3	0	0	3	0	0	0	213	0	0	0
Lane Group Flow (vph)	0	524	0	39	367	0	0	0	31	0	0	8
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		133.1		23.1	23.1				23.1			36.5
Effective Green, g (s)		126.6		23.1	23.1				23.1			36.5
Actuated g/C Ratio		0.70		0.13	0.13				0.13			0.20
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1282		231	649				236			377
v/s Ratio Prot		c0.29		0.02	c0.07				0.02			0.00
v/s Ratio Perm												
v/c Ratio		0.41		0.17	0.57				0.13			0.02
Uniform Delay, d1		11.1		69.9	73.7				69.6			57.4
Progression Factor		0.00		1.00	1.00				1.00			1.26
Incremental Delay, d2		0.2		0.3	1.1				0.3			0.0
Delay (s)		0.2		70.2	74.9				69.8			72.6
Level of Service		A		E	E				E			E
Approach Delay (s)		0.2			74.4			69.8			72.6	
Approach LOS		A			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Future Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		1.00			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.98			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			0.99				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		1844			5545				1834			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		1844			5545				1834			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	737	3	0	469	51	0	0	19	0	0	106
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	740	0	0	511	0	0	0	2	0	0	106
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		92.9			24.0				16.5			34.9
Effective Green, g (s)		72.9			24.0				16.5			34.9
Actuated g/C Ratio		0.41			0.13				0.09			0.19
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		746			739				168			380
v/s Ratio Prot		c0.40			0.09							0.05
v/s Ratio Perm									c0.00			
v/c Ratio		0.99			0.69				0.01			0.28
Uniform Delay, d1		53.3			74.5				74.3			61.8
Progression Factor		0.39			1.00				1.00			1.00
Incremental Delay, d2		21.9			2.8				0.0			0.4
Delay (s)		42.7			77.3				74.4			62.2
Level of Service		D			E				E			E
Approach Delay (s)		42.7			77.3			74.4			62.2	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	57.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Future Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	12	4	3	36	4	161	12	103	26	251	271	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1024	956	298	944	965	122	319	0	0	133	0	0
Stage 1	799	799	-	144	144	-	-	-	-	-	-	-
Stage 2	225	157	-	800	821	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	212	260	746	234	257	926	1252	-	-	1440	-	-
Stage 1	376	401	-	840	782	-	-	-	-	-	-	-
Stage 2	773	772	-	367	391	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	147	211	742	196	208	920	1246	-	-	1434	-	-
Mov Cap-2 Maneuver	147	211	-	196	208	-	-	-	-	-	-	-
Stage 1	371	330	-	828	771	-	-	-	-	-	-	-
Stage 2	627	761	-	297	321	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.9	15.9	0.7	3.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	184	529	1434	-	-
HCM Lane V/C Ratio	0.01	-	-	0.107	0.38	0.175	-	-
HCM Control Delay (s)	7.9	-	-	26.9	15.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.8	0.6	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Future Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	92	0	10	46	2	30	7	182	56	124	371	178

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	960	463	940	1021	210	549	0	0	238	0	0
Stage 1	708	708	-	224	224	-	-	-	-	-	-	-
Stage 2	240	252	-	716	797	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	243	257	595	243	237	815	1031	-	-	1329	-	-
Stage 1	429	438	-	776	720	-	-	-	-	-	-	-
Stage 2	768	698	-	420	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	215	232	594	220	214	815	1031	-	-	1329	-	-
Mov Cap-2 Maneuver	215	232	-	220	214	-	-	-	-	-	-	-
Stage 1	426	397	-	771	715	-	-	-	-	-	-	-
Stage 2	732	693	-	374	363	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.7	20.9	0.2	1.5
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1031	-	-	229	305	1329	-	-
HCM Lane V/C Ratio	0.007	-	-	0.445	0.258	0.093	-	-
HCM Control Delay (s)	8.5	-	-	32.7	20.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.1	1	0.3	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1265	395	137	1192	163	64
Future Volume (vph)	1265	395	137	1192	163	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4739	
Flt Permitted	1.00	1.00	0.15	1.00	0.97	
Satd. Flow (perm)	3574	1520	284	3539	4739	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1346	454	146	1242	214	96
RTOR Reduction (vph)	0	122	0	0	60	0
Lane Group Flow (vph)	1346	332	146	1242	250	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	106.0	106.0	122.5	122.5	15.0	
Effective Green, g (s)	107.0	107.0	123.5	123.5	16.0	
Actuated g/C Ratio	0.71	0.71	0.82	0.82	0.11	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2549	1084	342	2913	505	
v/s Ratio Prot	c0.38		0.03	c0.35	c0.05	
v/s Ratio Perm		0.22	0.32			
v/c Ratio	0.53	0.31	0.43	0.43	0.50	
Uniform Delay, d1	9.9	7.9	6.8	3.6	63.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.7	1.8	0.5	1.6	
Delay (s)	10.7	8.6	8.6	4.1	64.8	
Level of Service	B	A	A	A	E	
Approach Delay (s)	10.2			4.5	64.8	
Approach LOS	B			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	33	65	0	0	0	45	1888	188	258	2925	76
Future Volume (vph)	64	33	65	0	0	0	45	1888	188	258	2925	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.92					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1742					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1742					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	76	61	76	0	0	0	60	2275	211	304	3079	92
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	55	0	0	18
Lane Group Flow (vph)	76	106	0	0	0	0	60	2275	156	304	3079	74
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Effective Green, g (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Actuated g/C Ratio	0.09	0.09					0.06	0.60	0.60	0.20	0.75	0.75
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	162					101	3102	956	362	3780	1212
v/s Ratio Prot	0.04	c0.06					0.03	0.44		c0.17	c0.61	
v/s Ratio Perm									0.10			0.05
v/c Ratio	0.45	0.66					0.59	0.73	0.16	0.84	0.81	0.06
Uniform Delay, d1	64.4	65.7					69.1	21.1	13.0	57.5	12.0	4.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	9.2					9.0	1.6	0.4	15.6	1.4	0.0
Delay (s)	66.3	74.8					78.2	22.7	13.4	73.1	13.4	4.9
Level of Service	E	E					E	C	B	E	B	A
Approach Delay (s)		71.8			0.0			23.2			18.4	
Approach LOS		E			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	204	89	1807	322	132	2782
Future Volume (vph)	204	89	1807	322	132	2782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	276	105	1943	362	213	2960
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	276	105	1943	362	213	2960
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	23.1	70.1	95.9	90.1	36.5	142.9
Effective Green, g (s)	23.1	59.6	95.9	90.1	36.5	142.9
Actuated g/C Ratio	0.13	0.33	0.53	0.50	0.20	0.79
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	440	524	2736	800	355	4117
v/s Ratio Prot	c0.08	0.07	0.38	0.23	0.12	c0.57
v/s Ratio Perm						
v/c Ratio	0.63	0.20	0.71	0.45	0.60	0.72
Uniform Delay, d1	74.4	43.1	31.6	29.0	65.1	8.9
Progression Factor	0.11	0.12	1.00	1.00	0.86	0.18
Incremental Delay, d2	2.6	0.2	0.9	1.8	0.8	0.3
Delay (s)	10.8	5.3	32.5	30.9	56.9	1.9
Level of Service	B	A	C	C	E	A
Approach Delay (s)	9.3		32.2			5.6
Approach LOS	A		C			A

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2461	134
Future Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2461	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1717	1599	3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1717	1599	3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	42	135	144	362	83	134	257	1532	370	301	2618	168
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	250	0	0	73
Lane Group Flow (vph)	42	135	24	221	224	134	257	1532	120	301	2618	95
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	Over	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1						6
Actuated Green, G (s)	14.0	14.0	30.5	24.0	24.0	58.9	16.5	70.1	24.0	34.9	91.5	91.5
Effective Green, g (s)	14.0	14.0	30.5	24.0	24.0	58.9	16.5	70.1	24.0	34.9	91.5	91.5
Actuated g/C Ratio	0.08	0.08	0.17	0.13	0.13	0.33	0.09	0.39	0.13	0.19	0.51	0.51
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	334	222	228	612	321	2000	213	343	2559	820
v/s Ratio Prot	0.02	c0.07	0.01	c0.13	0.13	0.03	0.07	c0.30	0.07	0.17	c0.52	
v/s Ratio Perm			0.01			0.05						0.06
v/c Ratio	0.30	0.92	0.07	1.00	0.98	0.22	0.80	0.77	0.56	0.88	1.02	0.12
Uniform Delay, d1	78.4	82.4	62.9	77.9	77.8	43.9	80.1	47.8	73.1	70.5	44.2	23.1
Progression Factor	1.00	1.00	1.00	0.25	0.22	0.08	0.80	0.67	3.15	1.00	1.00	1.00
Incremental Delay, d2	1.2	50.0	0.1	49.9	46.6	0.2	10.7	2.3	2.6	21.4	23.9	0.3
Delay (s)	79.6	132.4	63.0	69.0	63.6	3.5	74.6	34.5	232.8	91.9	68.2	23.4
Level of Service	E	F	E	E	E	A	E	C	F	F	E	C
Approach Delay (s)		94.3			51.7			73.3			68.0	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	273	177	1952	0	0	2986
Future Volume (vph)	273	177	1952	0	0	2986
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	192	2122	0	0	3246
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	297	188	2122	0	0	3246
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.1	13.1	41.9			41.9
Effective Green, g (s)	13.1	13.1	41.9			41.9
Actuated g/C Ratio	0.20	0.20	0.64			0.64
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	691	319	3277			3277
v/s Ratio Prot	0.09		0.42			c0.64
v/s Ratio Perm		c0.12				
v/c Ratio	0.43	0.59	0.65			0.99
Uniform Delay, d1	22.7	23.5	7.0			11.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.4	2.8	1.0			13.7
Delay (s)	23.1	26.3	8.0			25.0
Level of Service	C	C	A			C
Approach Delay (s)	24.4		8.0			25.0
Approach LOS	C		A			C

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	284	101	18	0	287	0	65	29	15	34	0
Future Volume (vph)	94	284	101	18	0	287	0	65	29	15	34	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.944				
Flt Protected		0.985		0.950							0.981	
Satd. Flow (prot)	0	1808	1794	1805	0	1599	0	3408	0	0	3541	0
Flt Permitted		0.985		0.950							0.981	
Satd. Flow (perm)	0	1808	1794	1805	0	1599	0	3408	0	0	3541	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	154	359	113	29	0	399	0	76	45	30	47	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	113	29	0	399	0	121	0	0	77	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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 54.2%		ICU Level of Service A
Analysis Period (min) 15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	326	120	49	124
Future Volume (vph)	0	0	326	120	49	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt						0.850
Flt Protected				0.965		
Satd. Flow (prot)	0	0	0	3415	1863	1583
Flt Permitted				0.965		
Satd. Flow (perm)	0	0	0	3415	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	1265	
Travel Time (s)	3.1			16.7	24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	354	130	53	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	484	53	135
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 32.4%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	378	76	27	291	12	0	0	149	0	0	2
Future Volume (vph)	0	378	76	27	291	12	0	0	149	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				0.88			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.98		1.00	0.99				0.85			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1824		1805	5058				3189			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1824		1805	5058				3189			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	430	97	39	355	15	0	0	244	0	0	8
RTOR Reduction (vph)	0	3	0	0	3	0	0	0	213	0	0	0
Lane Group Flow (vph)	0	524	0	39	367	0	0	0	31	0	0	8
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		133.1		23.1	23.1				23.1			36.5
Effective Green, g (s)		126.6		23.1	23.1				23.1			36.5
Actuated g/C Ratio		0.70		0.13	0.13				0.13			0.20
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1282		231	649				409			377
v/s Ratio Prot		c0.29		0.02	c0.07				0.01			0.00
v/s Ratio Perm												
v/c Ratio		0.41		0.17	0.57				0.08			0.02
Uniform Delay, d1		11.1		69.9	73.7				69.1			57.4
Progression Factor		0.00		1.00	1.00				1.00			1.26
Incremental Delay, d2		0.2		0.3	1.1				0.1			0.0
Delay (s)		0.2		70.2	74.9				69.1			72.6
Level of Service		A		E	E				E			E
Approach Delay (s)		0.2			74.4			69.1			72.6	
Approach LOS		A			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Future Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		1.00			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.98			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			0.99				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		1844			5545				1834			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		1844			5545				1834			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	737	3	0	469	51	0	0	19	0	0	106
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	740	0	0	511	0	0	0	2	0	0	106
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		92.9			24.0				16.5			34.9
Effective Green, g (s)		72.9			24.0				16.5			34.9
Actuated g/C Ratio		0.41			0.13				0.09			0.19
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		746			739				168			380
v/s Ratio Prot		c0.40			0.09							0.05
v/s Ratio Perm									c0.00			
v/c Ratio		0.99			0.69				0.01			0.28
Uniform Delay, d1		53.3			74.5				74.3			61.8
Progression Factor		0.39			1.00				1.00			1.00
Incremental Delay, d2		21.9			2.8				0.0			0.4
Delay (s)		42.7			77.3				74.4			62.2
Level of Service		D			E				E			E
Approach Delay (s)		42.7			77.3			74.4			62.2	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	57.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Future Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	12	4	3	36	4	161	12	103	26	251	271	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1024	956	298	944	965	122	319	0	0	133	0	0
Stage 1	799	799	-	144	144	-	-	-	-	-	-	-
Stage 2	225	157	-	800	821	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	212	260	746	234	257	926	1252	-	-	1440	-	-
Stage 1	376	401	-	840	782	-	-	-	-	-	-	-
Stage 2	773	772	-	367	391	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	147	211	742	196	208	920	1246	-	-	1434	-	-
Mov Cap-2 Maneuver	147	211	-	196	208	-	-	-	-	-	-	-
Stage 1	371	330	-	828	771	-	-	-	-	-	-	-
Stage 2	627	761	-	297	321	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.9	15.9	0.7	3.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	184	529	1434	-	-
HCM Lane V/C Ratio	0.01	-	-	0.107	0.38	0.175	-	-
HCM Control Delay (s)	7.9	-	-	26.9	15.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.8	0.6	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Future Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	92	0	10	46	2	30	7	182	56	124	371	178

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	960	463	940	1021	210	549	0	0	238	0	0
Stage 1	708	708	-	224	224	-	-	-	-	-	-	-
Stage 2	240	252	-	716	797	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	243	257	595	243	237	815	1031	-	-	1329	-	-
Stage 1	429	438	-	776	720	-	-	-	-	-	-	-
Stage 2	768	698	-	420	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	215	232	594	220	214	815	1031	-	-	1329	-	-
Mov Cap-2 Maneuver	215	232	-	220	214	-	-	-	-	-	-	-
Stage 1	426	397	-	771	715	-	-	-	-	-	-	-
Stage 2	732	693	-	374	363	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.7	20.9	0.2	1.5
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1031	-	-	229	305	1329	-	-
HCM Lane V/C Ratio	0.007	-	-	0.445	0.258	0.093	-	-
HCM Control Delay (s)	8.5	-	-	32.7	20.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.1	1	0.3	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1265	395	137	1192	163	64
Future Volume (vph)	1265	395	137	1192	163	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4739	
Flt Permitted	1.00	1.00	0.15	1.00	0.97	
Satd. Flow (perm)	3574	1520	284	3539	4739	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1346	454	146	1242	214	96
RTOR Reduction (vph)	0	122	0	0	60	0
Lane Group Flow (vph)	1346	332	146	1242	250	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	106.0	106.0	122.5	122.5	15.0	
Effective Green, g (s)	107.0	107.0	123.5	123.5	16.0	
Actuated g/C Ratio	0.71	0.71	0.82	0.82	0.11	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2549	1084	342	2913	505	
v/s Ratio Prot	c0.38		0.03	c0.35	c0.05	
v/s Ratio Perm		0.22	0.32			
v/c Ratio	0.53	0.31	0.43	0.43	0.50	
Uniform Delay, d1	9.9	7.9	6.8	3.6	63.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.7	1.8	0.5	1.6	
Delay (s)	10.7	8.6	8.6	4.1	64.8	
Level of Service	B	A	A	A	E	
Approach Delay (s)	10.2			4.5	64.8	
Approach LOS	B			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	33	65	0	0	0	45	1888	188	258	2925	76
Future Volume (vph)	64	33	65	0	0	0	45	1888	188	258	2925	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.92					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1742					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1742					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	76	61	76	0	0	0	60	2275	211	304	3079	92
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	55	0	0	18
Lane Group Flow (vph)	76	106	0	0	0	0	60	2275	156	304	3079	74
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Effective Green, g (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Actuated g/C Ratio	0.09	0.09					0.06	0.60	0.60	0.20	0.75	0.75
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	162					101	3102	956	362	3780	1212
v/s Ratio Prot	0.04	c0.06					0.03	0.44		c0.17	c0.61	
v/s Ratio Perm									0.10			0.05
v/c Ratio	0.45	0.66					0.59	0.73	0.16	0.84	0.81	0.06
Uniform Delay, d1	64.4	65.7					69.1	21.1	13.0	57.5	12.0	4.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	9.2					9.0	1.6	0.4	15.6	1.4	0.0
Delay (s)	66.3	74.8					78.2	22.7	13.4	73.1	13.4	4.9
Level of Service	E	E					E	C	B	E	B	A
Approach Delay (s)		71.8			0.0			23.2			18.4	
Approach LOS		E			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	204	89	1807	322	132	2782
Future Volume (vph)	204	89	1807	322	132	2782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	276	105	1943	362	213	2960
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	276	105	1943	362	213	2960
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	23.1	70.1	95.9	90.1	36.5	142.9
Effective Green, g (s)	23.1	59.6	95.9	90.1	36.5	142.9
Actuated g/C Ratio	0.13	0.33	0.53	0.50	0.20	0.79
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	440	524	2736	800	355	4117
v/s Ratio Prot	c0.08	0.07	0.38	0.23	0.12	c0.57
v/s Ratio Perm						
v/c Ratio	0.63	0.20	0.71	0.45	0.60	0.72
Uniform Delay, d1	74.4	43.1	31.6	29.0	65.1	8.9
Progression Factor	0.11	0.12	1.00	1.00	0.86	0.18
Incremental Delay, d2	2.6	0.2	0.9	1.8	0.8	0.3
Delay (s)	10.8	5.3	32.5	30.9	56.9	1.9
Level of Service	B	A	C	C	E	A
Approach Delay (s)	9.3		32.2			5.6
Approach LOS	A		C			A

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2461	134
Future Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2461	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1717	1599	3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1717	1599	3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	42	135	144	362	83	134	257	1532	370	301	2618	168
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	250	0	0	73
Lane Group Flow (vph)	42	135	24	221	224	134	257	1532	120	301	2618	95
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	Over	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1						6
Actuated Green, G (s)	14.0	14.0	30.5	24.0	24.0	58.9	16.5	70.1	24.0	34.9	91.5	91.5
Effective Green, g (s)	14.0	14.0	30.5	24.0	24.0	58.9	16.5	70.1	24.0	34.9	91.5	91.5
Actuated g/C Ratio	0.08	0.08	0.17	0.13	0.13	0.33	0.09	0.39	0.13	0.19	0.51	0.51
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	334	222	228	612	321	2000	213	343	2559	820
v/s Ratio Prot	0.02	c0.07	0.01	c0.13	0.13	0.03	0.07	c0.30	0.07	0.17	c0.52	
v/s Ratio Perm			0.01			0.05						0.06
v/c Ratio	0.30	0.92	0.07	1.00	0.98	0.22	0.80	0.77	0.56	0.88	1.02	0.12
Uniform Delay, d1	78.4	82.4	62.9	77.9	77.8	43.9	80.1	47.8	73.1	70.5	44.2	23.1
Progression Factor	1.00	1.00	1.00	0.25	0.22	0.08	0.80	0.67	3.15	1.00	1.00	1.00
Incremental Delay, d2	1.2	50.0	0.1	49.9	46.6	0.2	10.7	2.3	2.6	21.4	23.9	0.3
Delay (s)	79.6	132.4	63.0	69.0	63.6	3.5	74.6	34.5	232.8	91.9	68.2	23.4
Level of Service	E	F	E	E	E	A	E	C	F	F	E	C
Approach Delay (s)		94.3			51.7			73.3			68.0	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	273	177	1952	0	0	2986
Future Volume (vph)	273	177	1952	0	0	2986
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	297	192	2122	0	0	3246
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	297	188	2122	0	0	3246
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.1	13.1	41.9			41.9
Effective Green, g (s)	13.1	13.1	41.9			41.9
Actuated g/C Ratio	0.20	0.20	0.64			0.64
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	691	319	3277			3277
v/s Ratio Prot	0.09		0.42			c0.64
v/s Ratio Perm		c0.12				
v/c Ratio	0.43	0.59	0.65			0.99
Uniform Delay, d1	22.7	23.5	7.0			11.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.4	2.8	1.0			13.7
Delay (s)	23.1	26.3	8.0			25.0
Level of Service	C	C	A			C
Approach Delay (s)	24.4		8.0			25.0
Approach LOS	C		A			C

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	284	101	18	0	269	0	61	29	13	29	0
Future Volume (vph)	88	284	101	18	0	269	0	61	29	13	29	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.948				
Flt Protected		0.986		0.950							0.981	
Satd. Flow (prot)	0	1811	1794	1805	0	1599	0	1801	0	0	1864	0
Flt Permitted		0.986		0.950							0.981	
Satd. Flow (perm)	0	1811	1794	1805	0	1599	0	1801	0	0	1864	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	144	359	113	29	0	374	0	71	45	26	40	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	503	113	29	0	374	0	116	0	0	66	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 54.2%		ICU Level of Service A
Analysis Period (min) 15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	326	92	42	107
Future Volume (vph)	0	0	326	92	42	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	575	
Travel Time (s)	3.1			16.7	11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	354	100	46	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	354	100	46	116
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	8	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 31.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	378	58	21	291	12	0	0	121	0	0	2
Future Volume (vph)	0	378	58	21	291	12	0	0	121	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				1.00			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.98		1.00	0.99				0.86			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1836		1805	5058				1844			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1836		1805	5058				1844			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	430	74	30	355	15	0	0	198	0	0	8
RTOR Reduction (vph)	0	2	0	0	3	0	0	0	173	0	0	0
Lane Group Flow (vph)	0	502	0	30	367	0	0	0	25	0	0	8
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		133.5		22.7	22.7				22.7			33.5
Effective Green, g (s)		127.0		22.7	22.7				22.7			33.5
Actuated g/C Ratio		0.71		0.13	0.13				0.13			0.19
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1295		227	637				232			346
v/s Ratio Prot		c0.27		0.02	c0.07				0.01			0.00
v/s Ratio Perm												
v/c Ratio		0.39		0.13	0.58				0.11			0.02
Uniform Delay, d1		10.7		69.9	74.1				69.7			59.9
Progression Factor		0.00		1.00	1.00				1.00			1.33
Incremental Delay, d2		0.2		0.3	1.3				0.2			0.0
Delay (s)		0.2		70.2	75.4				69.9			79.4
Level of Service		A		E	E				E			E
Approach Delay (s)		0.2			75.0			69.9			79.4	
Approach LOS		A			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Future Volume (vph)	0	663	2	0	422	33	0	0	12	0	0	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		0.95			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.98			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			0.99				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		3503			5545				1834			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		3503			5545				1834			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	737	3	0	469	51	0	0	19	0	0	106
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	740	0	0	511	0	0	0	2	0	0	106
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		80.2			24.0				16.5			22.2
Effective Green, g (s)		60.2			24.0				16.5			22.2
Actuated g/C Ratio		0.33			0.13				0.09			0.12
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		1171			739				168			241
v/s Ratio Prot		c0.21			c0.09							0.05
v/s Ratio Perm									c0.00			
v/c Ratio		0.63			0.69				0.01			0.44
Uniform Delay, d1		50.6			74.5				74.3			73.1
Progression Factor		0.49			1.00				1.00			1.00
Incremental Delay, d2		0.8			2.8				0.0			1.3
Delay (s)		25.4			77.3				74.4			74.4
Level of Service		C			E				E			E
Approach Delay (s)		25.4			77.3			74.4			74.4	
Approach LOS		C			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Future Vol, veh/h	8	2	2	31	1	135	5	76	10	203	157	26
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	12	4	3	36	4	161	12	103	26	251	271	44

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1024	956	298	944	965	122	319	0	0	133	0	0
Stage 1	799	799	-	144	144	-	-	-	-	-	-	-
Stage 2	225	157	-	800	821	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	212	260	746	234	257	926	1252	-	-	1440	-	-
Stage 1	376	401	-	840	782	-	-	-	-	-	-	-
Stage 2	773	772	-	367	391	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	147	211	742	196	208	920	1246	-	-	1434	-	-
Mov Cap-2 Maneuver	147	211	-	196	208	-	-	-	-	-	-	-
Stage 1	371	330	-	828	771	-	-	-	-	-	-	-
Stage 2	627	761	-	297	321	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.9	15.9	0.7	3.6
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1246	-	-	184	529	1434	-	-
HCM Lane V/C Ratio	0.01	-	-	0.107	0.38	0.175	-	-
HCM Control Delay (s)	7.9	-	-	26.9	15.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1.8	0.6	-	-

Intersection												
Int Delay, s/veh	5.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Future Vol, veh/h	35	0	8	37	2	25	5	167	47	88	341	103
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	92	0	10	46	2	30	7	182	56	124	371	178

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	948	960	463	940	1021	210	549	0	0	238	0	0
Stage 1	708	708	-	224	224	-	-	-	-	-	-	-
Stage 2	240	252	-	716	797	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	243	257	595	243	237	815	1031	-	-	1329	-	-
Stage 1	429	438	-	776	720	-	-	-	-	-	-	-
Stage 2	768	698	-	420	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	215	232	594	220	214	815	1031	-	-	1329	-	-
Mov Cap-2 Maneuver	215	232	-	220	214	-	-	-	-	-	-	-
Stage 1	426	397	-	771	715	-	-	-	-	-	-	-
Stage 2	732	693	-	374	363	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.7	20.9	0.2	1.5
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1031	-	-	229	305	1329	-	-
HCM Lane V/C Ratio	0.007	-	-	0.445	0.258	0.093	-	-
HCM Control Delay (s)	8.5	-	-	32.7	20.9	8	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.1	1	0.3	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1265	395	137	1192	163	64
Future Volume (vph)	1265	395	137	1192	163	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4739	
Flt Permitted	1.00	1.00	0.15	1.00	0.97	
Satd. Flow (perm)	3574	1520	284	3539	4739	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1346	454	146	1242	214	96
RTOR Reduction (vph)	0	122	0	0	60	0
Lane Group Flow (vph)	1346	332	146	1242	250	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	106.0	106.0	122.5	122.5	15.0	
Effective Green, g (s)	107.0	107.0	123.5	123.5	16.0	
Actuated g/C Ratio	0.71	0.71	0.82	0.82	0.11	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2549	1084	342	2913	505	
v/s Ratio Prot	c0.38		0.03	c0.35	c0.05	
v/s Ratio Perm		0.22	0.32			
v/c Ratio	0.53	0.31	0.43	0.43	0.50	
Uniform Delay, d1	9.9	7.9	6.8	3.6	63.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.7	1.8	0.5	1.6	
Delay (s)	10.7	8.6	8.6	4.1	64.8	
Level of Service	B	A	A	A	E	
Approach Delay (s)	10.2			4.5	64.8	
Approach LOS	B			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	33	65	0	0	0	45	1888	182	258	2908	76
Future Volume (vph)	64	33	65	0	0	0	45	1888	182	258	2908	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.92					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1742					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1742					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	76	61	76	0	0	0	60	2275	204	304	3061	92
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	53	0	0	18
Lane Group Flow (vph)	76	106	0	0	0	0	60	2275	151	304	3061	74
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Effective Green, g (s)	14.0	14.0					8.4	90.6	90.6	30.4	112.6	112.6
Actuated g/C Ratio	0.09	0.09					0.06	0.60	0.60	0.20	0.75	0.75
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	162					101	3102	956	362	3780	1212
v/s Ratio Prot	0.04	c0.06					0.03	0.44		c0.17	c0.61	
v/s Ratio Perm									0.10			0.05
v/c Ratio	0.45	0.66					0.59	0.73	0.16	0.84	0.81	0.06
Uniform Delay, d1	64.4	65.7					69.1	21.1	13.0	57.5	11.9	4.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	9.2					9.0	1.6	0.4	15.6	1.4	0.0
Delay (s)	66.3	74.8					78.2	22.7	13.3	73.1	13.2	4.9
Level of Service	E	E					E	C	B	E	B	A
Approach Delay (s)		71.8			0.0			23.3			18.3	
Approach LOS		E			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	204	89	1807	322	114	2782
Future Volume (vph)	204	89	1807	322	114	2782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	276	105	1943	362	184	2960
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	276	105	1943	362	184	2960
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	22.7	66.7	99.3	93.5	33.5	143.3
Effective Green, g (s)	22.7	56.2	99.3	93.5	33.5	143.3
Actuated g/C Ratio	0.13	0.31	0.55	0.52	0.19	0.80
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	432	494	2833	830	326	4129
v/s Ratio Prot	c0.08	0.07	0.38	0.23	0.10	c0.57
v/s Ratio Perm						
v/c Ratio	0.64	0.21	0.69	0.44	0.56	0.72
Uniform Delay, d1	74.8	45.6	29.1	26.9	66.6	8.7
Progression Factor	0.11	0.12	1.00	1.00	0.86	0.18
Incremental Delay, d2	2.9	0.2	0.7	1.7	0.7	0.3
Delay (s)	11.1	5.5	29.8	28.5	58.2	1.9
Level of Service	B	A	C	C	E	A
Approach Delay (s)	9.6		29.6			5.2
Approach LOS	A		C			A

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2443	134
Future Volume (vph)	30	111	127	326	73	110	180	1379	337	217	2443	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1717	1599	3502	5136	1599	3433	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1717	1599	3502	5136	1599	3433	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	42	135	144	362	83	134	257	1532	370	301	2599	168
RTOR Reduction (vph)	0	0	120	0	0	0	0	0	246	0	0	73
Lane Group Flow (vph)	42	135	24	221	224	134	257	1532	124	301	2599	95
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1			5			6
Actuated Green, G (s)	14.0	14.0	30.5	24.0	24.0	46.2	16.5	82.8	40.5	22.2	91.5	91.5
Effective Green, g (s)	14.0	14.0	30.5	24.0	24.0	46.2	16.5	82.8	40.5	22.2	91.5	91.5
Actuated g/C Ratio	0.08	0.08	0.17	0.13	0.13	0.26	0.09	0.46	0.22	0.12	0.51	0.51
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	334	222	228	499	321	2362	359	423	2559	820
v/s Ratio Prot	0.02	c0.07	0.01	c0.13	0.13	0.04	c0.07	0.30	0.05	0.09	c0.52	
v/s Ratio Perm			0.01			0.05			0.03			0.06
v/c Ratio	0.30	0.92	0.07	1.00	0.98	0.27	0.80	0.65	0.34	0.71	1.02	0.12
Uniform Delay, d1	78.4	82.4	62.9	77.9	77.8	53.4	80.1	37.4	58.6	75.8	44.2	23.1
Progression Factor	1.00	1.00	1.00	0.25	0.22	0.07	0.79	0.56	5.35	1.00	1.00	1.00
Incremental Delay, d2	1.2	50.0	0.1	49.9	46.6	0.3	11.0	1.1	0.5	5.6	21.8	0.3
Delay (s)	79.6	132.4	63.0	69.0	63.6	4.0	74.4	21.9	314.1	81.4	66.0	23.4
Level of Service	E	F	E	E	E	A	E	C	F	F	E	C
Approach Delay (s)		94.3			51.9			78.2			65.2	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	70.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	256	177	1952	0	0	2986
Future Volume (vph)	256	177	1952	0	0	2986
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	192	2122	0	0	3246
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	278	188	2122	0	0	3246
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.0	13.0	42.0			42.0
Effective Green, g (s)	13.0	13.0	42.0			42.0
Actuated g/C Ratio	0.20	0.20	0.65			0.65
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	686	316	3285			3285
v/s Ratio Prot	0.08		0.42			c0.64
v/s Ratio Perm		c0.12				
v/c Ratio	0.41	0.59	0.65			0.99
Uniform Delay, d1	22.6	23.6	7.0			11.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.4	3.0	1.0			13.2
Delay (s)	23.0	26.6	8.0			24.4
Level of Service	C	C	A			C
Approach Delay (s)	24.5		8.0			24.4
Approach LOS	C		A			C

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	338	138	8	0	218	0	131	25	6	5	66
Future Volume (vph)	106	338	138	8	0	218	0	131	25	6	5	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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			0.850		0.978			0.884	
Flt Protected		0.988		0.950							0.996	
Satd. Flow (prot)	0	1840	1794	1770	0	1583	0	1822	0	0	1640	0
Flt Permitted		0.988		0.950							0.996	
Satd. Flow (perm)	0	1840	1794	1770	0	1583	0	1822	0	0	1640	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			375	
Travel Time (s)		2.4			11.2			10.2			7.3	
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
Adj. Flow (vph)	115	367	150	9	0	237	0	142	27	7	5	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	482	150	9	0	237	0	169	0	0	84	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	335	120	77	0	0	0
Future Volume (vph)	335	120	77	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	0	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	1863	0	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	1863	0	0	0
Link Speed (mph)		30	35		30	
Link Distance (ft)		375	331		147	
Travel Time (s)		8.5	6.4		3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	130	84	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	364	130	84	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	8		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20			9	20	9
Sign Control		Free	Yield		Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 28.6%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	405	78	37	275	15	0	0	85	1	9	0
Future Volume (vph)	0	405	78	37	275	15	0	0	85	1	9	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	16	12	16	12
Storage Length (ft)	0		0	50		150	0		0	0		0
Storage Lanes	0		0	1		2	0		1	0		0
Taper Length (ft)	75			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.992				0.865			
Flt Protected				0.950							0.995	
Satd. Flow (prot)	0	1822	0	1770	5045	0	0	0	1826	0	2101	0
Flt Permitted				0.950							0.995	
Satd. Flow (perm)	0	1822	0	1770	5045	0	0	0	1826	0	2101	0
Link Speed (mph)		35			35			40			35	
Link Distance (ft)		177			904			765			991	
Travel Time (s)		3.4			17.6			13.0			19.3	
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
Adj. Flow (vph)	0	440	85	40	299	16	0	0	92	1	10	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	525	0	40	315	0	0	0	92	0	11	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)		16			18			0			0	
Link Offset(ft)		0			0			10			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	0.85	1.00	0.85	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Yield			Stop			Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 44.6%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	600	5	0	558	23	0	0	10	0	0	120
Future Volume (vph)	0	600	5	0	558	23	0	0	10	0	0	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	16	12	16	16
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	75			125			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	*1.00	*0.40	1.00	1.00	1.00	*0.20	1.00	1.00
Frt		0.999			0.994				0.865			*0.920
Flt Protected												
Satd. Flow (prot)	0	1861	0	0	5555	0	0	0	1826	0	0	1942
Flt Permitted												
Satd. Flow (perm)	0	1861	0	0	5555	0	0	0	1826	0	0	1942
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		165			489			991			1827	
Travel Time (s)		3.2			9.5			19.3			35.6	
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
Adj. Flow (vph)	0	652	5	0	607	25	0	0	11	0	0	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	657	0	0	632	0	0	0	11	0	0	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	2 veh
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			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	0.85	1.00	0.85	*0.40
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Yield			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 41.9%		ICU Level of Service A
Analysis Period (min) 15		
* User Entered Value		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	0	13	57	5	200	7	127	14	125	99	10
Future Volume (Veh/h)	28	0	13	57	5	200	7	127	14	125	99	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	30	0	14	62	5	217	8	138	15	136	108	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1002	
pX, platoon unblocked												
vC, conflicting volume	766	554	114	561	552	146	119			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	766	554	114	561	552	146	119			153		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	100	99	84	99	76	99			90		
cM capacity (veh/h)	222	396	939	399	397	902	1469			1428		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	284	161	255
Volume Left	30	62	8	136
Volume Right	14	217	15	11
cSH	293	695	1469	1428
Volume to Capacity	0.15	0.41	0.01	0.10
Queue Length 95th (ft)	13	50	0	8
Control Delay (s)	19.4	13.7	0.4	4.5
Lane LOS	C	B	A	A
Approach Delay (s)	19.4	13.7	0.4	4.5
Approach LOS	C	B		

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	2	13	37	1	65	0	329	26	36	184	19
Future Volume (Veh/h)	68	2	13	37	1	65	0	329	26	36	184	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	74	2	14	40	1	71	0	358	28	39	200	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											416	
pX, platoon unblocked												
vC, conflicting volume	732	674	110	565	671	372	221			386		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	732	674	110	565	671	372	221			386		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	99	98	90	100	89	100			97		
cM capacity (veh/h)	266	362	922	390	364	625	1345			1169		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	90	112	386	139	121
Volume Left	74	40	0	39	0
Volume Right	14	71	28	0	21
cSH	302	511	1345	1169	1700
Volume to Capacity	0.30	0.22	0.00	0.03	0.07
Queue Length 95th (ft)	30	21	0	3	0
Control Delay (s)	21.9	14.0	0.0	2.5	0.0
Lane LOS	C	B		A	
Approach Delay (s)	21.9	14.0	0.0	1.3	
Approach LOS	C	B			

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1129	181	58	1223	333	129
Future Volume (vph)	1129	181	58	1223	333	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	13
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3539	1583	1770	3539	3231	
Flt Permitted	1.00	1.00	0.19	1.00	0.97	
Satd. Flow (perm)	3539	1583	347	3539	3231	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1227	197	63	1329	362	140
RTOR Reduction (vph)	0	60	0	0	28	0
Lane Group Flow (vph)	1227	137	63	1329	474	0
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	103.2	103.2	116.5	116.5	21.0	
Effective Green, g (s)	104.2	104.2	117.5	117.5	22.0	
Actuated g/C Ratio	0.69	0.69	0.78	0.78	0.15	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2458	1099	345	2772	473	
v/s Ratio Prot	c0.35		0.01	c0.38	c0.15	
v/s Ratio Perm		0.09	0.13			
v/c Ratio	0.50	0.12	0.18	0.48	1.00	
Uniform Delay, d1	10.7	7.7	10.8	5.6	64.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2	0.5	0.6	41.8	
Delay (s)	11.4	7.9	11.4	6.2	105.8	
Level of Service	B	A	B	A	F	
Approach Delay (s)	10.9			6.5	105.8	
Approach LOS	B			A	F	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	396	184	13	0	261	0	122	31	10	10	0
Future Volume (vph)	131	396	184	13	0	261	0	122	31	10	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.962				
Flt Protected		0.987		0.950							0.973	
Satd. Flow (prot)	0	1870	1812	1805	0	1599	0	1828	0	0	1849	0
Flt Permitted		0.987		0.950							0.973	
Satd. Flow (perm)	0	1870	1812	1805	0	1599	0	1828	0	0	1849	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	0.83	0.93	0.82	0.50	0.92	0.90	0.92	0.89	0.57	0.50	0.62	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	3%
Adj. Flow (vph)	158	426	224	26	0	290	0	137	54	20	16	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	584	224	26	0	290	0	191	0	0	36	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 64.2%		ICU Level of Service C
Analysis Period (min) 15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	381	133	20	78
Future Volume (vph)	0	0	381	133	20	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	574	
Travel Time (s)	3.1			16.7	11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	414	145	22	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	414	145	22	85
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	8	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 32.6% 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	0	555	94	62	412	20	0	0	112	5	16	12
Future Vol, veh/h	0	555	94	62	412	20	0	0	112	5	16	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	2	0	0
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	50	-	150	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	92	78	62	86	75	92	25	73	25	38	92
Heavy Vehicles, %	0	1	0	5	0	0	2	0	2	0	0	0
Mvmt Flow	0	603	121	100	479	27	0	0	153	20	42	13

Major/Minor	Major1						Minor1			Minor2		
Conflicting Flow All	-	0	0				-	-	666	742	724	0
Stage 1	-	-	-				-	-	-	0	0	-
Stage 2	-	-	-				-	-	-	742	724	-
Critical Hdwy	-	-	-				-	-	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-				-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-				-	-	-	6.1	5.5	-
Follow-up Hdwy	-	-	-				-	-	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	0	-	-				0	0	459	334	354	-
Stage 1	0	-	-				0	0	-	-	-	-
Stage 2	0	-	-				0	0	-	411	433	-
Platoon blocked, %		-	-									
Mov Cap-1 Maneuver	-	-	-				-	-	459	222	354	-
Mov Cap-2 Maneuver	-	-	-				-	-	-	222	354	-
Stage 1	-	-	-				-	-	-	-	-	-
Stage 2	-	-	-				-	-	-	274	433	-

Approach	EB	NB	SB
HCM Control Delay, s	0	16.7	
HCM LOS		C	-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	459	-	-	-
HCM Lane V/C Ratio	0.334	-	-	-
HCM Control Delay (s)	16.7	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.5	-	-	-

Intersection												
Int Delay, s/veh	0.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	614	33	0	992	24	0	0	20	0	0	115
Future Vol, veh/h	0	614	33	0	992	24	0	0	20	0	0	115
Conflicting Peds, #/hr	0	0	0	1	0	27	0	0	5	5	0	0
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	150	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	95	72	92	92	62	92	92	75
Heavy Vehicles, %	2	2	2	2	1	4	0	0	0	0	0	1
Mvmt Flow	0	667	36	0	1044	33	0	0	32	0	0	153

Major/Minor	Major1						Minor1			Minor2		
Conflicting Flow All	-	0	0				-	-	690	-	-	0
Stage 1	-	-	-				-	-	-	-	-	-
Stage 2	-	-	-				-	-	-	-	-	-
Critical Hdwy	-	-	-				-	-	6.2	-	-	6.21
Critical Hdwy Stg 1	-	-	-				-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-				-	-	-	-	-	-
Follow-up Hdwy	-	-	-				-	-	3.3	-	-	3.309
Pot Cap-1 Maneuver	0	-	-				0	0	449	0	0	-
Stage 1	0	-	-				0	0	-	0	0	-
Stage 2	0	-	-				0	0	-	0	0	-
Platoon blocked, %		-	-									
Mov Cap-1 Maneuver	-	-	-				-	-	449	-	-	-
Mov Cap-2 Maneuver	-	-	-				-	-	-	-	-	-
Stage 1	-	-	-				-	-	-	-	-	-
Stage 2	-	-	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	13.6	
HCM LOS		B	-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	449	-	-	-
HCM Lane V/C Ratio	0.072	-	-	-
HCM Control Delay (s)	13.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Future Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	3	3	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	25	41	84	42	86	44	80	70	90	86	62
Heavy Vehicles, %	0	0	0	0	0	4	0	2	0	1	4	0
Mvmt Flow	43	12	15	46	5	247	18	199	20	164	169	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	882	768	182	771	770	213	194	0	0	222	0	0
Stage 1	510	510	-	248	248	-	-	-	-	-	-	-
Stage 2	372	258	-	523	522	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.24	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.336	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	269	334	866	320	333	822	1391	-	-	1353	-	-
Stage 1	550	541	-	760	705	-	-	-	-	-	-	-
Stage 2	653	698	-	541	534	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	164	283	865	269	282	818	1389	-	-	1348	-	-
Mov Cap-2 Maneuver	164	283	-	269	282	-	-	-	-	-	-	-
Stage 1	541	466	-	746	692	-	-	-	-	-	-	-
Stage 2	446	685	-	447	460	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.2	16.5	0.6	3.7
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	217	607	1348	-	-
HCM Lane V/C Ratio	0.013	-	-	0.32	0.49	0.122	-	-
HCM Control Delay (s)	7.6	0	-	29.2	16.5	8	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	2.7	0.4	-	-

Intersection	
Int Delay, s/veh	48.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Future Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Conflicting Peds, #/hr	4	0	7	7	0	4	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	79	71	75	82	53	84	81	65	90	50	81
Heavy Vehicles, %	0	0	3	0	2	0	0	0	3	2	5	0
Mvmt Flow	168	0	1	64	0	192	1	433	75	39	518	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1174	1111	271	817	1078	475	527	0	0	508	0	0
Stage 1	601	601	-	473	473	-	-	-	-	-	-	-
Stage 2	573	510	-	344	605	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.945	7.3	6.53	6.2	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.1	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.5	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3285	3.5	4.019	3.3	2.2	-	-	2.219	-	-
Pot Cap-1 Maneuver	~ 160	211	725	284	218	594	1050	-	-	1055	-	-
Stage 1	459	493	-	576	558	-	-	-	-	-	-	-
Stage 2	508	541	-	650	486	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 103	200	719	270	206	592	1050	-	-	1055	-	-
Mov Cap-2 Maneuver	~ 103	200	-	270	206	-	-	-	-	-	-	-
Stage 1	459	467	-	575	557	-	-	-	-	-	-	-
Stage 2	341	540	-	610	461	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 394.2	22.6	0	0.8
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1050	-	-	104	456	1055	-	-
HCM Lane V/C Ratio	0.001	-	-	1.629	0.562	0.037	-	-
HCM Control Delay (s)	8.4	0	-	$ 394.2	22.6	8.5	0.2	-
HCM Lane LOS	A	A	-	F	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	13	3.4	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1419	228	73	1538	357	138
Future Volume (vph)	1419	228	73	1538	357	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	13
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3539	1561	1770	3574	3254	
Flt Permitted	1.00	1.00	0.12	1.00	0.97	
Satd. Flow (perm)	3539	1561	225	3574	3254	
Peak-hour factor, PHF	0.94	0.84	0.63	0.91	0.81	0.81
Adj. Flow (vph)	1510	271	116	1690	441	170
RTOR Reduction (vph)	0	86	0	0	28	0
Lane Group Flow (vph)	1510	185	116	1690	583	0
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	2%	2%	2%	1%	1%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	101.5	101.5	116.5	116.5	21.0	
Effective Green, g (s)	102.5	102.5	117.5	117.5	22.0	
Actuated g/C Ratio	0.68	0.68	0.78	0.78	0.15	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2418	1066	274	2799	477	
v/s Ratio Prot	c0.43		0.03	c0.47	c0.18	
v/s Ratio Perm		0.12	0.30			
v/c Ratio	0.62	0.17	0.42	0.60	1.22	
Uniform Delay, d1	13.1	8.5	21.8	6.7	64.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.4	2.2	1.0	117.5	
Delay (s)	14.3	8.9	24.0	7.7	181.5	
Level of Service	B	A	C	A	F	
Approach Delay (s)	13.5			8.7	181.5	
Approach LOS	B			A	F	

Intersection Summary			
HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	23	58	0	0	0	41	2989	309	379	2531	91
Future Volume (vph)	43	23	58	0	0	0	41	2989	309	379	2531	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.90					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1704					1805	5085	1599	1805	5136	1583
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1704					1805	5085	1599	1805	5136	1583
Peak-hour factor, PHF	0.68	0.58	0.66	0.72	0.50	0.56	0.75	0.91	0.82	0.93	0.92	0.80
Adj. Flow (vph)	63	40	88	0	0	0	55	3285	377	408	2751	114
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	83	0	0	27
Lane Group Flow (vph)	63	73	0	0	0	0	55	3285	294	408	2751	87
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	0%	2%	1%	0%	1%	2%
Turn Type	Perm	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4								2			6
Actuated Green, G (s)	11.8	11.8					9.0	86.0	86.0	37.2	114.2	114.2
Effective Green, g (s)	11.8	11.8					9.0	86.0	86.0	37.2	114.2	114.2
Actuated g/C Ratio	0.08	0.08					0.06	0.57	0.57	0.25	0.76	0.76
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	141	134					108	2915	916	447	3910	1205
v/s Ratio Prot		c0.04					0.03	c0.65		c0.23	0.54	
v/s Ratio Perm	0.03								0.18			0.06
v/c Ratio	0.45	0.54					0.51	1.13	0.32	0.91	0.70	0.07
Uniform Delay, d1	66.0	66.5					68.4	32.0	16.7	54.8	9.2	4.5
Progression Factor	1.00	1.00					1.00	1.00	1.00	0.91	1.11	1.88
Incremental Delay, d2	2.2	4.4					3.7	62.2	0.9	15.5	0.4	0.0
Delay (s)	68.2	70.9					72.1	94.2	17.7	65.5	10.6	8.5
Level of Service	E	E					E	F	B	E	B	A
Approach Delay (s)		70.0			0.0			86.1			17.3	
Approach LOS		E			A			F			B	

Intersection Summary			
HCM 2000 Control Delay	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	311	113	2603	563	86	2365
Future Volume (vph)	311	113	2603	563	86	2365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	1.00	0.91	0.88	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3400	1568	5136	2787	1736	5136
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3400	1568	5136	2787	1736	5136
Peak-hour factor, PHF	0.88	0.79	0.97	0.88	0.92	0.96
Adj. Flow (vph)	353	143	2684	640	93	2464
RTOR Reduction (vph)	0	126	0	0	0	0
Lane Group Flow (vph)	353	17	2684	640	93	2464
Heavy Vehicles (%)	3%	3%	1%	2%	4%	1%
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	21.9	21.9	128.5	128.5	14.6	148.1
Effective Green, g (s)	21.9	21.9	128.5	128.5	14.6	148.1
Actuated g/C Ratio	0.12	0.12	0.71	0.71	0.08	0.82
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	413	190	3666	1989	140	4225
v/s Ratio Prot	c0.10		c0.52		0.05	c0.48
v/s Ratio Perm		0.01		0.23		
v/c Ratio	0.85	0.09	0.73	0.32	0.66	0.58
Uniform Delay, d1	77.5	70.2	15.4	9.6	80.3	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.06	0.09
Incremental Delay, d2	15.7	0.2	1.3	0.4	4.3	0.1
Delay (s)	93.2	70.4	16.8	10.0	89.5	0.5
Level of Service	F	E	B	A	F	A
Approach Delay (s)	86.6		15.5			3.8
Approach LOS	F		B			A

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	102	65	612	197	298	244	2155	317	228	1774	134
Future Volume (vph)	33	102	65	612	197	298	244	2155	317	228	1774	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	*1.00	*0.70		0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1599	1787	2438		3467	5136	1599	1805	5187	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1599	1787	2438		3467	5136	1599	1805	5187	1615
Peak-hour factor, PHF	0.65	0.75	0.66	0.93	0.82	0.92	0.83	0.98	0.95	0.90	0.91	0.84
Adj. Flow (vph)	51	136	98	658	240	324	294	2199	334	253	1949	160
RTOR Reduction (vph)	0	0	89	0	25	0	0	0	152	0	0	48
Lane Group Flow (vph)	51	136	9	415	782	0	294	2199	182	253	1949	112
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases			8						2			6
Actuated Green, G (s)	16.8	16.8	16.8	28.0	28.0		19.0	87.3	87.3	27.9	96.2	96.2
Effective Green, g (s)	16.8	16.8	16.8	28.0	28.0		19.0	87.3	87.3	27.9	96.2	96.2
Actuated g/C Ratio	0.09	0.09	0.09	0.16	0.16		0.11	0.48	0.48	0.15	0.53	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	168	177	149	277	379		365	2490	775	279	2772	863
v/s Ratio Prot	0.03	c0.07		0.23	c0.32		0.08	c0.43		c0.14	0.38	
v/s Ratio Perm			0.01						0.11			0.07
v/c Ratio	0.30	0.77	0.06	1.50	2.06		0.81	0.88	0.23	0.91	0.70	0.13
Uniform Delay, d1	76.1	79.7	74.4	76.0	76.0		78.7	41.8	26.9	74.8	31.2	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.81	0.65	1.28	1.00	1.00	1.00
Incremental Delay, d2	1.0	18.0	0.2	242.3	487.1		12.2	3.5	0.5	30.5	1.5	0.3
Delay (s)	77.2	97.7	74.6	318.3	563.1		75.6	30.5	34.9	105.3	32.8	21.3
Level of Service	E	F	E	F	F		E	C	C	F	C	C
Approach Delay (s)		86.1			480.0			35.7			39.8	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	120.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	325	134	3032	0	0	2676
Future Volume (vph)	325	134	3032	0	0	2676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	146	3296	0	0	2909
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	353	145	3296	0	0	2909
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.2	13.2	51.8			51.8
Effective Green, g (s)	13.2	13.2	51.8			51.8
Actuated g/C Ratio	0.18	0.18	0.69			0.69
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	604	278	3512			3512
v/s Ratio Prot	c0.10		c0.65			0.57
v/s Ratio Perm		0.09				
v/c Ratio	0.58	0.52	0.94			0.83
Uniform Delay, d1	28.4	28.0	10.2			8.4
Progression Factor	0.97	0.97	1.54			1.00
Incremental Delay, d2	1.4	1.8	0.7			2.4
Delay (s)	29.0	29.1	16.4			10.8
Level of Service	C	C	B			B
Approach Delay (s)	29.0		16.4			10.8
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	396	184	13	0	261	0	122	31	10	10	0
Future Volume (vph)	131	396	184	13	0	261	0	122	31	10	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.966				
Flt Protected		0.985		0.950							0.971	
Satd. Flow (prot)	0	1808	1794	1805	0	1599	0	1835	0	0	1845	0
Flt Permitted		0.985		0.950							0.971	
Satd. Flow (perm)	0	1808	1794	1805	0	1599	0	1835	0	0	1845	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	215	501	207	21	0	363	0	142	48	20	14	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	716	207	21	0	363	0	190	0	0	34	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 64.2%	ICU Level of Service C
Analysis Period (min) 15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	381	133	20	78
Future Volume (vph)	0	0	381	133	20	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	575	
Travel Time (s)	3.1			16.7	11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	414	145	22	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	414	145	22	85
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	8	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 32.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	560	110	62	412	20	0	0	112	0	0	12
Future Volume (vph)	0	560	110	62	412	20	0	0	112	0	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				1.00			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.98		1.00	0.99				0.86			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1825		1805	5054				1844			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1825		1805	5054				1844			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	636	141	89	502	25	0	0	184	0	0	48
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	157	0	0	0
Lane Group Flow (vph)	0	774	0	89	527	0	0	0	27	0	0	48
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		129.4		26.8	26.8				26.8			23.5
Effective Green, g (s)		122.9		26.8	26.8				26.8			23.5
Actuated g/C Ratio		0.68		0.15	0.15				0.15			0.13
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1246		268	752				274			243
v/s Ratio Prot		c0.42		0.05	c0.10				0.01			0.03
v/s Ratio Perm												
v/c Ratio		0.62		0.33	0.70				0.10			0.20
Uniform Delay, d1		15.7		68.6	72.8				66.2			69.8
Progression Factor		0.04		1.00	1.00				1.00			1.17
Incremental Delay, d2		0.7		0.7	3.0				0.2			0.4
Delay (s)		1.4		69.3	75.8				66.3			82.0
Level of Service		A		E	E				E			F
Approach Delay (s)		1.4			74.8			66.3			82.0	
Approach LOS		A			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Future Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		1.00			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.99			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			1.00				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		1840			5611				1835			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		1840			5611				1835			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	682	18	0	1102	37	0	0	32	0	0	140
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	699	0	0	1139	0	0	0	3	0	0	140
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		95.5			38.0				18.5			23.5
Effective Green, g (s)		75.5			38.0				18.5			23.5
Actuated g/C Ratio		0.42			0.21				0.10			0.13
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		771			1184				188			256
v/s Ratio Prot		c0.38			c0.20							0.07
v/s Ratio Perm									c0.00			
v/c Ratio		0.91			0.96				0.02			0.55
Uniform Delay, d1		49.0			70.3				72.6			73.3
Progression Factor		0.36			1.00				1.00			1.00
Incremental Delay, d2		1.7			17.7				0.0			2.4
Delay (s)		19.5			88.0				72.6			75.6
Level of Service		B			F				E			E
Approach Delay (s)		19.5			88.0			72.6			75.6	
Approach LOS		B			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	63.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Future Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	46	6	10	46	8	252	19	215	36	183	250	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1036	926	268	913	920	239	279	0	0	255	0	0
Stage 1	633	633	-	275	275	-	-	-	-	-	-	-
Stage 2	403	293	-	638	645	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	208	271	776	246	273	797	1295	-	-	1298	-	-
Stage 1	464	476	-	714	686	-	-	-	-	-	-	-
Stage 2	620	674	-	452	471	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	121	227	772	209	229	792	1289	-	-	1292	-	-
Mov Cap-2 Maneuver	121	227	-	209	229	-	-	-	-	-	-	-
Stage 1	455	407	-	700	673	-	-	-	-	-	-	-
Stage 2	411	661	-	377	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	46	20.4	0.6	3.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	148	534	1292	-	-
HCM Lane V/C Ratio	0.015	-	-	0.422	0.574	0.141	-	-
HCM Control Delay (s)	7.8	-	-	46	20.4	8.2	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.9	3.6	0.5	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Future Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	111	0	1	60	0	123	1	382	58	49	282	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	861	828	291	803	805	411	294	0	0	440	0	0
Stage 1	386	386	-	413	413	-	-	-	-	-	-	-
Stage 2	475	442	-	390	392	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	278	306	743	301	317	628	1279	-	-	1120	-	-
Stage 1	641	610	-	614	595	-	-	-	-	-	-	-
Stage 2	574	576	-	632	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	216	292	741	290	303	628	1279	-	-	1120	-	-
Mov Cap-2 Maneuver	216	292	-	290	303	-	-	-	-	-	-	-
Stage 1	640	583	-	613	594	-	-	-	-	-	-	-
Stage 2	461	575	-	602	581	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.7	18.2	0	1.2
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	218	454	1120	-	-
HCM Lane V/C Ratio	0.001	-	-	0.513	0.403	0.044	-	-
HCM Control Delay (s)	7.8	-	-	37.7	18.2	8.4	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	1.9	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1419	228	73	1538	357	138
Future Volume (vph)	1419	228	73	1538	357	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4741	
Flt Permitted	1.00	1.00	0.10	1.00	0.97	
Satd. Flow (perm)	3574	1520	186	3539	4741	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1510	262	78	1602	470	206
RTOR Reduction (vph)	0	83	0	0	54	0
Lane Group Flow (vph)	1510	179	78	1602	622	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	95.1	95.1	110.6	110.6	26.9	
Effective Green, g (s)	96.1	96.1	111.6	111.6	27.9	
Actuated g/C Ratio	0.64	0.64	0.74	0.74	0.19	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2289	973	243	2633	881	
v/s Ratio Prot	c0.42		0.02	c0.45	c0.13	
v/s Ratio Perm		0.12	0.22			
v/c Ratio	0.66	0.18	0.32	0.61	0.71	
Uniform Delay, d1	16.8	11.0	13.1	9.0	57.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.4	1.6	1.1	3.3	
Delay (s)	18.3	11.4	14.8	10.0	60.5	
Level of Service	B	B	B	B	E	
Approach Delay (s)	17.3			10.3	60.5	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	23	58	0	0	0	41	2989	309	379	2531	91
Future Volume (vph)	43	23	58	0	0	0	41	2989	309	379	2531	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.91					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1725					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1725					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	51	43	68	0	0	0	55	3601	347	446	2664	110
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	62	0	0	23
Lane Group Flow (vph)	51	71	0	0	0	0	55	3601	285	446	2664	87
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Effective Green, g (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Actuated g/C Ratio	0.08	0.08					0.06	0.62	0.62	0.21	0.77	0.77
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	132					99	3167	976	369	3867	1240
v/s Ratio Prot	0.03	c0.04					0.03	c0.70		c0.25	0.53	
v/s Ratio Perm									0.18			0.05
v/c Ratio	0.37	0.54					0.56	1.14	0.29	1.21	0.69	0.07
Uniform Delay, d1	65.8	66.7					69.1	28.8	13.4	59.5	8.6	4.3
Progression Factor	1.00	1.00					1.00	1.00	1.00	0.93	0.82	0.69
Incremental Delay, d2	1.7	4.5					6.6	66.1	0.8	108.5	0.3	0.0
Delay (s)	67.5	71.2					75.7	94.8	14.2	164.0	7.3	3.0
Level of Service	E	E					E	F	B	F	A	A
Approach Delay (s)		70.0			0.0			87.6			28.9	
Approach LOS		E			A			F			C	

Intersection Summary			
HCM 2000 Control Delay	61.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	311	113	2603	563	107	2365
Future Volume (vph)	311	113	2603	563	107	2365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	420	133	2799	633	173	2516
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	420	133	2799	633	173	2516
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	26.8	60.8	105.2	99.4	23.5	139.2
Effective Green, g (s)	26.8	50.3	105.2	99.4	23.5	139.2
Actuated g/C Ratio	0.15	0.28	0.58	0.55	0.13	0.77
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	511	442	3001	883	228	4011
v/s Ratio Prot	c0.12	0.08	c0.55	0.40	0.10	c0.49
v/s Ratio Perm						
v/c Ratio	0.82	0.30	0.93	0.72	0.76	0.63
Uniform Delay, d1	74.3	51.0	34.2	29.9	75.5	9.0
Progression Factor	0.10	0.06	1.00	1.00	0.92	0.25
Incremental Delay, d2	8.1	0.3	6.1	5.0	4.6	0.2
Delay (s)	15.9	3.4	40.3	34.8	74.4	2.5
Level of Service	B	A	D	C	E	A
Approach Delay (s)	12.8		39.3			7.1
Approach LOS	B		D			A

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1774	134
Future Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1774	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1734	1599	3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1734	1599	3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	46	99	98	680	224	363	349	2394	348	317	1887	168
RTOR Reduction (vph)	0	0	80	0	0	84	0	0	0	0	0	86
Lane Group Flow (vph)	46	99	18	449	455	279	349	2394	348	317	1887	82
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	Over	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1						6
Actuated Green, G (s)	14.0	14.0	32.5	38.0	38.0	61.5	18.5	67.5	38.0	23.5	75.5	75.5
Effective Green, g (s)	14.0	14.0	32.5	38.0	38.0	61.5	18.5	67.5	38.0	23.5	75.5	75.5
Actuated g/C Ratio	0.08	0.08	0.18	0.21	0.21	0.34	0.10	0.38	0.21	0.13	0.42	0.42
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	351	351	366	635	359	1926	337	231	2112	677
v/s Ratio Prot	0.03	c0.05	0.01	c0.27	0.26	0.09	0.10	c0.47	0.22	c0.18	0.37	
v/s Ratio Perm			0.01			0.08						0.05
v/c Ratio	0.33	0.67	0.05	1.28	1.24	0.44	0.97	1.24	1.03	1.37	0.89	0.12
Uniform Delay, d1	78.6	80.8	61.0	71.0	71.0	45.9	80.5	56.2	71.0	78.2	48.5	32.0
Progression Factor	1.00	1.00	1.00	0.18	0.18	0.02	0.67	0.54	1.44	1.00	1.00	1.00
Incremental Delay, d2	1.4	11.5	0.1	133.8	118.3	0.3	28.0	111.9	44.8	192.5	6.3	0.4
Delay (s)	79.9	92.3	61.0	146.8	131.2	1.0	82.3	142.5	147.2	270.8	54.8	32.3
Level of Service	E	F	E	F	F	A	F	F	F	F	D	C
Approach Delay (s)		77.4			99.4			136.2			82.1	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	109.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	325	134	3032	0	0	2676
Future Volume (vph)	325	134	3032	0	0	2676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	146	3296	0	0	2909
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	353	145	3296	0	0	2909
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.2	13.2	51.8			51.8
Effective Green, g (s)	13.2	13.2	51.8			51.8
Actuated g/C Ratio	0.18	0.18	0.69			0.69
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	604	278	3512			3512
v/s Ratio Prot	c0.10		c0.65			0.57
v/s Ratio Perm		0.09				
v/c Ratio	0.58	0.52	0.94			0.83
Uniform Delay, d1	28.4	28.0	10.2			8.4
Progression Factor	0.93	0.94	1.27			1.00
Incremental Delay, d2	1.4	1.8	0.7			2.4
Delay (s)	28.0	28.0	13.6			10.8
Level of Service	C	C	B			B
Approach Delay (s)	28.0		13.6			10.8
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	396	184	13	0	281	0	132	31	16	15	0
Future Volume (vph)	141	396	184	13	0	281	0	132	31	16	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.968				
Flt Protected		0.984		0.950							0.971	
Satd. Flow (prot)	0	1805	1794	1805	0	1599	0	1839	0	0	1845	0
Flt Permitted		0.984		0.950							0.971	
Satd. Flow (perm)	0	1805	1794	1805	0	1599	0	1839	0	0	1845	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	231	501	207	21	0	390	0	153	48	32	21	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	732	207	21	0	390	0	201	0	0	53	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 66.4% ICU Level of Service C

Analysis Period (min) 15

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	381	173	31	119
Future Volume (vph)	0	0	381	173	31	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	1265	
Travel Time (s)	3.1			16.7	24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	414	188	34	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	414	188	34	129
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 35.1% ICU Level of Service A

Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	560	143	81	412	20	0	0	152	0	0	12
Future Volume (vph)	0	560	143	81	412	20	0	0	152	0	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				1.00			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.97		1.00	0.99				0.86			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1812		1805	5054				1844			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1812		1805	5054				1844			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	636	183	116	502	25	0	0	249	0	0	48
RTOR Reduction (vph)	0	4	0	0	3	0	0	0	212	0	0	0
Lane Group Flow (vph)	0	815	0	116	524	0	0	0	37	0	0	48
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		129.2		27.0	27.0				27.0			26.5
Effective Green, g (s)		122.7		27.0	27.0				27.0			26.5
Actuated g/C Ratio		0.68		0.15	0.15				0.15			0.15
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1235		270	758				276			274
v/s Ratio Prot		c0.45		0.06	c0.10				0.02			0.03
v/s Ratio Perm												
v/c Ratio		0.66		0.43	0.69				0.14			0.18
Uniform Delay, d1		16.6		69.5	72.5				66.4			67.2
Progression Factor		0.06		1.00	1.00				1.00			1.21
Incremental Delay, d2		0.8		1.1	2.7				0.2			0.3
Delay (s)		1.8		70.6	75.3				66.6			81.7
Level of Service		A		E	E				E			F
Approach Delay (s)		1.8			74.4			66.6			81.7	
Approach LOS		A			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Future Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		1.00			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.99			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			1.00				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		1840			5611				1835			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		1840			5611				1835			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	682	18	0	1102	37	0	0	32	0	0	140
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	699	0	0	1137	0	0	0	3	0	0	140
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		95.5			38.0				18.3			23.5
Effective Green, g (s)		75.5			38.0				18.3			23.5
Actuated g/C Ratio		0.42			0.21				0.10			0.13
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		771			1184				186			256
v/s Ratio Prot		c0.38			c0.20							0.07
v/s Ratio Perm									c0.00			
v/c Ratio		0.91			0.96				0.02			0.55
Uniform Delay, d1		49.0			70.2				72.8			73.3
Progression Factor		0.73			1.00				1.00			1.00
Incremental Delay, d2		4.5			17.2				0.0			2.4
Delay (s)		40.5			87.4				72.8			75.6
Level of Service		D			F				E			E
Approach Delay (s)		40.5			87.4			72.8			75.6	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	70.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Future Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	46	6	10	46	8	252	19	215	36	183	250	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1036	926	268	913	920	239	279	0	0	255	0	0
Stage 1	633	633	-	275	275	-	-	-	-	-	-	-
Stage 2	403	293	-	638	645	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	208	271	776	246	273	797	1295	-	-	1298	-	-
Stage 1	464	476	-	714	686	-	-	-	-	-	-	-
Stage 2	620	674	-	452	471	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	121	227	772	209	229	792	1289	-	-	1292	-	-
Mov Cap-2 Maneuver	121	227	-	209	229	-	-	-	-	-	-	-
Stage 1	455	407	-	700	673	-	-	-	-	-	-	-
Stage 2	411	661	-	377	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	46	20.4	0.6	3.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	148	534	1292	-	-
HCM Lane V/C Ratio	0.015	-	-	0.422	0.574	0.141	-	-
HCM Control Delay (s)	7.8	-	-	46	20.4	8.2	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.9	3.6	0.5	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Future Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	111	0	1	60	0	123	1	382	58	49	282	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	861	828	291	803	805	411	294	0	0	440	0	0
Stage 1	386	386	-	413	413	-	-	-	-	-	-	-
Stage 2	475	442	-	390	392	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	278	306	743	301	317	628	1279	-	-	1120	-	-
Stage 1	641	610	-	614	595	-	-	-	-	-	-	-
Stage 2	574	576	-	632	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	216	292	741	290	303	628	1279	-	-	1120	-	-
Mov Cap-2 Maneuver	216	292	-	290	303	-	-	-	-	-	-	-
Stage 1	640	583	-	613	594	-	-	-	-	-	-	-
Stage 2	461	575	-	602	581	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.7	18.2	0	1.2
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	218	454	1120	-	-
HCM Lane V/C Ratio	0.001	-	-	0.513	0.403	0.044	-	-
HCM Control Delay (s)	7.8	-	-	37.7	18.2	8.4	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	1.9	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1419	228	73	1538	357	138
Future Volume (vph)	1419	228	73	1538	357	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4741	
Flt Permitted	1.00	1.00	0.10	1.00	0.97	
Satd. Flow (perm)	3574	1520	186	3539	4741	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1510	262	78	1602	470	206
RTOR Reduction (vph)	0	83	0	0	54	0
Lane Group Flow (vph)	1510	179	78	1602	622	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	95.1	95.1	110.6	110.6	26.9	
Effective Green, g (s)	96.1	96.1	111.6	111.6	27.9	
Actuated g/C Ratio	0.64	0.64	0.74	0.74	0.19	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2289	973	243	2633	881	
v/s Ratio Prot	c0.42		0.02	c0.45	c0.13	
v/s Ratio Perm		0.12	0.22			
v/c Ratio	0.66	0.18	0.32	0.61	0.71	
Uniform Delay, d1	16.8	11.0	13.1	9.0	57.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.4	1.6	1.1	3.3	
Delay (s)	18.3	11.4	14.8	10.0	60.5	
Level of Service	B	B	B	B	E	
Approach Delay (s)	17.3			10.3	60.5	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	23	58	0	0	0	41	2989	319	379	2572	91
Future Volume (vph)	43	23	58	0	0	0	41	2989	319	379	2572	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.91					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1725					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1725					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	51	43	68	0	0	0	55	3601	358	446	2707	110
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	64	0	0	23
Lane Group Flow (vph)	51	71	0	0	0	0	55	3601	294	446	2707	87
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Effective Green, g (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Actuated g/C Ratio	0.08	0.08					0.06	0.62	0.62	0.21	0.77	0.77
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	132					99	3167	976	369	3867	1240
v/s Ratio Prot	0.03	c0.04					0.03	c0.70		c0.25	0.54	
v/s Ratio Perm									0.19			0.05
v/c Ratio	0.37	0.54					0.56	1.14	0.30	1.21	0.70	0.07
Uniform Delay, d1	65.8	66.7					69.1	28.8	13.5	59.5	8.7	4.3
Progression Factor	1.00	1.00					1.00	1.00	1.00	0.93	0.82	0.68
Incremental Delay, d2	1.7	4.5					6.6	66.1	0.8	108.1	0.3	0.0
Delay (s)	67.5	71.2					75.7	94.8	14.3	163.5	7.5	2.9
Level of Service	E	E					E	F	B	F	A	A
Approach Delay (s)		70.0			0.0			87.4			28.7	
Approach LOS		E			A			F			C	

Intersection Summary			
HCM 2000 Control Delay	61.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	311	113	2603	563	140	2365
Future Volume (vph)	311	113	2603	563	140	2365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	420	133	2799	633	226	2516
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	420	133	2799	633	226	2516
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	27.0	64.0	102.0	96.2	26.5	139.0
Effective Green, g (s)	27.0	53.5	102.0	96.2	26.5	139.0
Actuated g/C Ratio	0.15	0.30	0.57	0.53	0.15	0.77
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	514	470	2910	854	257	4005
v/s Ratio Prot	c0.12	0.08	c0.55	0.40	c0.13	0.49
v/s Ratio Perm						
v/c Ratio	0.82	0.28	0.96	0.74	0.88	0.63
Uniform Delay, d1	74.1	48.5	37.1	32.3	75.2	9.1
Progression Factor	0.11	0.07	1.00	1.00	0.96	0.32
Incremental Delay, d2	7.7	0.3	9.4	5.8	10.9	0.2
Delay (s)	16.0	3.6	46.6	38.1	82.9	3.2
Level of Service	B	A	D	D	F	A
Approach Delay (s)	13.0		45.0			9.7
Approach LOS	B		D			A

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1807	134
Future Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1807	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1734	1599	3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1734	1599	3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	46	99	98	680	224	363	349	2394	348	317	1922	168
RTOR Reduction (vph)	0	0	80	0	0	0	0	0	151	0	0	86
Lane Group Flow (vph)	46	99	18	449	455	363	349	2394	197	317	1922	82
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	Over	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1						6
Actuated Green, G (s)	14.0	14.0	32.3	38.0	38.0	61.5	18.3	67.5	38.0	23.5	75.7	75.7
Effective Green, g (s)	14.0	14.0	32.3	38.0	38.0	61.5	18.3	67.5	38.0	23.5	75.7	75.7
Actuated g/C Ratio	0.08	0.08	0.18	0.21	0.21	0.34	0.10	0.38	0.21	0.13	0.42	0.42
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	350	351	366	635	356	1926	337	231	2117	679
v/s Ratio Prot	0.03	c0.05	0.01	c0.27	0.26	0.12	0.10	c0.47	0.12	c0.18	0.38	
v/s Ratio Perm			0.01			0.11						0.05
v/c Ratio	0.33	0.67	0.05	1.28	1.24	0.57	0.98	1.24	0.59	1.37	0.91	0.12
Uniform Delay, d1	78.6	80.8	61.1	71.0	71.0	48.5	80.7	56.2	63.9	78.2	48.9	31.8
Progression Factor	1.00	1.00	1.00	0.19	0.19	0.06	0.65	0.50	2.03	1.00	1.00	1.00
Incremental Delay, d2	1.4	11.5	0.1	133.5	117.9	0.8	28.9	111.7	1.3	192.5	7.1	0.4
Delay (s)	79.9	92.3	61.2	146.7	131.0	3.5	81.2	140.0	131.0	270.8	56.0	32.2
Level of Service	E	F	E	F	F	A	F	F	F	F	E	C
Approach Delay (s)		77.4			100.0			132.3			82.6	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	107.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	366	134	3032	0	0	2676
Future Volume (vph)	366	134	3032	0	0	2676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	146	3296	0	0	2909
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	398	145	3296	0	0	2909
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	14.0	14.0	51.0			51.0
Effective Green, g (s)	14.0	14.0	51.0			51.0
Actuated g/C Ratio	0.19	0.19	0.68			0.68
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	640	295	3457			3457
v/s Ratio Prot	c0.12		c0.65			0.57
v/s Ratio Perm		0.09				
v/c Ratio	0.62	0.49	0.95			0.84
Uniform Delay, d1	28.1	27.3	10.9			9.0
Progression Factor	0.94	0.94	1.22			1.00
Incremental Delay, d2	1.9	1.3	0.9			2.7
Delay (s)	28.2	27.0	14.3			11.6
Level of Service	C	C	B			B
Approach Delay (s)	27.9		14.3			11.6
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	396	184	13	0	281	0	132	31	16	15	0
Future Volume (vph)	141	396	184	13	0	281	0	132	31	16	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.964				
Flt Protected		0.984		0.950							0.971	
Satd. Flow (prot)	0	1805	1794	1805	0	1599	0	3480	0	0	3505	0
Flt Permitted		0.984		0.950							0.971	
Satd. Flow (perm)	0	1805	1794	1805	0	1599	0	3480	0	0	3505	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	231	501	207	21	0	390	0	153	48	32	21	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	732	207	21	0	390	0	201	0	0	53	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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	381	173	31	119
Future Volume (vph)	0	0	381	173	31	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt					0.881	
Flt Protected				0.967		
Satd. Flow (prot)	0	0	0	3422	3118	0
Flt Permitted				0.967		
Satd. Flow (perm)	0	0	0	3422	3118	0
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	1265	
Travel Time (s)	3.1			16.7	24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	414	188	34	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	602	163	0
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 32.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	560	143	81	412	20	0	0	152	0	0	12
Future Volume (vph)	0	560	143	81	412	20	0	0	152	0	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				0.88			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.97		1.00	0.99				0.85			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1812		1805	5054				3189			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1812		1805	5054				3189			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	636	183	116	502	25	0	0	249	0	0	48
RTOR Reduction (vph)	0	4	0	0	3	0	0	0	212	0	0	0
Lane Group Flow (vph)	0	815	0	116	524	0	0	0	37	0	0	48
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		129.2		27.0	27.0				27.0			26.5
Effective Green, g (s)		122.7		27.0	27.0				27.0			26.5
Actuated g/C Ratio		0.68		0.15	0.15				0.15			0.15
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1235		270	758				478			274
v/s Ratio Prot		c0.45		0.06	c0.10				0.01			0.03
v/s Ratio Perm												
v/c Ratio		0.66		0.43	0.69				0.08			0.18
Uniform Delay, d1		16.6		69.5	72.5				65.8			67.2
Progression Factor		0.06		1.00	1.00				1.00			1.23
Incremental Delay, d2		0.8		1.1	2.7				0.1			0.3
Delay (s)		1.8		70.6	75.3				65.9			83.2
Level of Service		A		E	E				E			F
Approach Delay (s)		1.8			74.4			65.9			83.2	
Approach LOS		A			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Future Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		1.00			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.98			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			1.00				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		1840			5611				1835			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		1840			5611				1835			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	682	18	0	1102	37	0	0	32	0	0	140
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	699	0	0	1137	0	0	0	3	0	0	140
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		95.5			38.0				17.5			23.5
Effective Green, g (s)		75.5			38.0				17.5			23.5
Actuated g/C Ratio		0.42			0.21				0.10			0.13
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		771			1184				178			256
v/s Ratio Prot		c0.38			c0.20							0.07
v/s Ratio Perm									c0.00			
v/c Ratio		0.91			0.96				0.02			0.55
Uniform Delay, d1		49.0			70.2				73.5			73.3
Progression Factor		0.73			1.00				1.00			1.00
Incremental Delay, d2		4.5			17.2				0.0			2.4
Delay (s)		40.5			87.4				73.5			75.6
Level of Service		D			F				E			E
Approach Delay (s)		40.5			87.4			73.5			75.6	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	70.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Future Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	46	6	10	46	8	252	19	215	36	183	250	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1036	926	268	913	920	239	279	0	0	255	0	0
Stage 1	633	633	-	275	275	-	-	-	-	-	-	-
Stage 2	403	293	-	638	645	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	208	271	776	246	273	797	1295	-	-	1298	-	-
Stage 1	464	476	-	714	686	-	-	-	-	-	-	-
Stage 2	620	674	-	452	471	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	121	227	772	209	229	792	1289	-	-	1292	-	-
Mov Cap-2 Maneuver	121	227	-	209	229	-	-	-	-	-	-	-
Stage 1	455	407	-	700	673	-	-	-	-	-	-	-
Stage 2	411	661	-	377	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	46	20.4	0.6	3.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	148	534	1292	-	-
HCM Lane V/C Ratio	0.015	-	-	0.422	0.574	0.141	-	-
HCM Control Delay (s)	7.8	-	-	46	20.4	8.2	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.9	3.6	0.5	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Future Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	111	0	1	60	0	123	1	382	58	49	282	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	861	828	291	803	805	411	294	0	0	440	0	0
Stage 1	386	386	-	413	413	-	-	-	-	-	-	-
Stage 2	475	442	-	390	392	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	278	306	743	301	317	628	1279	-	-	1120	-	-
Stage 1	641	610	-	614	595	-	-	-	-	-	-	-
Stage 2	574	576	-	632	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	216	292	741	290	303	628	1279	-	-	1120	-	-
Mov Cap-2 Maneuver	216	292	-	290	303	-	-	-	-	-	-	-
Stage 1	640	583	-	613	594	-	-	-	-	-	-	-
Stage 2	461	575	-	602	581	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.7	18.2	0	1.2
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	218	454	1120	-	-
HCM Lane V/C Ratio	0.001	-	-	0.513	0.403	0.044	-	-
HCM Control Delay (s)	7.8	-	-	37.7	18.2	8.4	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	1.9	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1419	228	73	1538	357	138
Future Volume (vph)	1419	228	73	1538	357	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4741	
Flt Permitted	1.00	1.00	0.10	1.00	0.97	
Satd. Flow (perm)	3574	1520	186	3539	4741	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1510	262	78	1602	470	206
RTOR Reduction (vph)	0	83	0	0	54	0
Lane Group Flow (vph)	1510	179	78	1602	622	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	95.1	95.1	110.6	110.6	26.9	
Effective Green, g (s)	96.1	96.1	111.6	111.6	27.9	
Actuated g/C Ratio	0.64	0.64	0.74	0.74	0.19	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2289	973	243	2633	881	
v/s Ratio Prot	c0.42		0.02	c0.45	c0.13	
v/s Ratio Perm		0.12	0.22			
v/c Ratio	0.66	0.18	0.32	0.61	0.71	
Uniform Delay, d1	16.8	11.0	13.1	9.0	57.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.4	1.6	1.1	3.3	
Delay (s)	18.3	11.4	14.8	10.0	60.5	
Level of Service	B	B	B	B	E	
Approach Delay (s)	17.3			10.3	60.5	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	23	58	0	0	0	41	2989	319	379	2572	91
Future Volume (vph)	43	23	58	0	0	0	41	2989	319	379	2572	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.91					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1725					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1725					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	51	43	68	0	0	0	55	3601	358	446	2707	110
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	64	0	0	23
Lane Group Flow (vph)	51	71	0	0	0	0	55	3601	294	446	2707	87
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Effective Green, g (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Actuated g/C Ratio	0.08	0.08					0.06	0.62	0.62	0.21	0.77	0.77
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	132					99	3167	976	369	3867	1240
v/s Ratio Prot	0.03	c0.04					0.03	c0.70		c0.25	0.54	
v/s Ratio Perm									0.19			0.05
v/c Ratio	0.37	0.54					0.56	1.14	0.30	1.21	0.70	0.07
Uniform Delay, d1	65.8	66.7					69.1	28.8	13.5	59.5	8.7	4.3
Progression Factor	1.00	1.00					1.00	1.00	1.00	0.93	0.82	0.68
Incremental Delay, d2	1.7	4.5					6.6	66.1	0.8	108.1	0.3	0.0
Delay (s)	67.5	71.2					75.7	94.8	14.3	163.5	7.5	2.9
Level of Service	E	E					E	F	B	F	A	A
Approach Delay (s)		70.0			0.0			87.4			28.7	
Approach LOS		E			A			F			C	

Intersection Summary			
HCM 2000 Control Delay	61.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	311	113	2603	563	140	2365
Future Volume (vph)	311	113	2603	563	140	2365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	420	133	2799	633	226	2516
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	420	133	2799	633	226	2516
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	27.0	64.0	102.0	96.2	26.5	139.0
Effective Green, g (s)	27.0	53.5	102.0	96.2	26.5	139.0
Actuated g/C Ratio	0.15	0.30	0.57	0.53	0.15	0.77
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	514	470	2910	854	257	4005
v/s Ratio Prot	c0.12	0.08	c0.55	0.40	c0.13	0.49
v/s Ratio Perm						
v/c Ratio	0.82	0.28	0.96	0.74	0.88	0.63
Uniform Delay, d1	74.1	48.5	37.1	32.3	75.2	9.1
Progression Factor	0.11	0.07	1.00	1.00	0.96	0.32
Incremental Delay, d2	7.7	0.3	9.4	5.8	10.9	0.2
Delay (s)	16.0	3.6	46.6	38.1	82.8	3.2
Level of Service	B	A	D	D	F	A
Approach Delay (s)	13.0		45.0			9.7
Approach LOS	B		D			A

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1807	134
Future Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1807	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1734	1599	3502	5136	1599	1770	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1734	1599	3502	5136	1599	1770	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	46	99	98	680	224	363	349	2394	348	317	1922	168
RTOR Reduction (vph)	0	0	81	0	0	0	0	0	151	0	0	85
Lane Group Flow (vph)	46	99	17	449	455	363	349	2394	197	317	1922	83
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	Over	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1						6
Actuated Green, G (s)	14.0	14.0	31.5	38.0	38.0	61.5	17.5	67.5	38.0	23.5	76.5	76.5
Effective Green, g (s)	14.0	14.0	31.5	38.0	38.0	61.5	17.5	67.5	38.0	23.5	76.5	76.5
Actuated g/C Ratio	0.08	0.08	0.18	0.21	0.21	0.34	0.10	0.38	0.21	0.13	0.42	0.42
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	342	351	366	635	340	1926	337	231	2140	686
v/s Ratio Prot	0.03	c0.05	0.00	c0.27	0.26	0.12	0.10	c0.47	0.12	c0.18	0.38	
v/s Ratio Perm			0.01			0.11						0.05
v/c Ratio	0.33	0.67	0.05	1.28	1.24	0.57	1.03	1.24	0.59	1.37	0.90	0.12
Uniform Delay, d1	78.6	80.8	61.8	71.0	71.0	48.5	81.2	56.2	63.9	78.2	48.1	31.4
Progression Factor	1.00	1.00	1.00	0.19	0.19	0.06	0.65	0.50	2.03	1.00	1.00	1.00
Incremental Delay, d2	1.4	11.5	0.1	133.5	117.9	0.8	41.7	111.7	1.3	192.5	6.5	0.4
Delay (s)	79.9	92.3	61.9	146.7	131.0	3.5	94.5	140.0	131.0	270.8	54.6	31.7
Level of Service	E	F	E	F	F	A	F	F	F	F	D	C
Approach Delay (s)		77.7			100.0			133.8			81.5	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	107.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	366	134	3032	0	0	2676
Future Volume (vph)	366	134	3032	0	0	2676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	146	3296	0	0	2909
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	398	145	3296	0	0	2909
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	14.0	14.0	51.0			51.0
Effective Green, g (s)	14.0	14.0	51.0			51.0
Actuated g/C Ratio	0.19	0.19	0.68			0.68
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	640	295	3457			3457
v/s Ratio Prot	c0.12		c0.65			0.57
v/s Ratio Perm		0.09				
v/c Ratio	0.62	0.49	0.95			0.84
Uniform Delay, d1	28.1	27.3	10.9			9.0
Progression Factor	0.94	0.94	1.22			1.00
Incremental Delay, d2	1.9	1.3	0.9			2.7
Delay (s)	28.2	27.0	14.3			11.6
Level of Service	C	C	B			B
Approach Delay (s)	27.9		14.3			11.6
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	396	184	13	0	261	0	122	31	10	10	0
Future Volume (vph)	131	396	184	13	0	261	0	122	31	10	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		250	0		0	0		0
Storage Lanes	0		1	1		1	0		0	0		0
Taper Length (ft)	75			75			75			75		
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
Ped Bike Factor												
Frt			0.850			0.850		0.966				
Flt Protected		0.985		0.950							0.971	
Satd. Flow (prot)	0	1808	1794	1805	0	1599	0	1835	0	0	1845	0
Flt Permitted		0.985		0.950							0.971	
Satd. Flow (perm)	0	1808	1794	1805	0	1599	0	1835	0	0	1845	0
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		125			577			522			733	
Travel Time (s)		2.4			11.2			10.2			14.3	
Confl. Peds. (#/hr)				1		1	1		10	10		
Peak Hour Factor	0.61	0.79	0.89	0.62	0.92	0.72	0.92	0.86	0.64	0.50	0.72	0.70
Heavy Vehicles (%)	7%	2%	2%	0%	2%	1%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	215	501	207	21	0	363	0	142	48	20	14	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	716	207	21	0	363	0	190	0	0	34	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			12			10	
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	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20		9	20		9	20		9	20		9
Sign Control		Free			Stop			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 64.2%		ICU Level of Service C
Analysis Period (min) 15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	381	133	20	78
Future Volume (vph)	0	0	381	133	20	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	300			275
Storage Lanes	0	0	1			1
Taper Length (ft)	75		125			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1770	1863	1863	1583
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1770	1863	1863	1583
Link Speed (mph)	30			30	35	
Link Distance (ft)	138			733	575	
Travel Time (s)	3.1			16.7	11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	414	145	22	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	414	145	22	85
Enter Blocked Intersection	No	No	1 veh	No	No	1 veh
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			12	8	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	20			9
Sign Control	Stop			Free	Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 32.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	560	110	62	412	20	0	0	112	0	0	12
Future Volume (vph)	0	560	110	62	412	20	0	0	112	0	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	16	12	12	16
Total Lost time (s)		10.5		7.5	7.5				7.5			10.5
Lane Util. Factor		1.00		1.00	0.91				1.00			1.00
Frpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Flpb, ped/bikes		1.00		1.00	1.00				1.00			1.00
Frt		0.98		1.00	0.99				0.86			0.86
Flt Protected		1.00		0.95	1.00				1.00			1.00
Satd. Flow (prot)		1825		1805	5054				1844			1863
Flt Permitted		1.00		0.95	1.00				1.00			1.00
Satd. Flow (perm)		1825		1805	5054				1844			1863
Peak-hour factor, PHF	0.25	0.88	0.78	0.70	0.82	0.81	0.92	0.92	0.61	0.38	0.75	0.25
Adj. Flow (vph)	0	636	141	89	502	25	0	0	184	0	0	48
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	157	0	0	0
Lane Group Flow (vph)	0	774	0	89	527	0	0	0	27	0	0	48
Confl. Peds. (#/hr)									2	2		
Heavy Vehicles (%)	0%	1%	4%	0%	2%	0%	2%	2%	1%	0%	0%	0%
Turn Type		NA		Split	NA				Over			Prot
Protected Phases		1 9		8	8				8			1
Permitted Phases												
Actuated Green, G (s)		129.4		26.8	26.8				26.8			23.5
Effective Green, g (s)		122.9		26.8	26.8				26.8			23.5
Actuated g/C Ratio		0.68		0.15	0.15				0.15			0.13
Clearance Time (s)				7.5	7.5				7.5			10.5
Vehicle Extension (s)				3.0	3.0				3.0			3.0
Lane Grp Cap (vph)		1246		268	752				274			243
v/s Ratio Prot		c0.42		0.05	c0.10				0.01			0.03
v/s Ratio Perm												
v/c Ratio		0.62		0.33	0.70				0.10			0.20
Uniform Delay, d1		15.7		68.6	72.8				66.2			69.8
Progression Factor		0.04		1.00	1.00				1.00			1.20
Incremental Delay, d2		0.7		0.7	3.0				0.2			0.4
Delay (s)		1.4		69.3	75.8				66.3			84.2
Level of Service		A		E	E				E			F
Approach Delay (s)		1.4			74.8			66.3			84.2	
Approach LOS		A			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Future Volume (vph)	0	614	12	0	992	24	0	0	20	0	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	12	12	16
Total Lost time (s)		10.5			10.0				7.5			10.5
Lane Util. Factor		0.95			*1.00				1.00			1.00
Frpb, ped/bikes		1.00			1.00				0.99			1.00
Flpb, ped/bikes		1.00			1.00				1.00			1.00
Frt		1.00			1.00				0.86			0.92
Flt Protected		1.00			1.00				1.00			1.00
Satd. Flow (prot)		3494			5611				1835			1961
Flt Permitted		1.00			1.00				1.00			1.00
Satd. Flow (perm)		3494			5611				1835			1961
Peak-hour factor, PHF	0.92	0.90	0.67	0.92	0.90	0.65	0.92	0.92	0.62	0.92	0.92	0.82
Adj. Flow (vph)	0	682	18	0	1102	37	0	0	32	0	0	140
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	699	0	0	1139	0	0	0	3	0	0	140
Confl. Peds. (#/hr)						5	1		1			
Heavy Vehicles (%)	2%	3%	0%	2%	1%	0%	2%	2%	0%	2%	2%	1%
Turn Type		NA			NA				Perm			Prot
Protected Phases		1 3 4			4							1
Permitted Phases									5			
Actuated Green, G (s)		89.5			41.0				18.5			14.5
Effective Green, g (s)		69.5			41.0				18.5			14.5
Actuated g/C Ratio		0.39			0.23				0.10			0.08
Clearance Time (s)					10.0				7.5			10.5
Vehicle Extension (s)					3.0				3.0			3.0
Lane Grp Cap (vph)		1349			1278				188			157
v/s Ratio Prot		c0.20			c0.20							c0.07
v/s Ratio Perm									c0.00			
v/c Ratio		0.52			0.89				0.02			0.89
Uniform Delay, d1		42.4			67.3				72.6			82.0
Progression Factor		0.51			1.00				1.00			1.00
Incremental Delay, d2		0.2			8.2				0.0			41.9
Delay (s)		21.8			75.5				72.6			123.8
Level of Service		C			E				E			F
Approach Delay (s)		21.8			75.5			72.6			123.8	
Approach LOS		C			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Future Vol, veh/h	30	3	6	39	2	212	8	159	14	148	145	15
Conflicting Peds, #/hr	2	0	1	1	0	2	3	0	4	3	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	50	58	85	25	84	42	74	39	81	58	59
Heavy Vehicles, %	4	0	0	10	0	3	0	3	0	4	3	5
Mvmt Flow	46	6	10	46	8	252	19	215	36	183	250	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1036	926	268	913	920	239	279	0	0	255	0	0
Stage 1	633	633	-	275	275	-	-	-	-	-	-	-
Stage 2	403	293	-	638	645	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.2	7.2	6.5	6.23	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.2	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.3	3.59	4	3.327	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	208	271	776	246	273	797	1295	-	-	1298	-	-
Stage 1	464	476	-	714	686	-	-	-	-	-	-	-
Stage 2	620	674	-	452	471	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	121	227	772	209	229	792	1289	-	-	1292	-	-
Mov Cap-2 Maneuver	121	227	-	209	229	-	-	-	-	-	-	-
Stage 1	455	407	-	700	673	-	-	-	-	-	-	-
Stage 2	411	661	-	377	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	46	20.4	0.6	3.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	148	534	1292	-	-
HCM Lane V/C Ratio	0.015	-	-	0.422	0.574	0.141	-	-
HCM Control Delay (s)	7.8	-	-	46	20.4	8.2	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.9	3.6	0.5	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Future Vol, veh/h	42	0	1	48	0	102	1	351	49	35	259	7
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	91	82	80	88	83	72	92	84	71	92	58
Heavy Vehicles, %	0	2	4	3	1	8	0	0	6	2	0	0
Mvmt Flow	111	0	1	60	0	123	1	382	58	49	282	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	861	828	291	803	805	411	294	0	0	440	0	0
Stage 1	386	386	-	413	413	-	-	-	-	-	-	-
Stage 2	475	442	-	390	392	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.24	7.13	6.51	6.28	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.13	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.336	3.527	4.009	3.372	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	278	306	743	301	317	628	1279	-	-	1120	-	-
Stage 1	641	610	-	614	595	-	-	-	-	-	-	-
Stage 2	574	576	-	632	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	216	292	741	290	303	628	1279	-	-	1120	-	-
Mov Cap-2 Maneuver	216	292	-	290	303	-	-	-	-	-	-	-
Stage 1	640	583	-	613	594	-	-	-	-	-	-	-
Stage 2	461	575	-	602	581	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.7	18.2	0	1.2
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	218	454	1120	-	-
HCM Lane V/C Ratio	0.001	-	-	0.513	0.403	0.044	-	-
HCM Control Delay (s)	7.8	-	-	37.7	18.2	8.4	-	-
HCM Lane LOS	A	-	-	E	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.6	1.9	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1419	228	73	1538	357	138
Future Volume (vph)	1419	228	73	1538	357	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5	5.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.94	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	3574	1520	1770	3539	4741	
Flt Permitted	1.00	1.00	0.10	1.00	0.97	
Satd. Flow (perm)	3574	1520	186	3539	4741	
Peak-hour factor, PHF	0.94	0.87	0.94	0.96	0.76	0.67
Adj. Flow (vph)	1510	262	78	1602	470	206
RTOR Reduction (vph)	0	83	0	0	54	0
Lane Group Flow (vph)	1510	179	78	1602	622	0
Confl. Peds. (#/hr)		2	2			2
Heavy Vehicles (%)	1%	3%	2%	2%	4%	2%
Turn Type	NA	Perm	pm+pt	NA	Prot	
Protected Phases	6		5	2	4	
Permitted Phases		6	2			
Actuated Green, G (s)	95.1	95.1	110.6	110.6	26.9	
Effective Green, g (s)	96.1	96.1	111.6	111.6	27.9	
Actuated g/C Ratio	0.64	0.64	0.74	0.74	0.19	
Clearance Time (s)	6.5	6.5	6.5	6.5	6.0	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	2289	973	243	2633	881	
v/s Ratio Prot	c0.42		0.02	c0.45	c0.13	
v/s Ratio Perm		0.12	0.22			
v/c Ratio	0.66	0.18	0.32	0.61	0.71	
Uniform Delay, d1	16.8	11.0	13.1	9.0	57.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.4	1.6	1.1	3.3	
Delay (s)	18.3	11.4	14.8	10.0	60.5	
Level of Service	B	B	B	B	E	
Approach Delay (s)	17.3			10.3	60.5	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	23	58	0	0	0	41	2989	309	379	2531	91
Future Volume (vph)	43	23	58	0	0	0	41	2989	309	379	2531	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00					1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.91					1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1725					1805	5136	1583	1787	5036	1615
Flt Permitted	0.95	1.00					0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1725					1805	5136	1583	1787	5036	1615
Peak-hour factor, PHF	0.84	0.54	0.85	0.85	0.95	0.83	0.75	0.83	0.89	0.85	0.95	0.83
Adj. Flow (vph)	51	43	68	0	0	0	55	3601	347	446	2664	110
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	62	0	0	23
Lane Group Flow (vph)	51	71	0	0	0	0	55	3601	285	446	2664	87
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	1%	2%	1%	3%	0%
Turn Type	Split	NA					Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4					5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Effective Green, g (s)	11.5	11.5					8.3	92.5	92.5	31.0	115.2	115.2
Actuated g/C Ratio	0.08	0.08					0.06	0.62	0.62	0.21	0.77	0.77
Clearance Time (s)	5.0	5.0					5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	132					99	3167	976	369	3867	1240
v/s Ratio Prot	0.03	c0.04					0.03	c0.70		c0.25	0.53	
v/s Ratio Perm									0.18			0.05
v/c Ratio	0.37	0.54					0.56	1.14	0.29	1.21	0.69	0.07
Uniform Delay, d1	65.8	66.7					69.1	28.8	13.4	59.5	8.6	4.3
Progression Factor	1.00	1.00					1.00	1.00	1.00	0.93	0.82	0.69
Incremental Delay, d2	1.7	4.5					6.6	66.1	0.8	108.5	0.3	0.0
Delay (s)	67.5	71.2					75.7	94.8	14.2	164.0	7.3	3.0
Level of Service	E	E					E	F	B	F	A	A
Approach Delay (s)		70.0			0.0			87.6			28.9	
Approach LOS		E			A			F			C	

Intersection Summary			
HCM 2000 Control Delay	61.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	311	113	2603	563	107	2365
Future Volume (vph)	311	113	2603	563	107	2365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	2.0	6.5	10.5	6.5
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5136	1599	1752	5187
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5136	1599	1752	5187
Peak-hour factor, PHF	0.74	0.85	0.93	0.89	0.62	0.94
Adj. Flow (vph)	420	133	2799	633	173	2516
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	420	133	2799	633	173	2516
Heavy Vehicles (%)	2%	2%	1%	1%	3%	0%
Turn Type	Prot	pt+ov	NA	custom	Prot	NA
Protected Phases	8	8 1	2 9	9	1	6
Permitted Phases						
Actuated Green, G (s)	26.8	60.8	105.2	99.4	23.5	139.2
Effective Green, g (s)	26.8	50.3	105.2	99.4	23.5	139.2
Actuated g/C Ratio	0.15	0.28	0.58	0.55	0.13	0.77
Clearance Time (s)	7.5			6.5	10.5	6.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	511	442	3001	883	228	4011
v/s Ratio Prot	c0.12	0.08	c0.55	0.40	0.10	c0.49
v/s Ratio Perm						
v/c Ratio	0.82	0.30	0.93	0.72	0.76	0.63
Uniform Delay, d1	74.3	51.0	34.2	29.9	75.5	9.0
Progression Factor	0.10	0.06	1.00	1.00	0.90	0.21
Incremental Delay, d2	8.1	0.3	6.1	5.0	4.5	0.2
Delay (s)	15.9	3.4	40.3	34.8	72.4	2.2
Level of Service	B	A	D	C	E	A
Approach Delay (s)	12.8		39.3			6.7
Approach LOS	B		D			A

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	30.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1774	134
Future Volume (vph)	33	81	86	612	197	298	244	2155	317	228	1774	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1900	1583	1665	1734	1599	3502	5136	1599	3433	5036	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	1900	1583	1665	1734	1599	3502	5136	1599	3433	5036	1615
Peak-hour factor, PHF	0.71	0.82	0.88	0.90	0.88	0.82	0.70	0.90	0.91	0.72	0.94	0.80
Adj. Flow (vph)	46	99	98	680	224	363	349	2394	348	317	1887	168
RTOR Reduction (vph)	0	0	80	0	0	88	0	0	0	0	0	88
Lane Group Flow (vph)	46	99	18	449	455	275	349	2394	348	317	1887	80
Heavy Vehicles (%)	0%	0%	2%	3%	0%	1%	0%	1%	1%	2%	3%	0%
Turn Type	Split	NA	pm+ov	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3	5	4	4	4	5	2	4	1	6	
Permitted Phases			3			1			5			6
Actuated Green, G (s)	14.0	14.0	32.5	41.0	41.0	55.5	18.5	73.5	59.5	14.5	72.5	72.5
Effective Green, g (s)	14.0	14.0	32.5	41.0	41.0	55.5	18.5	73.5	59.5	14.5	72.5	72.5
Actuated g/C Ratio	0.08	0.08	0.18	0.23	0.23	0.31	0.10	0.41	0.33	0.08	0.40	0.40
Clearance Time (s)	10.0	10.0	7.5	10.0	10.0	10.0	7.5	6.5	10.0	10.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	147	351	379	394	581	359	2097	528	276	2028	650
v/s Ratio Prot	0.03	c0.05	0.01	c0.27	0.26	0.11	0.10	c0.47	0.15	0.09	c0.37	
v/s Ratio Perm			0.01			0.06			0.07			0.05
v/c Ratio	0.33	0.67	0.05	1.18	1.15	0.47	0.97	1.14	0.66	1.15	0.93	0.12
Uniform Delay, d1	78.6	80.8	61.0	69.5	69.5	50.4	80.5	53.2	51.6	82.8	51.3	33.8
Progression Factor	1.00	1.00	1.00	0.18	0.18	0.17	0.67	0.52	1.77	1.00	1.00	1.00
Incremental Delay, d2	1.4	11.5	0.1	96.0	83.7	0.3	28.0	67.3	1.6	100.4	9.2	0.4
Delay (s)	79.9	92.3	61.0	108.4	96.0	9.0	82.3	94.9	92.9	183.2	60.5	34.2
Level of Service	E	F	E	F	F	A	F	F	F	F	E	C
Approach Delay (s)		77.4			75.5			93.3			75.0	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	83.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	325	134	3032	0	0	2676
Future Volume (vph)	325	134	3032	0	0	2676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0			5.0
Lane Util. Factor	0.97	1.00	0.91			0.91
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3433	1583	5085			5085
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3433	1583	5085			5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	146	3296	0	0	2909
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	353	145	3296	0	0	2909
Turn Type	Prot	Perm	NA			NA
Protected Phases	8		2			6
Permitted Phases		8				
Actuated Green, G (s)	13.2	13.2	51.8			51.8
Effective Green, g (s)	13.2	13.2	51.8			51.8
Actuated g/C Ratio	0.18	0.18	0.69			0.69
Clearance Time (s)	5.0	5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	604	278	3512			3512
v/s Ratio Prot	c0.10		c0.65			0.57
v/s Ratio Perm		0.09				
v/c Ratio	0.58	0.52	0.94			0.83
Uniform Delay, d1	28.4	28.0	10.2			8.4
Progression Factor	0.93	0.94	1.27			1.00
Incremental Delay, d2	1.4	1.8	0.7			2.4
Delay (s)	28.0	28.0	13.6			10.8
Level of Service	C	C	B			B
Approach Delay (s)	28.0		13.6			10.8
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix I

SimTraffic Queue Reports

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LTR
Maximum Queue (ft)	59	25	39	93	49	218
Average Queue (ft)	10	1	10	42	17	74
95th Queue (ft)	40	10	29	73	34	168
Link Distance (ft)	18	18	529		469	310
Upstream Blk Time (%)	0	0				0
Queuing Penalty (veh)	1	0				1
Storage Bay Dist (ft)				250		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	30	84	6	47
Average Queue (ft)	8	42	0	9
95th Queue (ft)	30	69	4	34
Link Distance (ft)	87	397	1740	496
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	SB
Directions Served	L	T
Maximum Queue (ft)	86	67
Average Queue (ft)	14	30
95th Queue (ft)	54	59
Link Distance (ft)		265
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	NB	SB
Directions Served	TR	L	T	T	TR	R	LTR
Maximum Queue (ft)	29	65	198	166	50	64	29
Average Queue (ft)	3	5	76	24	2	25	8
95th Queue (ft)	20	28	167	110	27	44	29
Link Distance (ft)	56		867			721	888
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)		50		150	150		
Storage Blk Time (%)			26	1	0		
Queuing Penalty (veh)			43	1	0		

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	35	234	293	243	26	84
Average Queue (ft)	1	90	159	87	6	33
95th Queue (ft)	15	233	258	216	23	60
Link Distance (ft)	44		454	454	888	1740
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	1					
Storage Bay Dist (ft)		150				
Storage Blk Time (%)		6	16			
Queuing Penalty (veh)		6	15			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	51	70	4	49	6
Average Queue (ft)	15	29	0	12	0
95th Queue (ft)	38	56	2	39	4
Link Distance (ft)	72	329	496	321	321
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	LR
Maximum Queue (ft)	247	220	84	99	157	141	171	170
Average Queue (ft)	109	54	32	48	71	49	69	81
95th Queue (ft)	218	152	70	85	143	114	137	154
Link Distance (ft)	470	470			1337	1337	321	321
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			250	400				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Zone Summary

Zone wide Queuing Penalty: 68

Intersection: 5: Dow Jones Lot

Movement	NB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	184	57	121
Average Queue (ft)	49	25	50
95th Queue (ft)	134	51	94
Link Distance (ft)		523	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		275
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LT
Maximum Queue (ft)	58	21	26	100	66	32
Average Queue (ft)	11	1	9	45	18	11
95th Queue (ft)	39	10	27	78	41	25
Link Distance (ft)	17	17	526		469	666
Upstream Blk Time (%)	1	0				
Queuing Penalty (veh)	1	0				
Storage Bay Dist (ft)				250		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	30	104	11	73
Average Queue (ft)	9	44	1	16
95th Queue (ft)	30	76	10	51
Link Distance (ft)	87	397	1740	496
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	NB	SB
Directions Served	TR	L	T	T	TR	R	LTR
Maximum Queue (ft)	40	65	295	219	186	61	33
Average Queue (ft)	3	8	138	69	21	29	12
95th Queue (ft)	20	39	258	209	105	54	34
Link Distance (ft)	56		867			721	888
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)		50		150	150		
Storage Blk Time (%)		0	44	5	0		
Queuing Penalty (veh)		0	101	6	0		

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	31	275	436	406	26	106
Average Queue (ft)	1	202	280	215	7	41
95th Queue (ft)	14	310	446	361	25	83
Link Distance (ft)	44		454	454	888	1740
Upstream Blk Time (%)	0		4	1		
Queuing Penalty (veh)	0		0	0		
Storage Bay Dist (ft)		150				
Storage Blk Time (%)		29	56			
Queuing Penalty (veh)		40	78			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	63	64	27	53	6
Average Queue (ft)	18	33	1	15	0
95th Queue (ft)	42	59	12	44	4
Link Distance (ft)	72	329	496	321	321
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	LR
Maximum Queue (ft)	380	310	143	172	200	201	201	221
Average Queue (ft)	154	100	43	77	91	78	83	94
95th Queue (ft)	306	240	95	142	182	161	158	171
Link Distance (ft)	470	470			1337	1337	321	321
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)			250	400				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		1						

Zone Summary

Zone wide Queuing Penalty: 229

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LT
Maximum Queue (ft)	55	31	30	109	58	32
Average Queue (ft)	11	1	10	46	19	12
95th Queue (ft)	40	12	28	81	41	26
Link Distance (ft)	17	17	526		469	666
Upstream Blk Time (%)	1	0				
Queuing Penalty (veh)	1	0				
Storage Bay Dist (ft)				250		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	29	79	18	68	6
Average Queue (ft)	8	41	1	17	0
95th Queue (ft)	29	66	8	48	4
Link Distance (ft)	81	395			497
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			60	100	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	175	56	95
Average Queue (ft)	49	25	46
95th Queue (ft)	131	51	85
Link Distance (ft)		521	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		275
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	B1	B1	NB	SB
Directions Served	TR	L	T	T	TR	T	T	R	R
Maximum Queue (ft)	34	70	210	236	353	393	447	207	33
Average Queue (ft)	3	14	132	97	273	59	173	110	7
95th Queue (ft)	18	50	197	181	422	269	484	188	35
Link Distance (ft)	69		259	259	259	555	555	723	889
Upstream Blk Time (%)	0			0	69	0	7		
Queuing Penalty (veh)	2			0	0	0	0		
Storage Bay Dist (ft)		50							
Storage Blk Time (%)		2	59						
Queuing Penalty (veh)		2	12						

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	79	174	572	505	35	161
Average Queue (ft)	18	162	415	293	6	78
95th Queue (ft)	58	192	628	504	24	151
Link Distance (ft)	43		571	571	889	1740
Upstream Blk Time (%)	10		14	10		
Queuing Penalty (veh)	69		0	0		
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		66	90			
Queuing Penalty (veh)		93	126			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	58	79	18	5	61	28
Average Queue (ft)	24	34	1	0	16	1
95th Queue (ft)	48	62	9	3	48	12
Link Distance (ft)	81	320		497		337
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			100		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	LR
Maximum Queue (ft)	360	308	133	167	191	186	114	153	185
Average Queue (ft)	203	155	54	63	99	79	34	72	89
95th Queue (ft)	335	302	99	126	176	159	85	123	157
Link Distance (ft)	474	474			1331	1331		337	337
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			250	400			100		
Storage Blk Time (%)		0					0	3	
Queuing Penalty (veh)		2					0	2	

Zone Summary

Zone wide Queuing Penalty: 308

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LT
Maximum Queue (ft)	74	40	26	123	58	49
Average Queue (ft)	13	3	10	52	21	14
95th Queue (ft)	46	20	28	92	43	33
Link Distance (ft)	17	17	526		469	666
Upstream Blk Time (%)	1	0				
Queuing Penalty (veh)	2	0				
Storage Bay Dist (ft)				250		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	34	111	23	6	56
Average Queue (ft)	10	44	1	0	18
95th Queue (ft)	33	79	10	4	48
Link Distance (ft)	81	395		1740	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			60		100
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	153	74	106
Average Queue (ft)	41	28	49
95th Queue (ft)	114	56	89
Link Distance (ft)		1193	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		275
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	B1	B1	NB	SB
Directions Served	TR	L	T	T	TR	T	T	R	R
Maximum Queue (ft)	35	74	216	196	361	477	550	263	24
Average Queue (ft)	3	18	132	96	283	54	253	144	2
95th Queue (ft)	17	63	204	183	419	272	617	239	14
Link Distance (ft)	68		260	260	260	555	555	2106	889
Upstream Blk Time (%)	0			0	73	0	16		
Queuing Penalty (veh)	0			0	0	0	0		
Storage Bay Dist (ft)		50							
Storage Blk Time (%)		4	60						
Queuing Penalty (veh)		4	16						

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	63	175	577	439	36	164
Average Queue (ft)	21	162	428	293	6	76
95th Queue (ft)	58	203	648	493	24	141
Link Distance (ft)	43		571	571	889	1740
Upstream Blk Time (%)	12		11	1		
Queuing Penalty (veh)	83		0	0		
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		59	89			
Queuing Penalty (veh)		82	125			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	54	68	14	6	48	16
Average Queue (ft)	25	31	1	0	14	1
95th Queue (ft)	48	59	6	4	42	10
Link Distance (ft)	81	320		497		337
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	LR
Maximum Queue (ft)	438	341	148	191	215	202	110	148	179
Average Queue (ft)	228	165	58	79	98	78	38	75	89
95th Queue (ft)	373	313	112	144	182	157	90	126	156
Link Distance (ft)	474	474			1331	1331		337	337
Upstream Blk Time (%)	0								
Queuing Penalty (veh)	0								
Storage Bay Dist (ft)			250	400			100		
Storage Blk Time (%)		1					0	3	
Queuing Penalty (veh)		2					0	2	

Zone Summary

Zone wide Queuing Penalty: 316

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	R	T	TR	LT	T
Maximum Queue (ft)	59	34	30	86	46	27	32	13
Average Queue (ft)	13	1	9	42	17	6	13	2
95th Queue (ft)	44	18	26	70	34	16	26	8
Link Distance (ft)	11	11	519		470	470	663	663
Upstream Blk Time (%)	1	0						
Queuing Penalty (veh)	1	0						
Storage Bay Dist (ft)				250				
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	34	93	12	4	57	6
Average Queue (ft)	12	43	1	0	13	0
95th Queue (ft)	36	73	7	3	43	6
Link Distance (ft)	81	395		1740		497
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			60		100	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	NB	SB	SB
Directions Served	LT	T	T	R
Maximum Queue (ft)	182	24	49	124
Average Queue (ft)	51	1	25	48
95th Queue (ft)	140	17	50	94
Link Distance (ft)	663	663	1187	1187
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	B1	B1	NB	NB	SB
Directions Served	TR	L	T	T	TR	T	T	R	R	R
Maximum Queue (ft)	28	74	213	209	327	324	431	131	137	19
Average Queue (ft)	3	21	128	96	245	28	123	60	69	2
95th Queue (ft)	16	66	195	181	399	174	378	116	123	14
Link Distance (ft)	54		242	242	242	555	555	2100	2100	889
Upstream Blk Time (%)			0	0	62		1			
Queuing Penalty (veh)			0	0	0		0			
Storage Bay Dist (ft)		50								
Storage Blk Time (%)		4	50							
Queuing Penalty (veh)		4	13							

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	64	175	590	594	30	158
Average Queue (ft)	17	158	514	420	6	78
95th Queue (ft)	54	196	685	662	23	142
Link Distance (ft)	43		571	571	889	1740
Upstream Blk Time (%)	10		41	30		
Queuing Penalty (veh)	66		0	0		
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		63	92			
Queuing Penalty (veh)		88	128			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	52	70	14	1	39	6
Average Queue (ft)	24	29	1	0	14	0
95th Queue (ft)	47	55	6	1	39	4
Link Distance (ft)	81	320		497		337
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	LR
Maximum Queue (ft)	465	358	124	159	192	194	108	136	154
Average Queue (ft)	209	150	53	63	106	78	34	70	81
95th Queue (ft)	374	303	102	118	179	162	86	116	137
Link Distance (ft)	474	474			1331	1331		337	337
Upstream Blk Time (%)	0								
Queuing Penalty (veh)	0								
Storage Bay Dist (ft)			250	400			100		
Storage Blk Time (%)		1					0	2	
Queuing Penalty (veh)		2					0	1	

Zone Summary

Zone wide Queuing Penalty: 305

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LTR
Maximum Queue (ft)	36	16	26	108	87	140
Average Queue (ft)	11	1	6	45	31	46
95th Queue (ft)	36	8	22	80	68	105
Link Distance (ft)	18	18	529		469	310
Upstream Blk Time (%)	1	0				
Queuing Penalty (veh)	2	0				
Storage Bay Dist (ft)				250		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	45	88	18	43
Average Queue (ft)	22	51	1	14
95th Queue (ft)	47	80	7	40
Link Distance (ft)	87	397	1740	496
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	SB
Directions Served	L	T
Maximum Queue (ft)	77	75
Average Queue (ft)	14	28
95th Queue (ft)	57	60
Link Distance (ft)		265
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	NB	SB
Directions Served	TR	L	T	T	TR	R	LTR
Maximum Queue (ft)	59	66	281	225	123	54	50
Average Queue (ft)	6	19	149	85	16	23	16
95th Queue (ft)	31	63	270	236	94	40	42
Link Distance (ft)	56		867			721	888
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	1						
Storage Bay Dist (ft)		50		150	150		
Storage Blk Time (%)		1	47	6	0		
Queuing Penalty (veh)		2	114	9	0		

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	36	275	498	484	30	263
Average Queue (ft)	2	267	471	467	9	90
95th Queue (ft)	17	295	487	480	29	227
Link Distance (ft)	44		454	454	888	1740
Upstream Blk Time (%)	0		97	99		
Queuing Penalty (veh)	0		0	0		
Storage Bay Dist (ft)		150				
Storage Blk Time (%)		85	98			
Queuing Penalty (veh)		199	229			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	45	72	11	35	21
Average Queue (ft)	18	39	1	10	1
95th Queue (ft)	38	63	7	33	11
Link Distance (ft)	72	329	496	321	321
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	LR
Maximum Queue (ft)	296	241	73	87	198	198	264	282
Average Queue (ft)	152	84	23	35	110	97	148	174
95th Queue (ft)	248	187	57	72	173	169	243	269
Link Distance (ft)	470	470			1337	1337	321	321
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							0	0
Storage Bay Dist (ft)			250	400				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Zone Summary

Zone wide Queuing Penalty: 555

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LT
Maximum Queue (ft)	35	18	35	121	100	27
Average Queue (ft)	17	1	6	55	39	7
95th Queue (ft)	41	10	23	94	79	21
Link Distance (ft)	17	17	526		469	666
Upstream Blk Time (%)	1	0				
Queuing Penalty (veh)	4	0				
Storage Bay Dist (ft)				250		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	109	32	57
Average Queue (ft)	25	54	2	21
95th Queue (ft)	50	90	13	52
Link Distance (ft)	87	397	1740	496
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	251	48	132
Average Queue (ft)	103	15	48
95th Queue (ft)	216	44	97
Link Distance (ft)		522	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300		275
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	NB	SB
Directions Served	TR	L	T	T	TR	R	LTR
Maximum Queue (ft)	69	75	684	225	188	82	63
Average Queue (ft)	18	30	362	191	58	31	24
95th Queue (ft)	57	82	639	283	178	61	54
Link Distance (ft)	56		867			721	888
Upstream Blk Time (%)	0		1				
Queuing Penalty (veh)	3		0				
Storage Bay Dist (ft)		50		150	150		
Storage Blk Time (%)		2	73	24	0		
Queuing Penalty (veh)		8	261	48	0		

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	52	275	493	486	31	244
Average Queue (ft)	4	267	469	468	12	99
95th Queue (ft)	26	300	481	481	34	213
Link Distance (ft)	44		454	454	888	1740
Upstream Blk Time (%)	0		97	97		
Queuing Penalty (veh)	2		0	0		
Storage Bay Dist (ft)		150				
Storage Blk Time (%)		82	95			
Queuing Penalty (veh)		269	315			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	54	140	70	40	32
Average Queue (ft)	20	49	5	12	2
95th Queue (ft)	42	99	42	38	13
Link Distance (ft)	72	329	496	321	321
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	LR
Maximum Queue (ft)	358	295	63	117	215	239	318	331
Average Queue (ft)	195	133	30	48	131	122	211	230
95th Queue (ft)	311	260	62	98	200	208	314	331
Link Distance (ft)	470	470			1337	1337	321	321
Upstream Blk Time (%)							0	3
Queuing Penalty (veh)							1	6
Storage Bay Dist (ft)			250	400				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Zone Summary

Zone wide Queuing Penalty: 918

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LT
Maximum Queue (ft)	64	47	130	146	170	32
Average Queue (ft)	20	2	79	76	93	6
95th Queue (ft)	50	19	370	165	321	24
Link Distance (ft)	17	17	526		469	666
Upstream Blk Time (%)	16	0	13		12	
Queuing Penalty (veh)	58	0	0		0	
Storage Bay Dist (ft)				250		
Storage Blk Time (%)			14	0		
Queuing Penalty (veh)			36	0		

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	59	118	23	9	64
Average Queue (ft)	22	58	1	0	19
95th Queue (ft)	48	97	10	5	48
Link Distance (ft)	81	395		1740	
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)			60		100
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	NB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	355	374	281	212
Average Queue (ft)	203	156	97	85
95th Queue (ft)	448	601	386	215
Link Distance (ft)		666	521	
Upstream Blk Time (%)		16	10	
Queuing Penalty (veh)		81	0	
Storage Bay Dist (ft)	300			275
Storage Blk Time (%)	25	0	14	1
Queuing Penalty (veh)	33	2	11	0

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	B1	B1	NB	SB
Directions Served	TR	L	T	T	TR	T	T	R	R
Maximum Queue (ft)	40	74	319	267	274	66	34	219	48
Average Queue (ft)	5	29	209	166	135	5	1	118	13
95th Queue (ft)	26	77	303	254	233	42	20	195	38
Link Distance (ft)	69		259	259	259	555	555	723	889
Upstream Blk Time (%)	0		4	0	2				
Queuing Penalty (veh)	2		0	0	0				
Storage Bay Dist (ft)		50							
Storage Blk Time (%)		9	67						
Queuing Penalty (veh)		12	42						

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	90	175	606	602	41	241
Average Queue (ft)	57	164	588	587	12	115
95th Queue (ft)	90	203	598	595	37	200
Link Distance (ft)	43		571	571	889	1740
Upstream Blk Time (%)	42		92	87		
Queuing Penalty (veh)	260		0	0		
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		63	83			
Queuing Penalty (veh)		207	273			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	64	119	2	1	39	6
Average Queue (ft)	22	50	0	0	12	0
95th Queue (ft)	48	90	2	1	36	4
Link Distance (ft)	81	320		497		337
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			100		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	LR
Maximum Queue (ft)	451	383	132	108	285	302	174	254	309
Average Queue (ft)	248	189	38	41	173	153	93	133	172
95th Queue (ft)	404	347	91	85	269	270	162	209	268
Link Distance (ft)	474	474			1331	1331		337	337
Upstream Blk Time (%)	0	0							0
Queuing Penalty (veh)	0	0							0
Storage Bay Dist (ft)			250	400			100		
Storage Blk Time (%)		1					5	17	
Queuing Penalty (veh)		3					6	20	

Zone Summary

Zone wide Queuing Penalty: 1045

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	L	R	TR	LT
Maximum Queue (ft)	73	56	137	159	164	39
Average Queue (ft)	22	3	15	66	42	10
95th Queue (ft)	58	26	98	125	101	27
Link Distance (ft)	17	17	526		469	666
Upstream Blk Time (%)	3	0	0			
Queuing Penalty (veh)	11	1	0			
Storage Bay Dist (ft)				250		
Storage Blk Time (%)				1		
Queuing Penalty (veh)				0		

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	52	113	17	4	59
Average Queue (ft)	22	58	1	0	19
95th Queue (ft)	47	96	12	3	47
Link Distance (ft)	81	395		1740	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			60		100
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	NB	SB	SB	B5
Directions Served	L	T	T	R	T
Maximum Queue (ft)	372	324	411	242	41
Average Queue (ft)	151	52	105	111	3
95th Queue (ft)	354	320	519	276	40
Link Distance (ft)		666	1193		804
Upstream Blk Time (%)		2	2		
Queuing Penalty (veh)		12	4		
Storage Bay Dist (ft)	300			275	
Storage Blk Time (%)	8	0	0	11	
Queuing Penalty (veh)	15	1	0	3	

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	B1	B1	NB	SB
Directions Served	TR	L	T	T	TR	T	T	R	R
Maximum Queue (ft)	96	75	310	256	309	35	59	270	52
Average Queue (ft)	10	39	215	166	141	2	3	157	11
95th Queue (ft)	52	87	295	242	259	26	36	250	37
Link Distance (ft)	68		260	260	260	555	555	2106	889
Upstream Blk Time (%)	2		3	0	3				
Queuing Penalty (veh)	12		0	0	0				
Storage Bay Dist (ft)		50							
Storage Blk Time (%)		15	68						
Queuing Penalty (veh)		21	55						

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	99	175	606	608	45	210
Average Queue (ft)	57	161	588	588	10	108
95th Queue (ft)	98	204	596	598	33	187
Link Distance (ft)	43		571	571	889	1740
Upstream Blk Time (%)	39		91	88		
Queuing Penalty (veh)	242		0	0		
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		60	78			
Queuing Penalty (veh)		198	258			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	49	96	6	12	44	6
Average Queue (ft)	23	47	0	0	12	0
95th Queue (ft)	47	78	3	5	38	4
Link Distance (ft)	81	320		497		337
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	LR
Maximum Queue (ft)	471	350	143	112	294	306	174	257	289
Average Queue (ft)	261	194	43	43	171	153	96	137	170
95th Queue (ft)	426	336	97	88	270	258	164	213	255
Link Distance (ft)	474	474			1331	1331		337	337
Upstream Blk Time (%)	0								0
Queuing Penalty (veh)	0								0
Storage Bay Dist (ft)			250	400			100		
Storage Blk Time (%)		1					5	18	
Queuing Penalty (veh)		2					6	21	

Zone Summary

Zone wide Queuing Penalty: 862

Intersection: 9: Old Columbia Pike & Stewart Ln

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	L	R	T	TR	LT	T
Maximum Queue (ft)	56	53	29	99	84	19	28	9
Average Queue (ft)	19	2	6	44	32	5	9	2
95th Queue (ft)	50	20	22	73	63	14	24	7
Link Distance (ft)	11	11	519		470	470	663	663
Upstream Blk Time (%)	1	0						
Queuing Penalty (veh)	4	0						
Storage Bay Dist (ft)				250				
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 16: Prosperity Dr/Prosperity Dr. & Bank Lot/Whitethorn Ct.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	64	159	6	60	9
Average Queue (ft)	26	62	0	19	0
95th Queue (ft)	53	118	4	51	6
Link Distance (ft)	81	395			497
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)			60	100	
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 18: Old Columbia Pike & Dow Jones Lot

Movement	NB	NB	SB	SB
Directions Served	LT	T	T	TR
Maximum Queue (ft)	342	230	48	298
Average Queue (ft)	152	21	19	100
95th Queue (ft)	343	147	46	253
Link Distance (ft)	663	663	1187	1187
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Old Columbia Pike & Industrial Pkwy

Movement	EB	WB	WB	WB	WB	B1	B1	NB	NB	SB
Directions Served	TR	L	T	T	TR	T	T	R	R	R
Maximum Queue (ft)	53	74	289	236	241	20	5	152	145	52
Average Queue (ft)	7	48	199	154	121	2	0	66	78	12
95th Queue (ft)	34	96	285	235	207	22	3	122	126	35
Link Distance (ft)	54		242	242	242	555	555	2100	2100	889
Upstream Blk Time (%)	1		3	0	0					
Queuing Penalty (veh)	8		0	0	0					
Storage Bay Dist (ft)		50								
Storage Blk Time (%)		18	60							
Queuing Penalty (veh)		24	48							

Intersection: 27: Old Columbia Pike/Prosperity Dr & Tech Rd

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	T	T	TR	R	R
Maximum Queue (ft)	95	175	614	605	49	217
Average Queue (ft)	56	159	588	588	13	114
95th Queue (ft)	91	206	600	599	38	196
Link Distance (ft)	43		571	571	889	1740
Upstream Blk Time (%)	40		90	87		
Queuing Penalty (veh)	250		0	0		
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		66	80			
Queuing Penalty (veh)		217	265			

Intersection: 32: Prosperity Dr. & Parking Lot/Prosperity Terr.

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	TR	L	TR
Maximum Queue (ft)	54	120	5	35	10
Average Queue (ft)	24	48	0	12	0
95th Queue (ft)	48	86	3	36	7
Link Distance (ft)	81	320	497		337
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				150	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 686: Prosperity Dr. & Cherry Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	LR
Maximum Queue (ft)	488	400	242	103	322	317	174	275	303
Average Queue (ft)	273	201	45	43	180	163	96	138	178
95th Queue (ft)	439	354	135	82	292	284	163	218	268
Link Distance (ft)	474	474			1331	1331		337	337
Upstream Blk Time (%)	1	0						0	
Queuing Penalty (veh)	0	0						0	
Storage Bay Dist (ft)			250	400			100		
Storage Blk Time (%)		2			0		5	18	
Queuing Penalty (veh)		4			0		6	22	

Zone Summary

Zone wide Queuing Penalty: 850

Appendix J

Yellow and Red Time and Crossing Time Checking

Old Columbia Pike

Yellow and Red Time

	Post Speed	Slope	Width of Int.	Vehicle L	Opp. T+R Lane No.	# of LT lane	Meadian (ft)	Adjust Factor	Calculated Time: Yellow time	Calculated Time: Red for Thru	Calculated Time: Red for Left	Rounded time: Yellow time	Rounded time: Red for Thru	Rounded time: Red for Left	Rounded time: Addition Red	Final: Yellow time	Final: Red	Final: Min. Phase time for PED
Industrial Parkway																		
US 29 SB/NB T (across Ind. PED)	50	-1.50%	120	20	N/A	0	0	0	5.25	0.90	N/A	5.5	1			0	0	27.00
US 29 SB/NB T+ NB R (across OCP PED)	50	-1.50%	120	20	N/A	0	0	0	5.25	0.90	N/A	5.5	1			5.5	1	16.00
US 29 SB L+ SB T & OCP SB R	50	-1.50%	155	20	3	1	28	0.5	4.47	1.38	2.00	4.5	1.5	2	4.00	4.5	6.00	
Industrial WB L+R & OCP NB R (across US 29 PED)	30	-2.40%	294	20	0	1	14	0.5	2.99	NA	0.50	3.5	NA	1	3.00	3.5	4.00	23.00
Tech Road																		
US 29 SB L+T & OCP SB R	50	-1.50%	102	20	4	1	12	0.5	4.47	0.66	2.50	4.5	1	2.5	3.50	4.5	6.00	
US 29 SB/NB T + SB R (across Tech PED)	50	-1.50%	102	20	N/A	0	12	0.5	5.25	0.66	N/A	5.5	1			5.5	1	21.00
US 29 NB L+T & OCP NB R	50	1.50%	102	20	4	2	12	1	4.16	0.66	3.00	4.5	1	3		4.5	3	
Tech EB (across OCP PED)	30	-1.00%	284	20	2	1	28	0.5	3.66	5.89	1.50	4	6	1.5	2.50	4	6.00	14.00
Tech WB + US 29 NB R (across US 29 PED)	30	-1.00%	284	20	2	2	14	1	3.66	5.89	2.00	4	6	2	2.50	4	6.00	31.00

Additional Red Time for Longer Path

	Speed	Extra L	Extra Red	Remarks
Industrial Parkway				
US 29 NB RT	22.5	120	3.64	Not Followed by conflict, no need
US 29 SB LT	21	120	3.90	Need for SB LT
WB LT	31	120	2.64	Need for WB LT
Tech Road				
US 29 SB LT	22.5	110	3.33	Need for SB LT
Tech EB TH	31	110	2.42	Need for EB LT
Tech WB LT + US 29 NB R	31	110	2.42	Need for WB LT

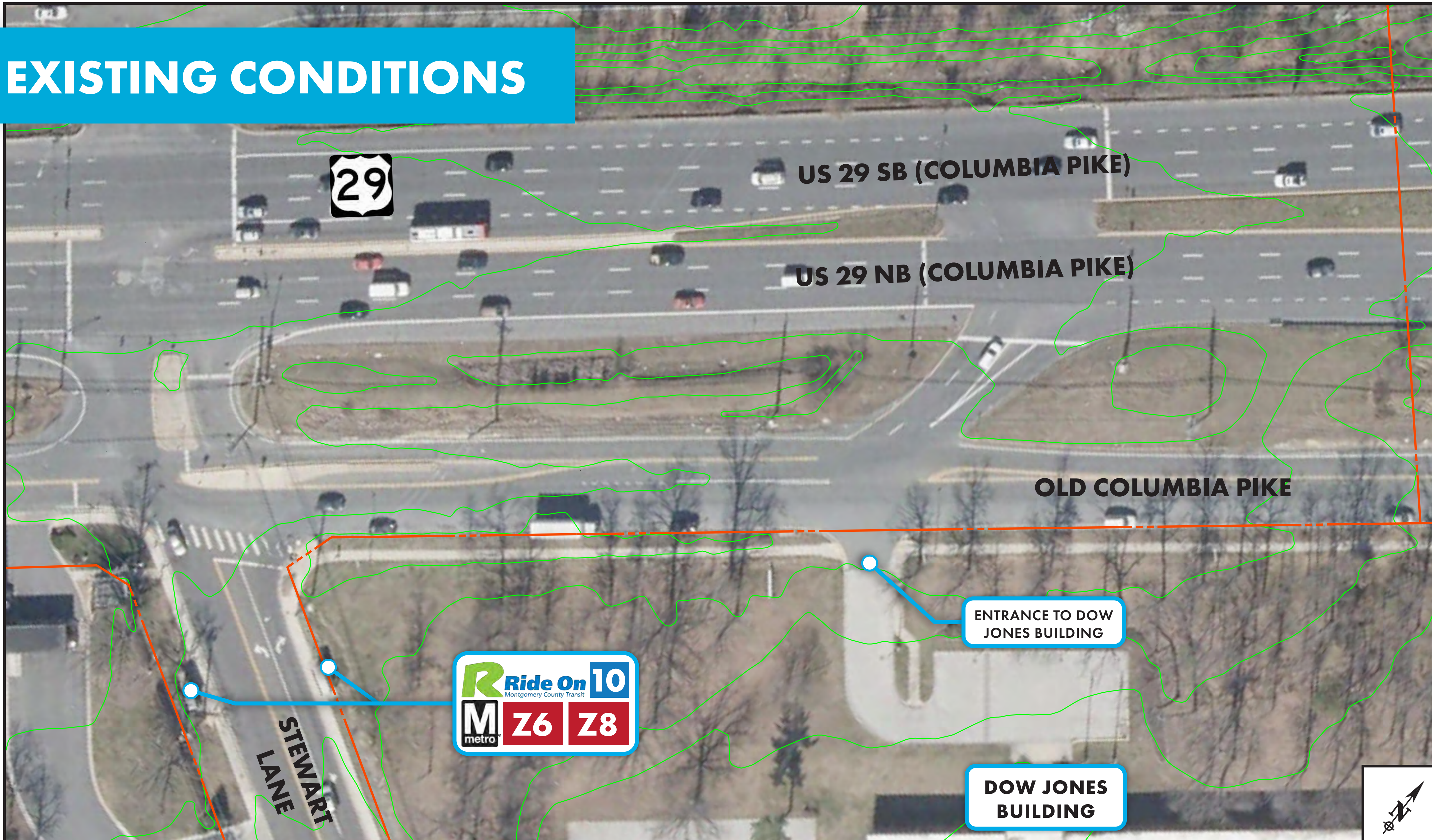
Pedestrian Walking Time

4 ft/s	seconds	Min.
Industrial Parkway		
80 ft across E leg of OCP at Industrial (Phase 2+6)	20.00	27.00
62 ft across (SB side) N Leg of US 29 at Industrial (phase	15.50	22.50
50 ft across (NB side) N Leg of US 29 at Industrial (phase	12.50	19.50
35 ft across N Leg of OCP at Industrial (Phase 9)	8.75	15.75
Tech Road		
55 ft across E leg of OCP at Tech (Phase 2+6)	13.75	20.75
95 ft (SB side) across N Leg of US 29 at Tech (Phase 4)	23.75	30.75
60 ft (NB side) across N Leg of US 29 at Tech (Phase 4)	15.00	22.00
28 ft across N Leg of OCP at Tech (Phase 3)	7.00	14.00

Appendix G

Alternative Plan Displays

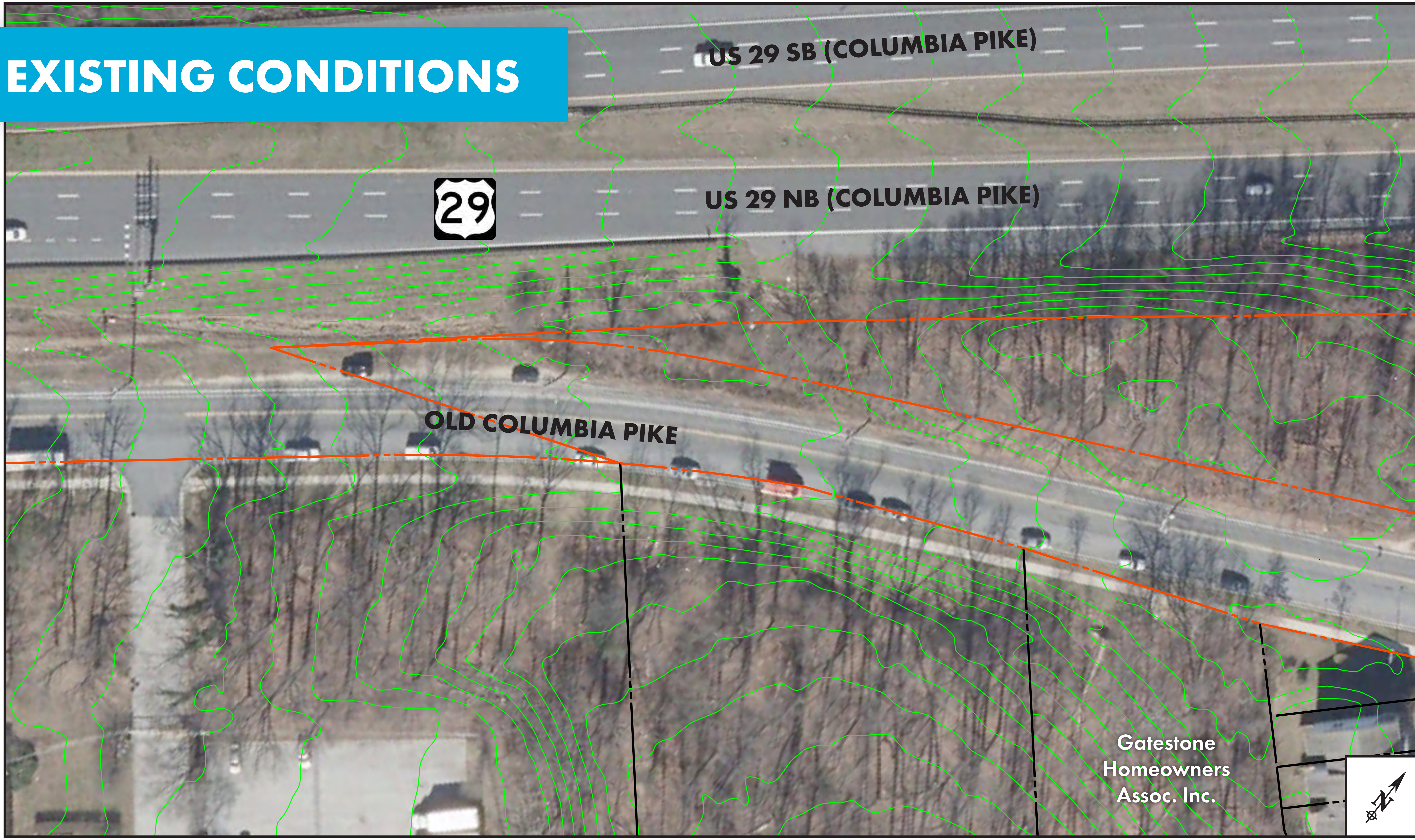
EXISTING CONDITIONS



LEGEND | 2' Contours — Property Line — Existing Right-of-Way

0 25 50
SCALE IN FEET

EXISTING CONDITIONS



LEGEND | 2' Contours — Property Line — Existing Right-of-Way

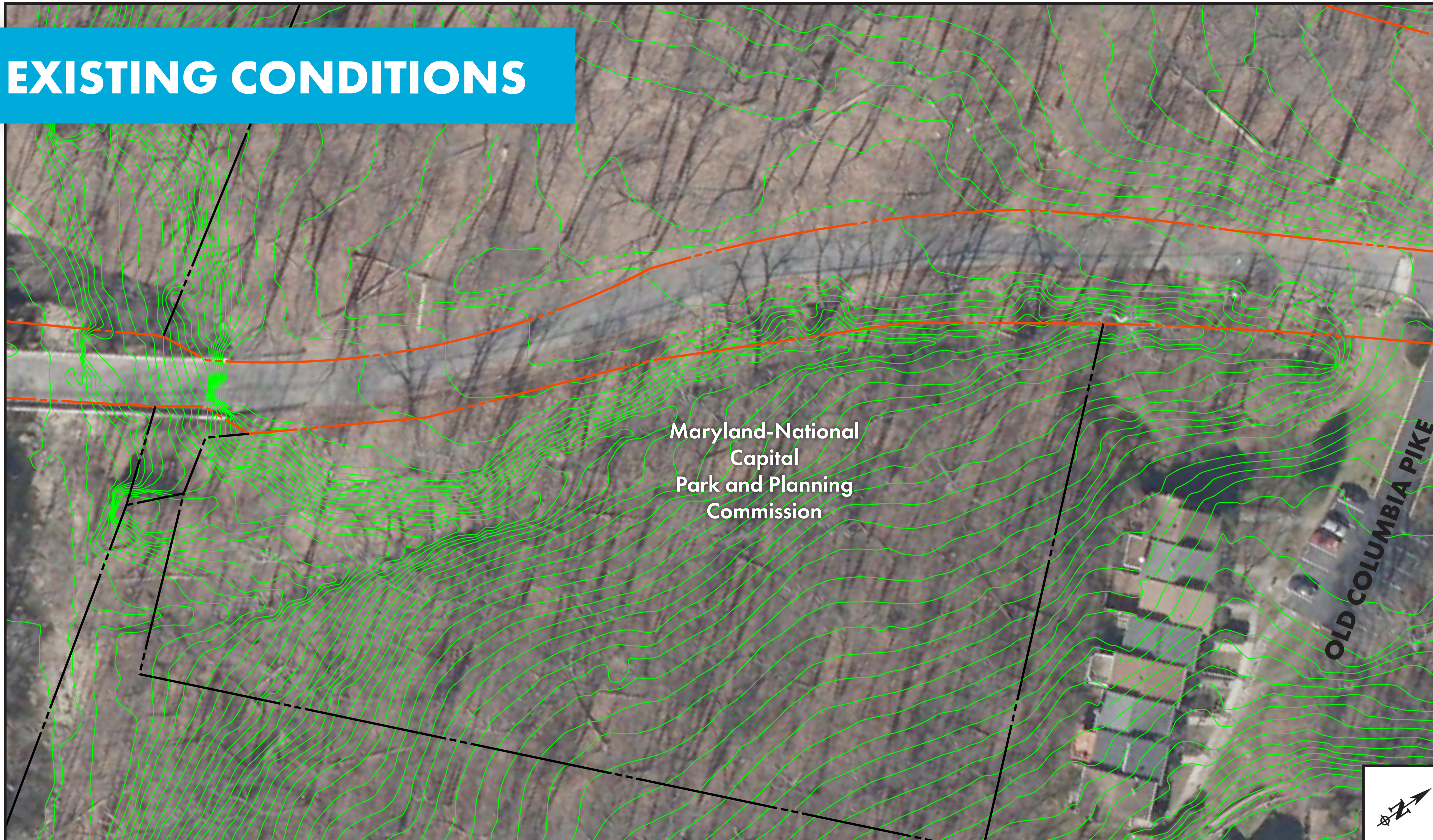
0 25 50
SCALE IN FEET

EXISTING CONDITIONS

LEGEND | 2' Contours — Property Line — Existing Right-of-Way

0 25 50
SCALE IN FEET

EXISTING CONDITIONS



LEGEND | 2′ Contours — Property Line — Existing Right-of-Way

0 25 50
SCALE IN FEET

EXISTING CONDITIONS

LEGEND | 2' Contours | Property Line | Existing Right-of-Way

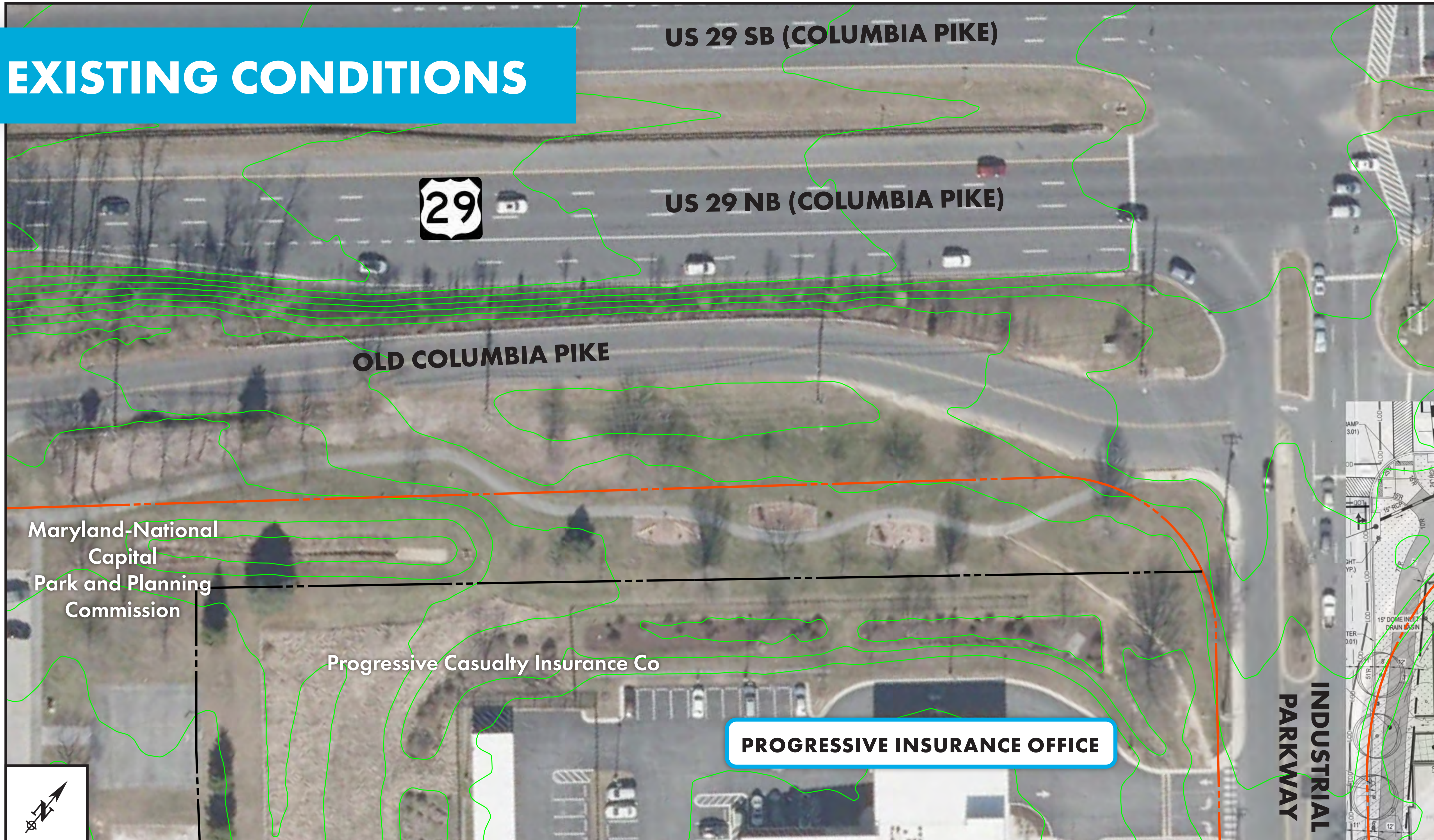
0 25 50
SCALE IN FEET

EXISTING CONDITIONS

LEGEND | 2' Contours Property Line Existing Right-of-Way

0 25 50
SCALE IN FEET

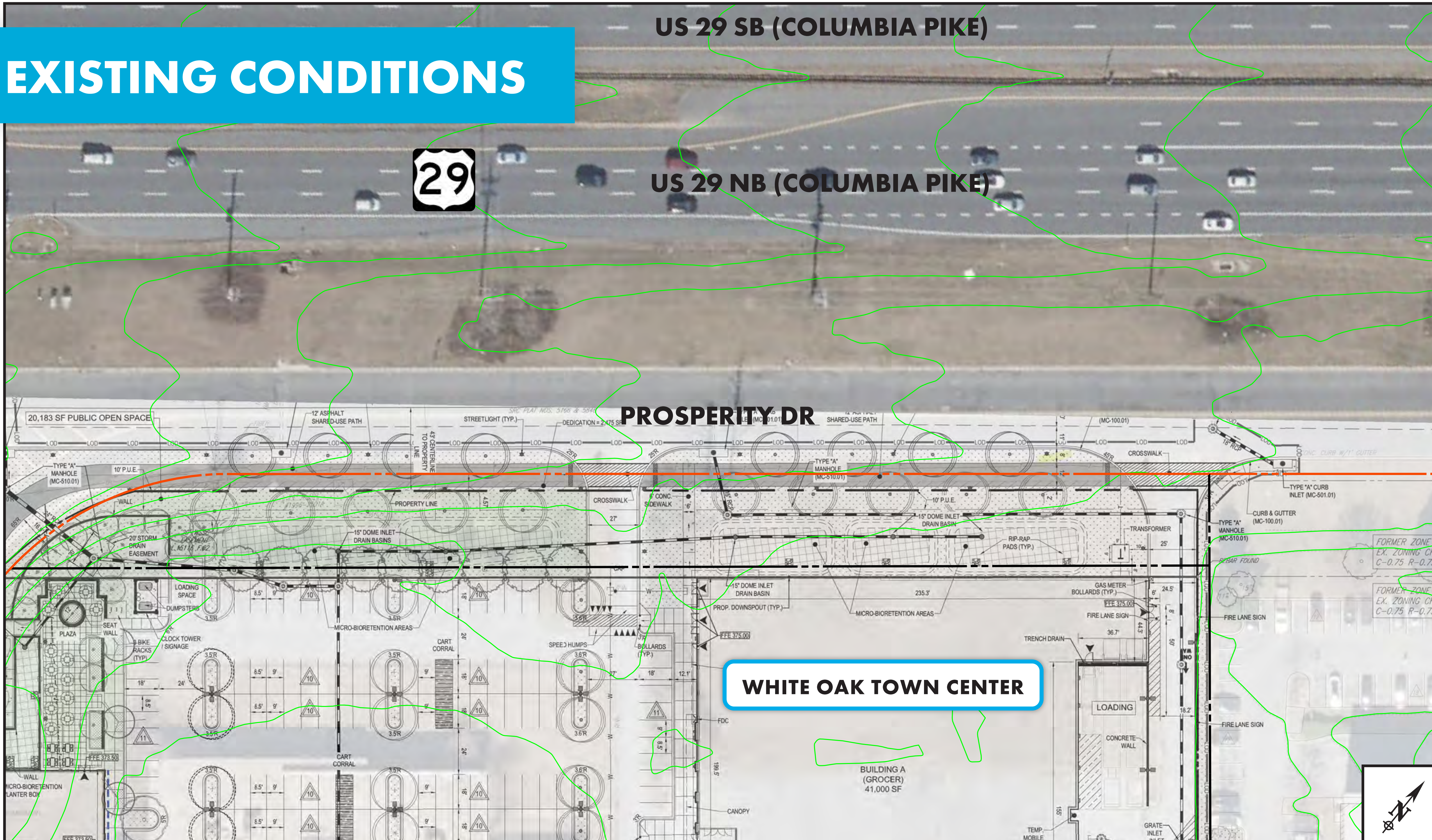
EXISTING CONDITIONS



LEGEND | 2' Contours — Property Line — Existing Right-of-Way

0 25 50
SCALE IN FEET

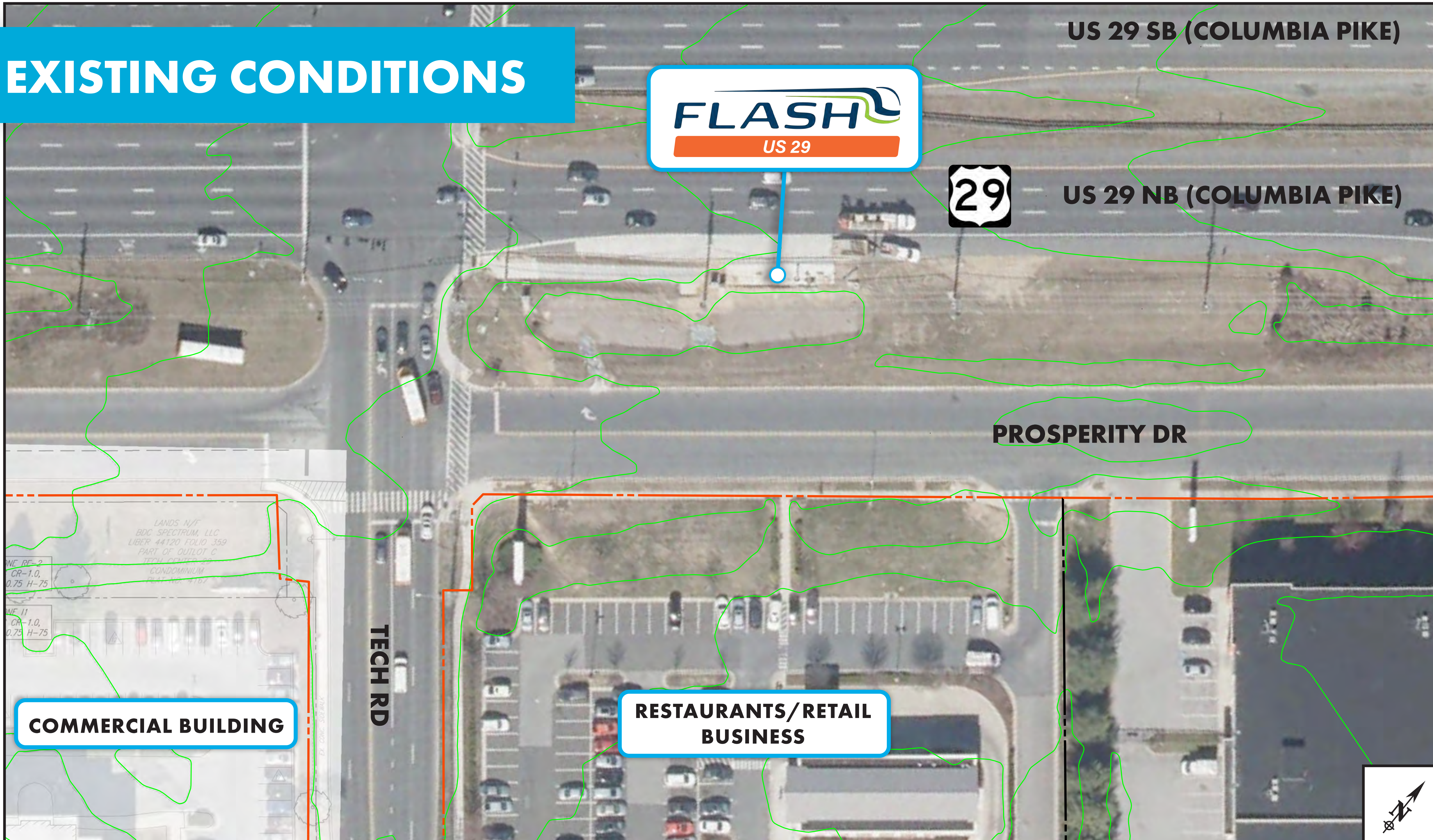
EXISTING CONDITIONS



LEGEND | 2' Contours | Property Line | Existing Right-of-Way

0 25 50
SCALE IN FEET

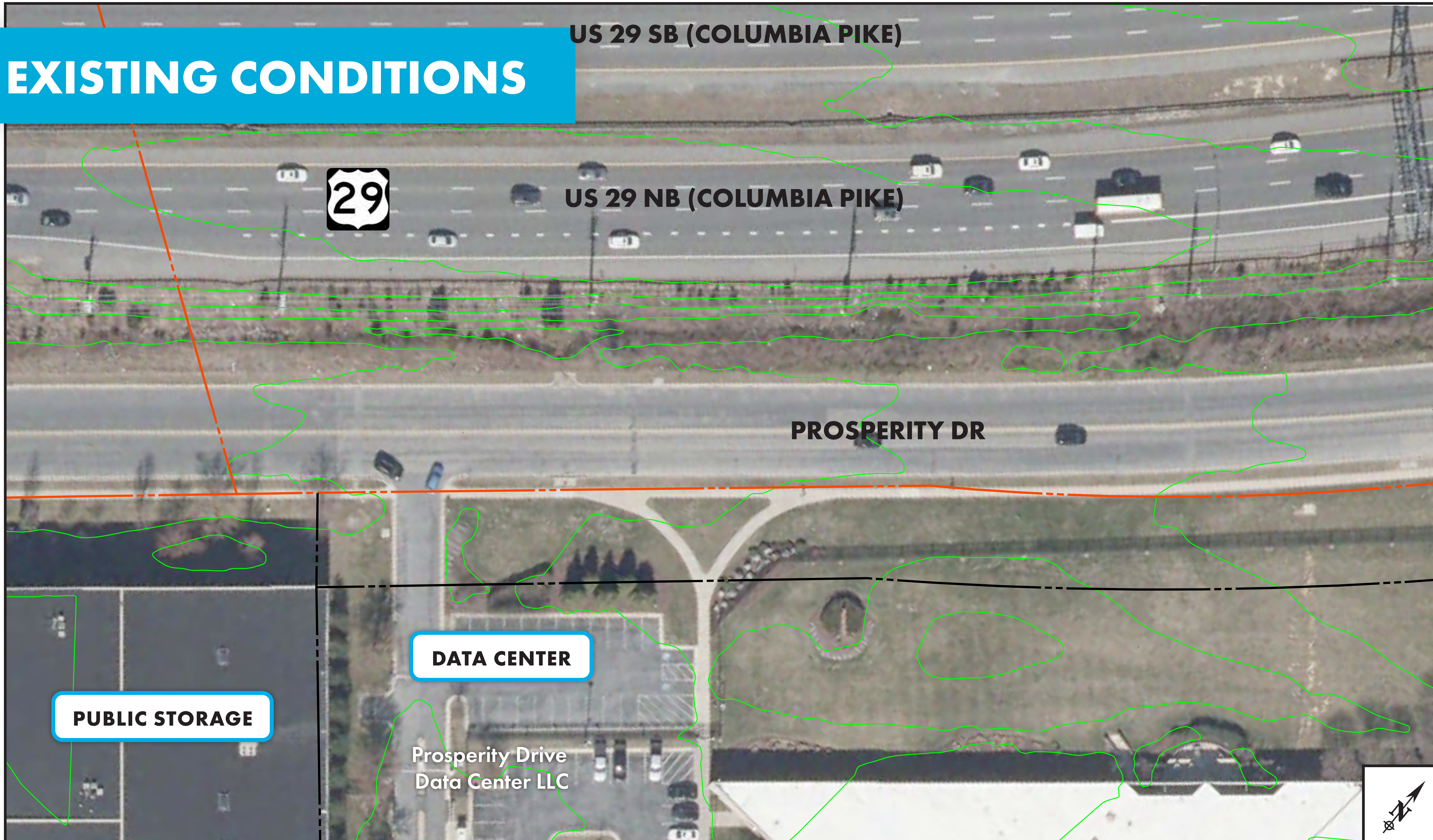
EXISTING CONDITIONS



LEGEND | 2' Contours — Property Line — Existing Right-of-Way

0 25 50
SCALE IN FEET

EXISTING CONDITIONS



LEGEND | 2' Contours | Property Line | Existing Right-of-Way

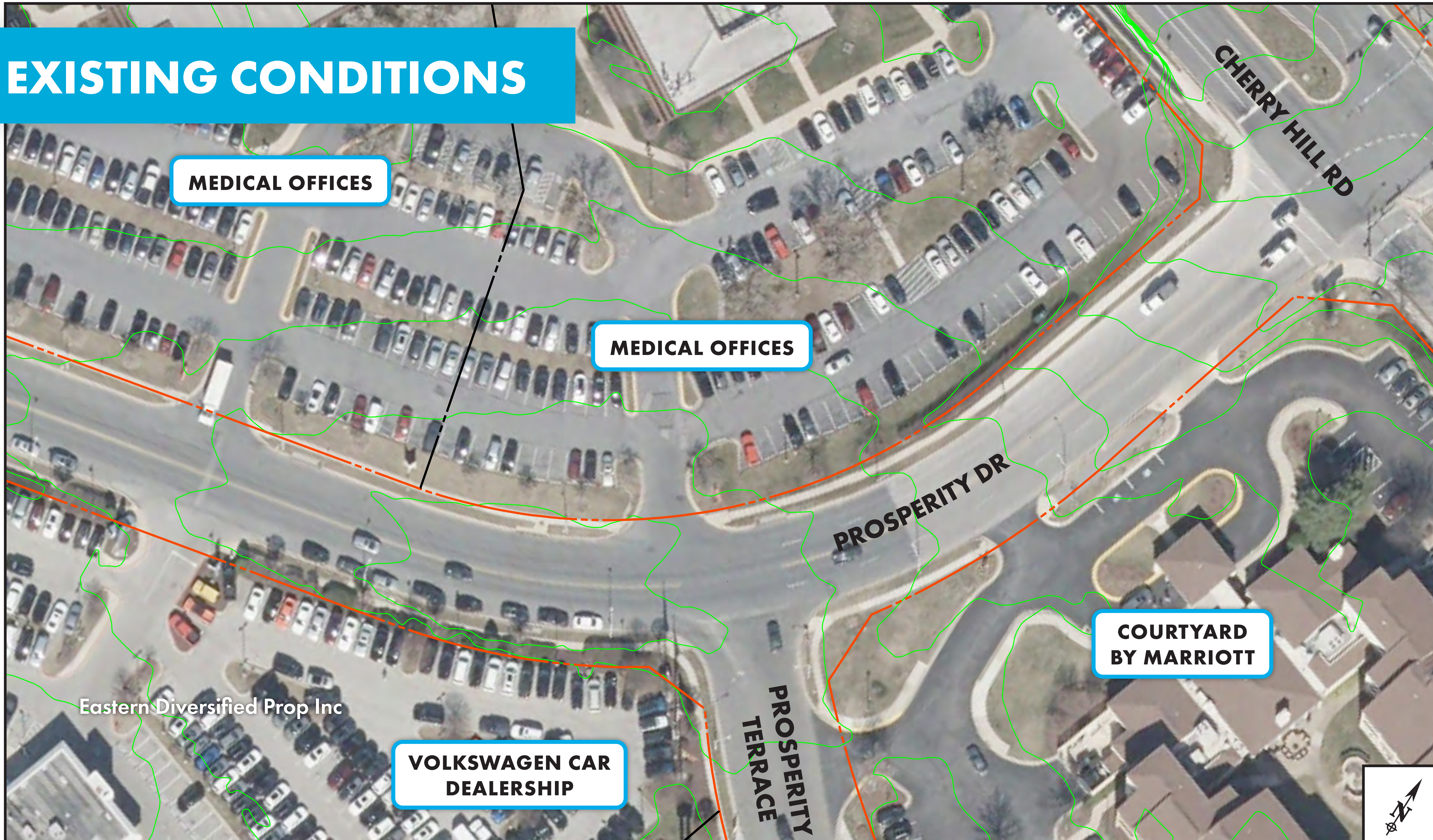
0 25 50
SCALE IN FEET

EXISTING CONDITIONS

LEGEND | 2' Contours — Property Line — Existing Right-of-Way

0 25 50
SCALE IN FEET

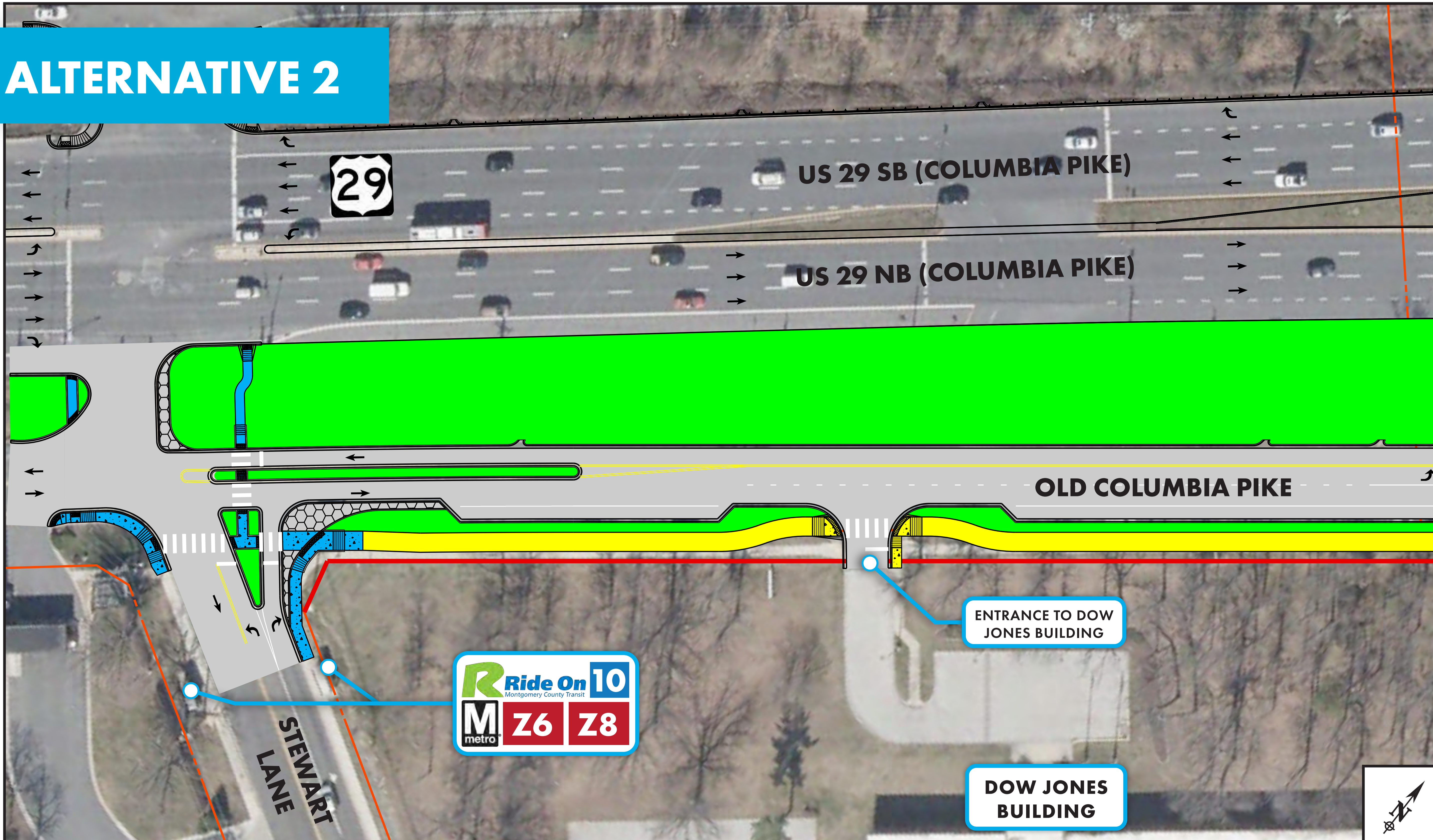
EXISTING CONDITIONS



LEGEND | 2' Contours Property Line Existing Right-of-Way

0 25 50
SCALE IN FEET

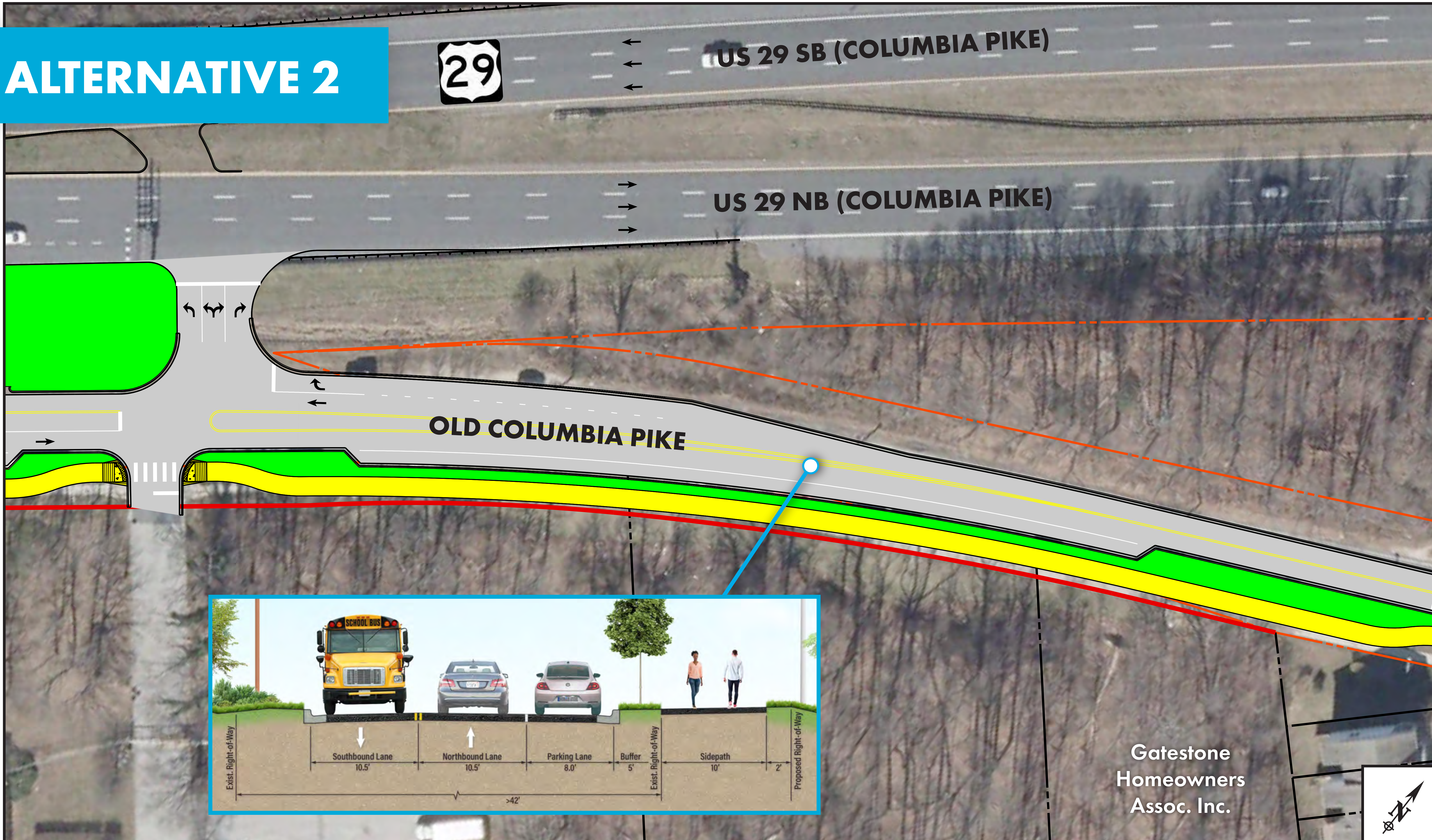
ALTERNATIVE 2



LEGEND | Roadway Pavement | Sidewalk | Sidepath | Channelizing Island | Stamped Concrete | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

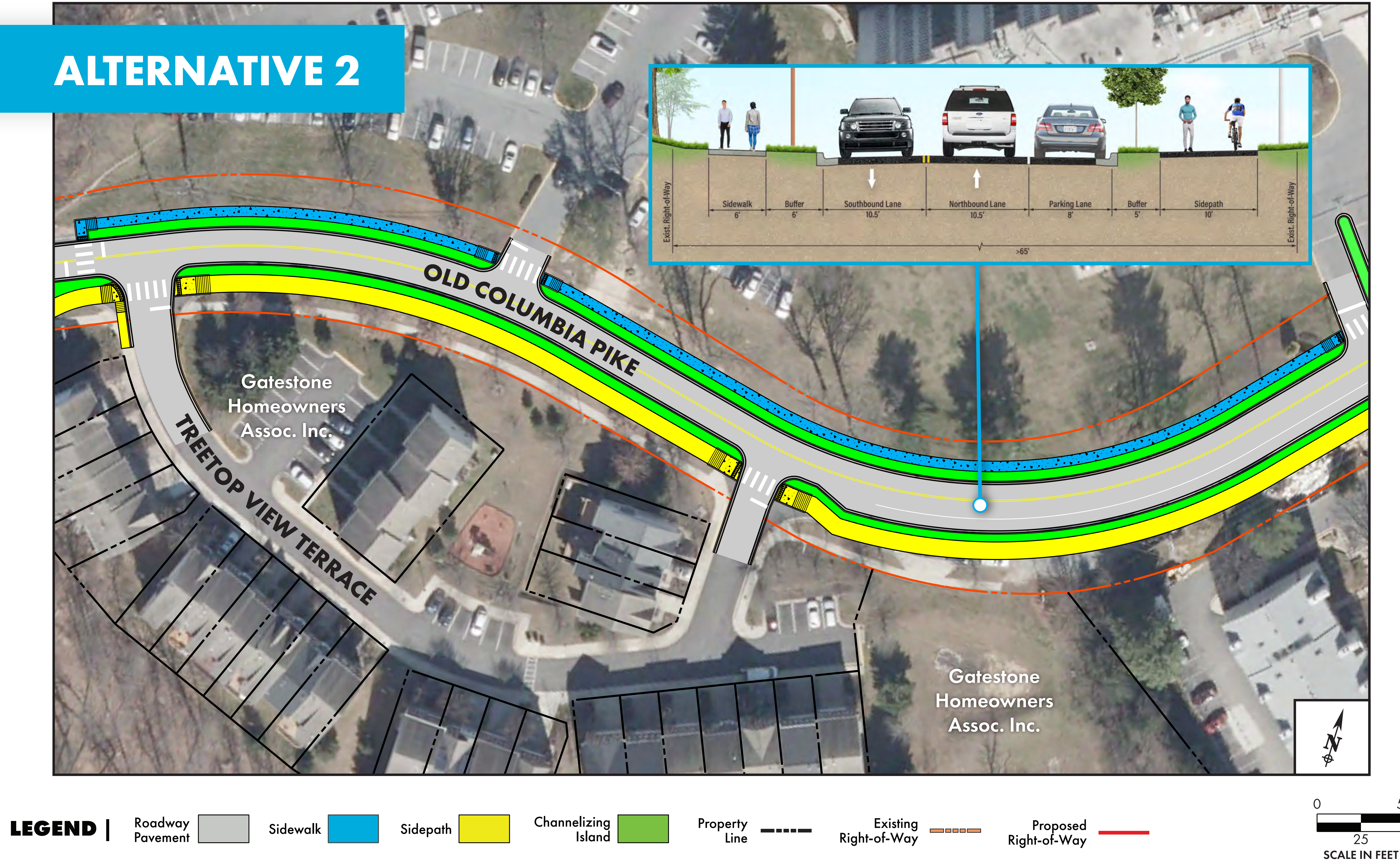
ALTERNATIVE 2



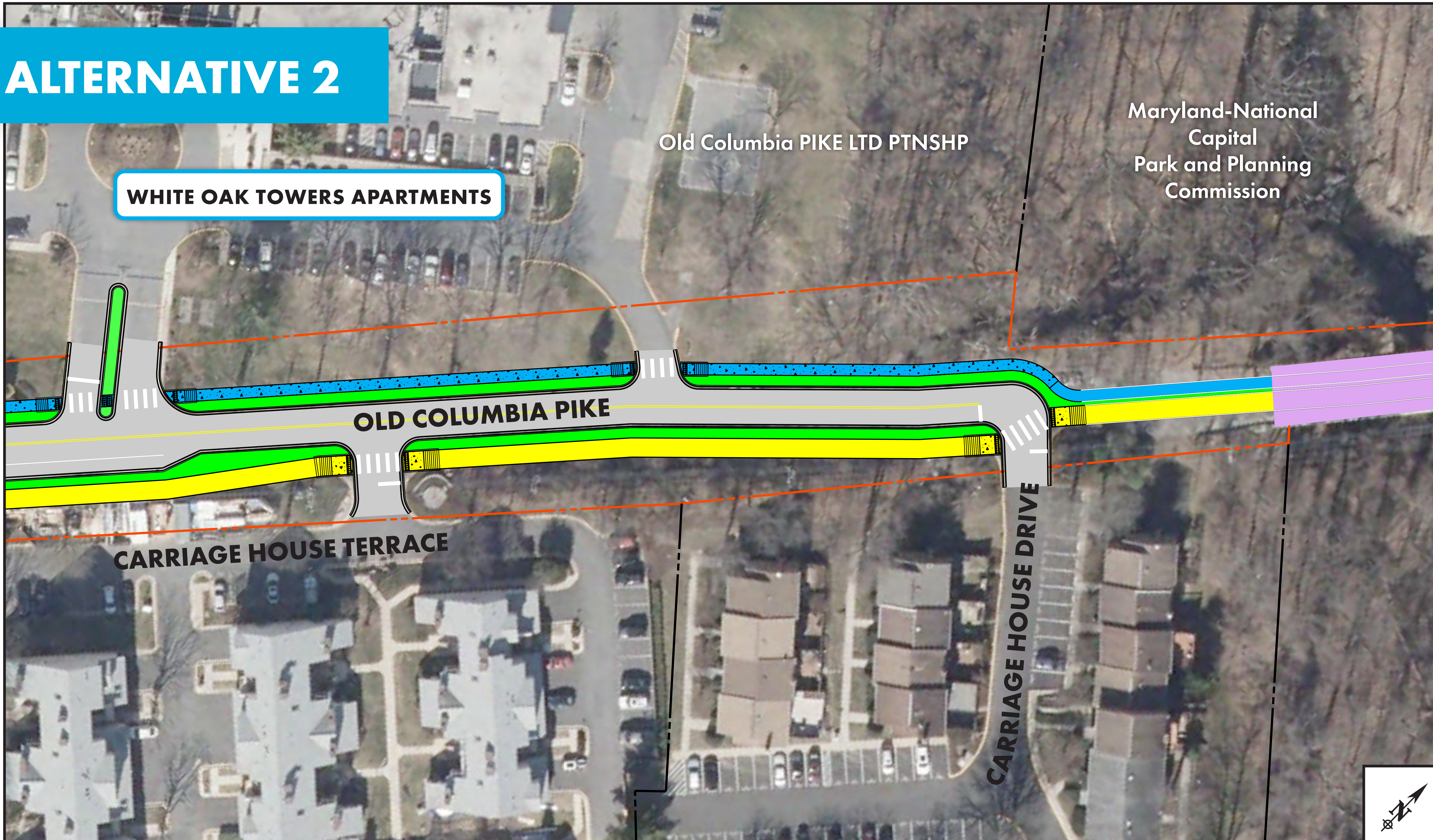
LEGEND | Roadway Pavement; Sidepath; Channelizing Island; Property Line; Existing Right-of-Way; Proposed Right-of-Way

0 25 50
SCALE IN FEET

ALTERNATIVE 2



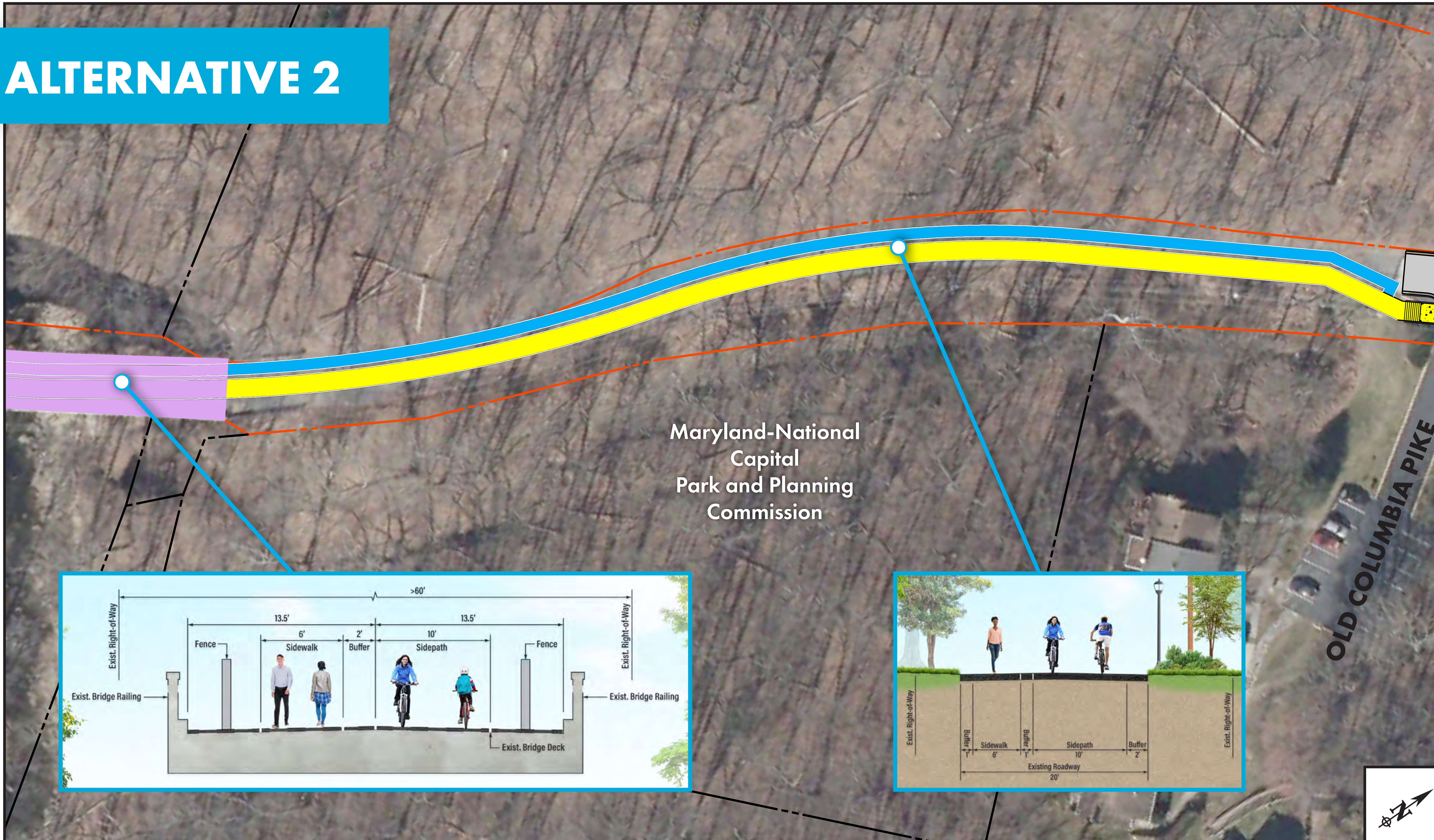
ALTERNATIVE 2



LEGEND | Roadway Pavement | Sidewalk | Sidepath | Channelizing Island | Existing Bridge | Property Line | Existing Right-of-Way

0 25 50
SCALE IN FEET

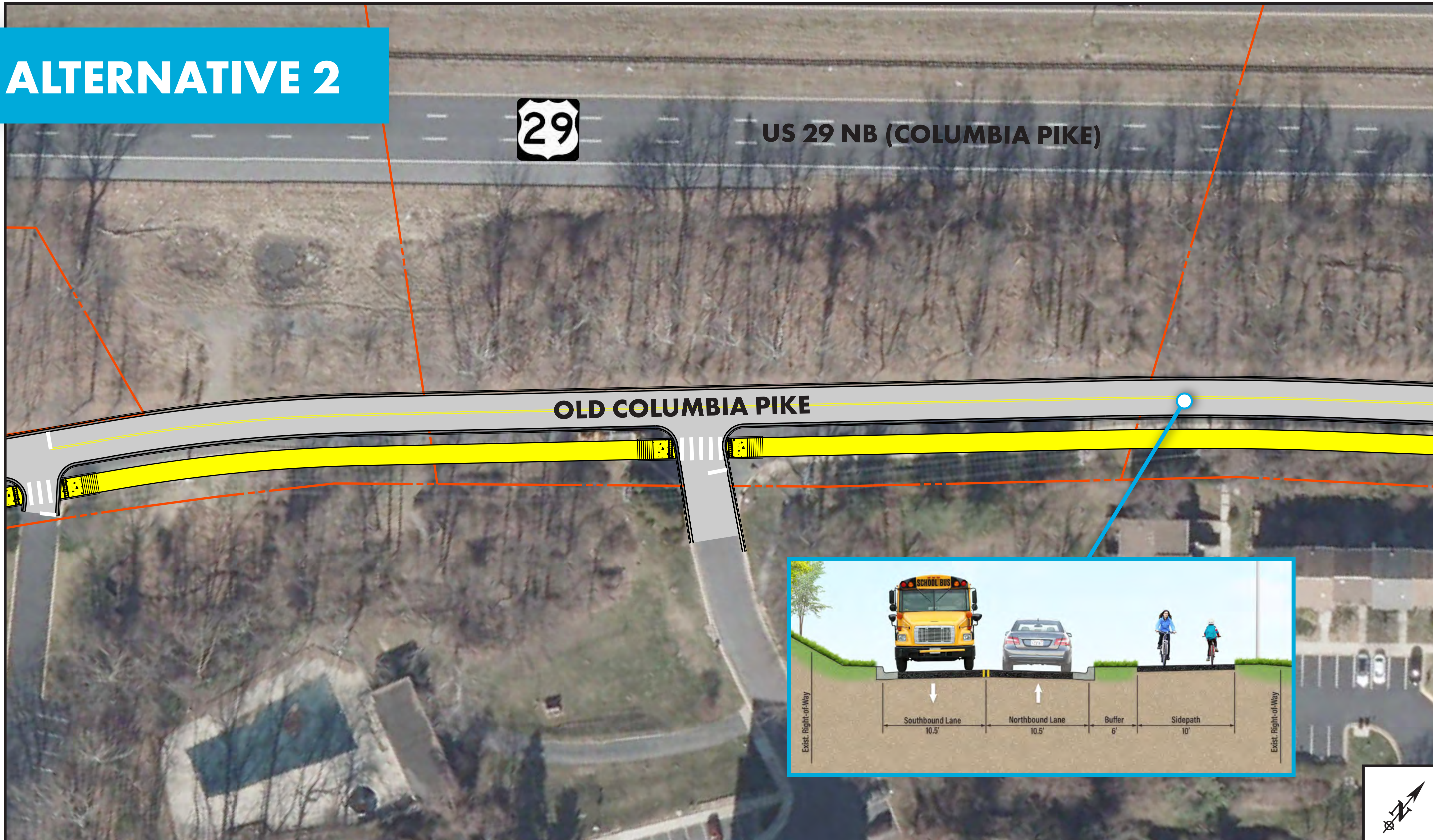
ALTERNATIVE 2



LEGEND | Roadway Pavement | Sidewalk | Sidepath | Existing Bridge | Property Line | Existing Right-of-Way

0 25 50
SCALE IN FEET

ALTERNATIVE 2



LEGEND | Roadway Pavement · Sidepath · Existing Right-of-Way

0 25 50
SCALE IN FEET

ALTERNATIVE 2

LEGEND | Roadway Pavement · Sidepath · Property Line · Existing Right-of-Way

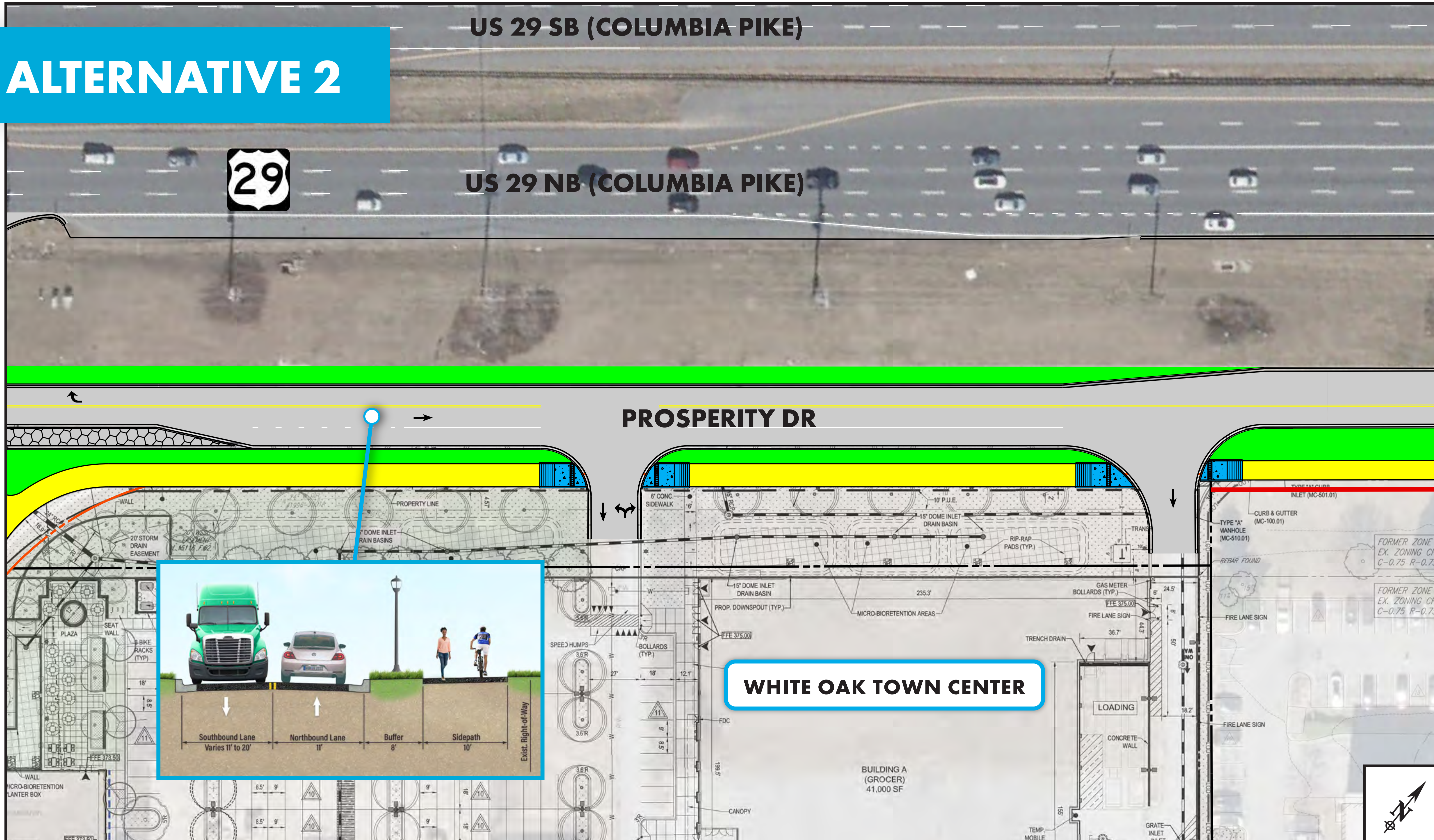
0 25 50
SCALE IN FEET

ALTERNATIVE 2

LEGEND | Roadway Pavement | Sidewalk | Sidepath | Channelizing Island | Stamped Concrete | Property Line | Existing Right-of-Way

0 25 50
SCALE IN FEET

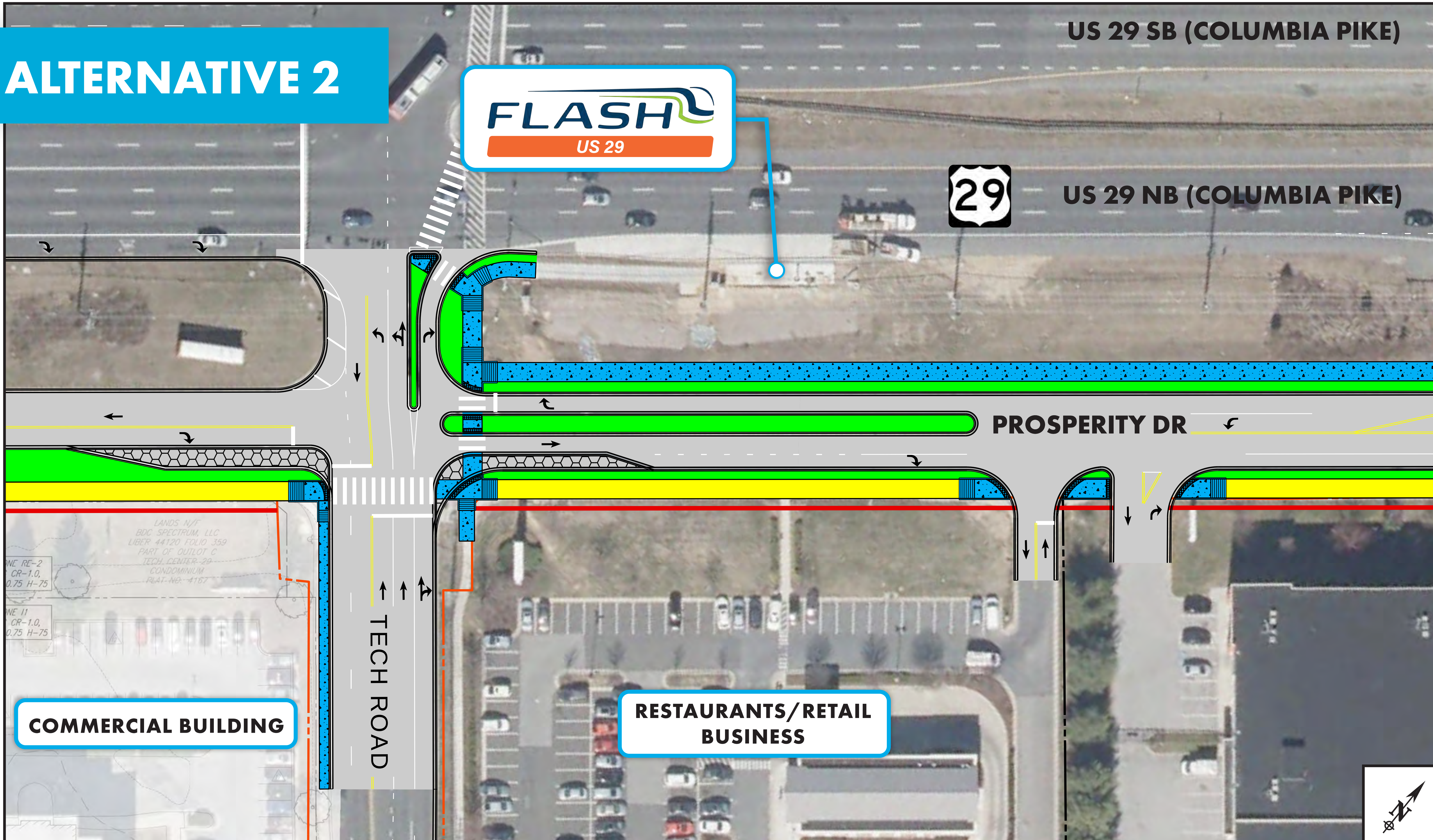
ALTERNATIVE 2



LEGEND | Roadway Pavement · Sidewalk · Sidepath · Channelizing Island · Stamped Concrete · Property Line · Existing Right-of-Way · Proposed Right-of-Way

0 25 50
SCALE IN FEET

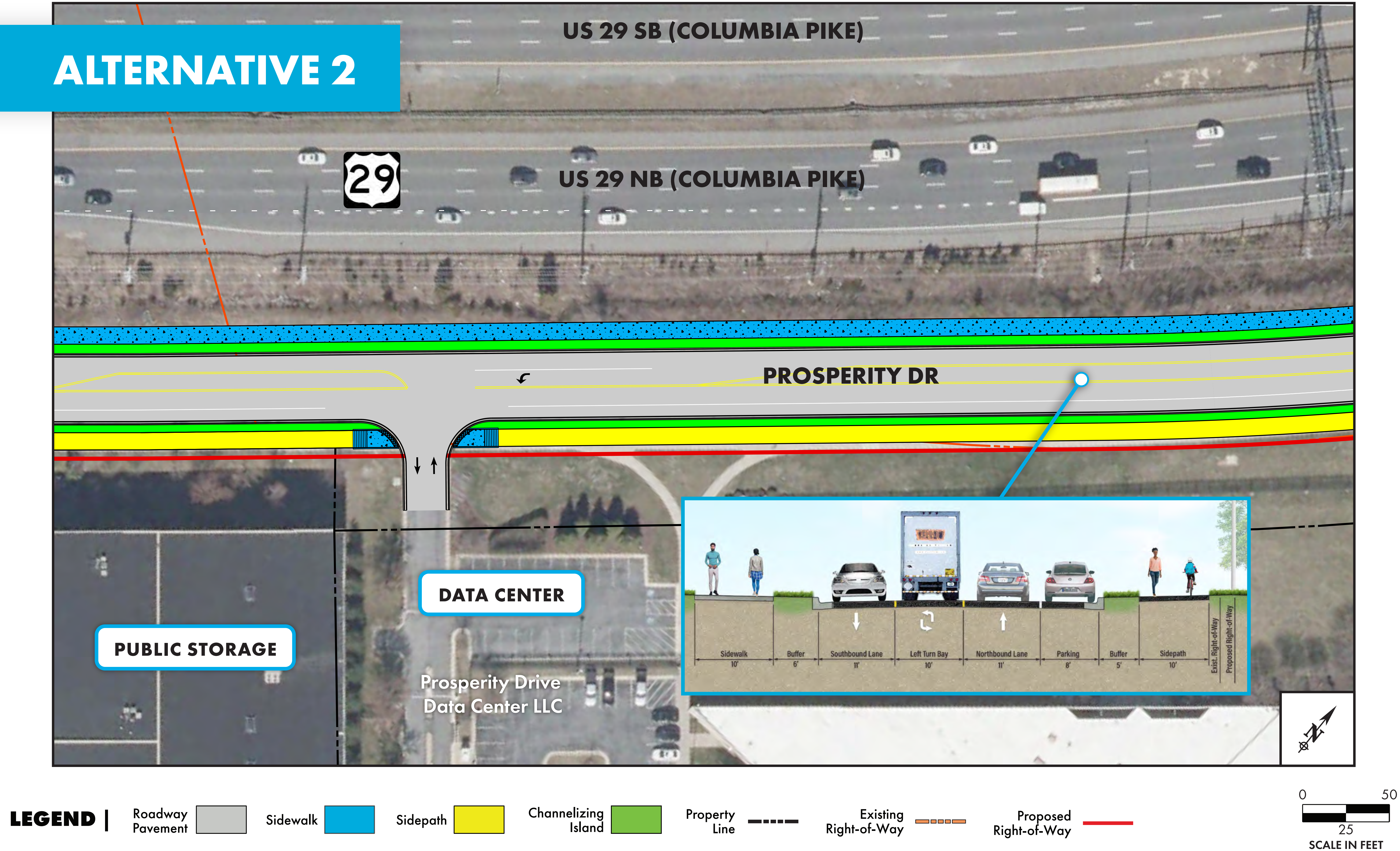
ALTERNATIVE 2



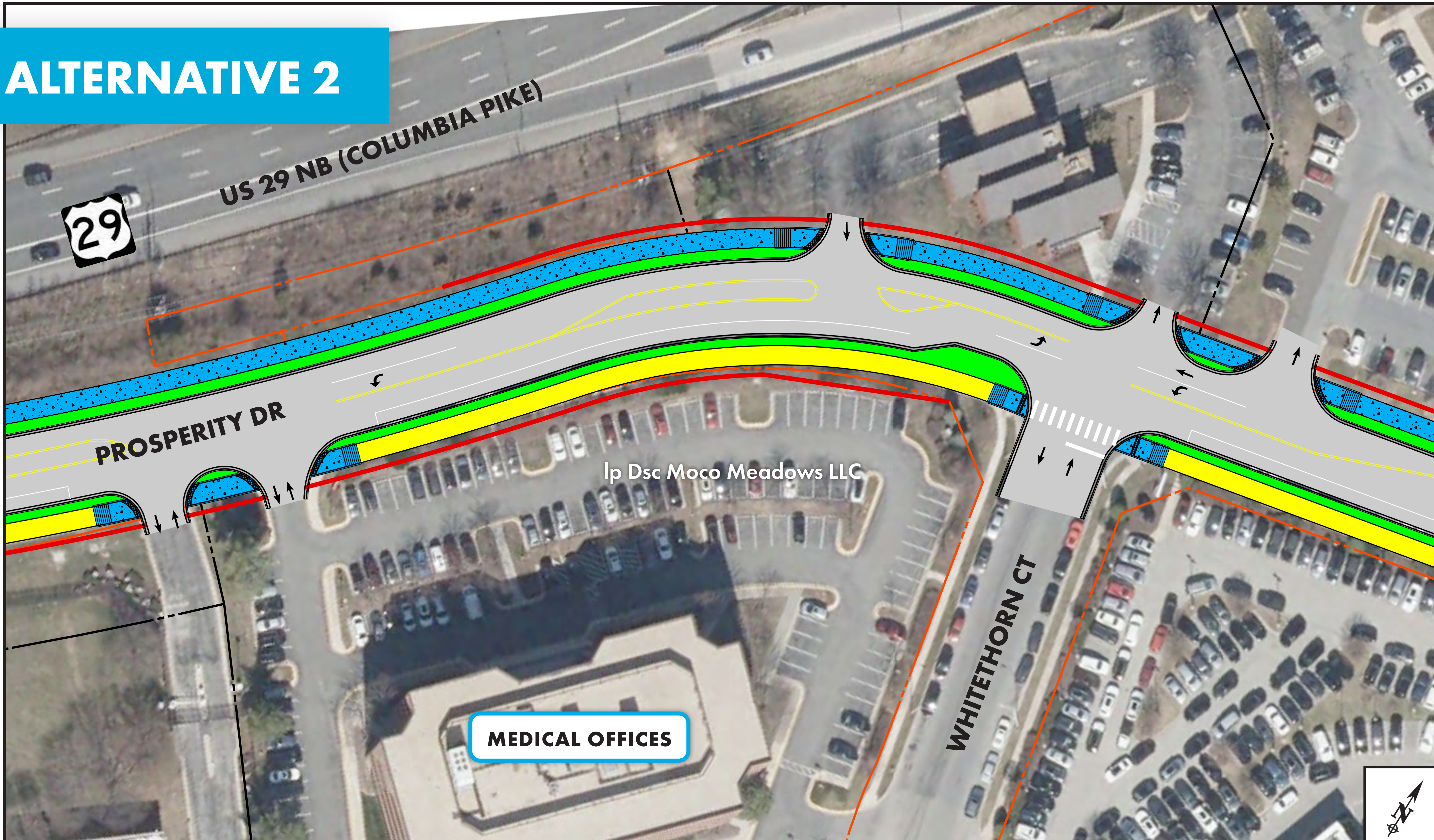
LEGEND | Roadway Pavement | Sidewalk | Sidepath | Channelizing Island | Stamped Concrete | Property Line | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

ALTERNATIVE 2



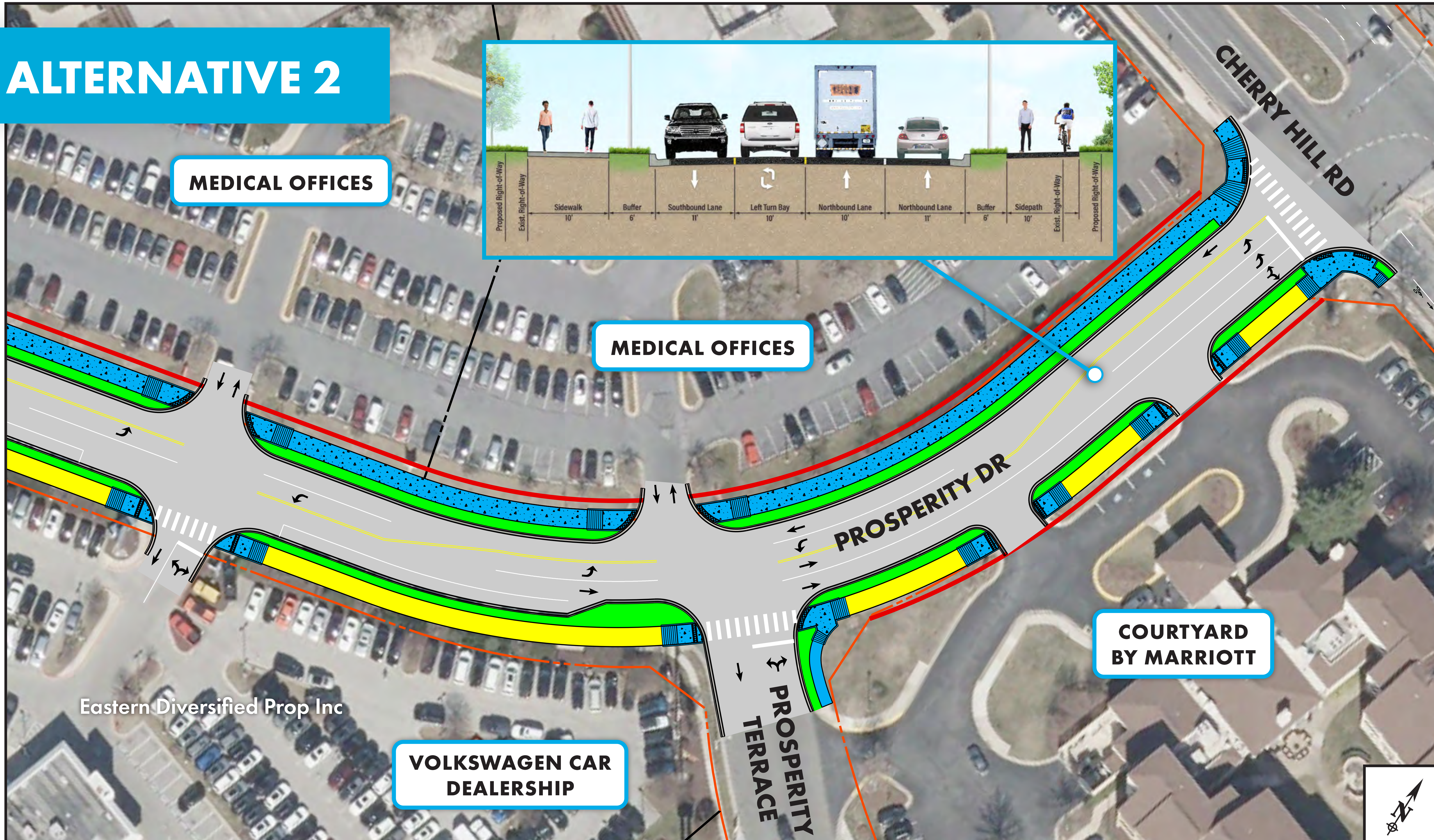
ALTERNATIVE 2



LEGEND | Roadway Pavement · Sidewalk · Sidepath · Channelizing Island · Property Line · Existing Right-of-Way · Proposed Right-of-Way

0 25 50
SCALE IN FEET

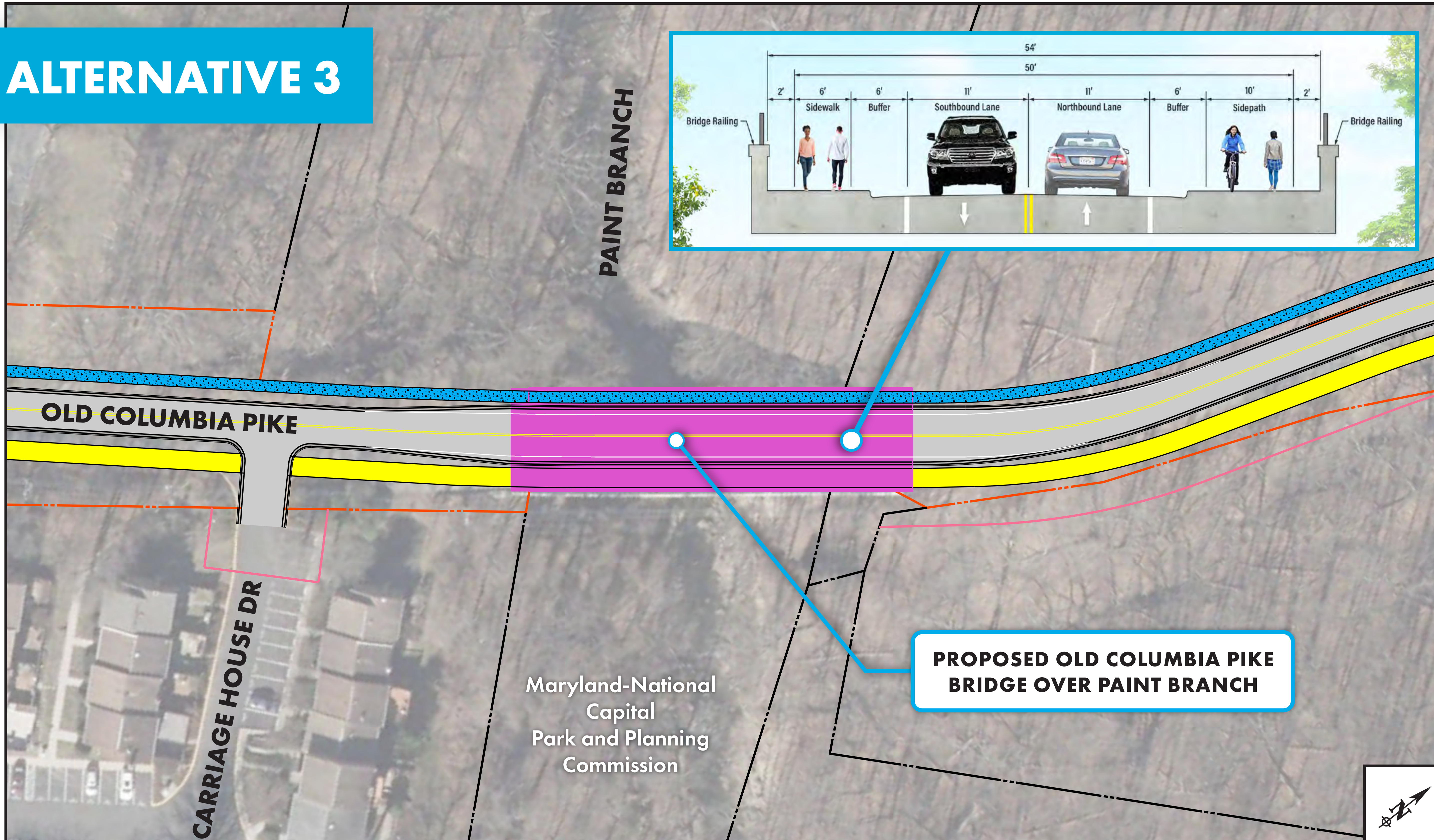
ALTERNATIVE 2



LEGEND | Roadway Pavement | Sidewalk | Sidepath | Channelizing Island | Property Line | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

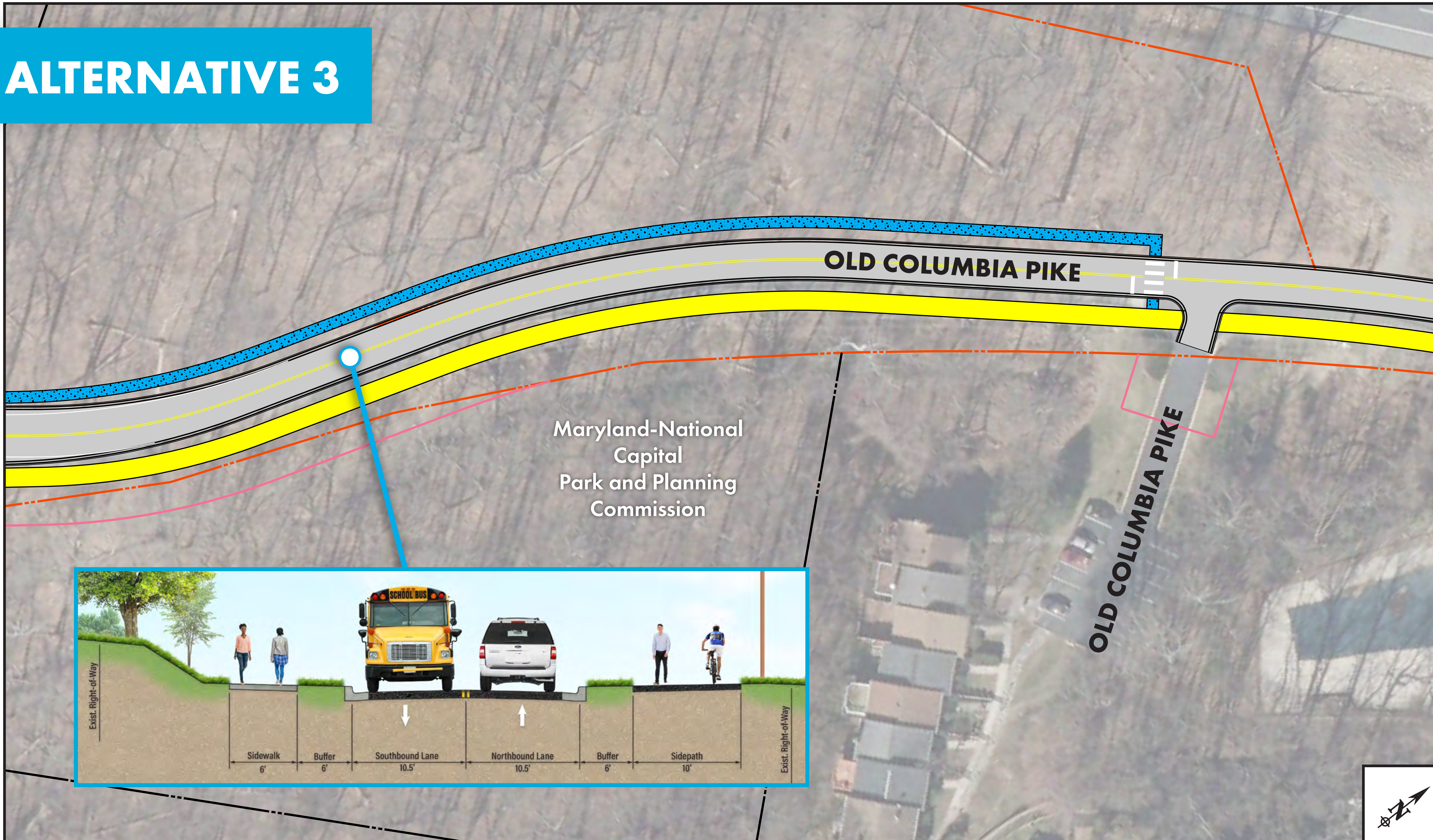
ALTERNATIVE 3



LEGEND | Roadway Pavement | New Bridge | Sidewalk | Sidepath | Property Line | Existing Right-of-Way | Temporary Easement

0 25 50
SCALE IN FEET

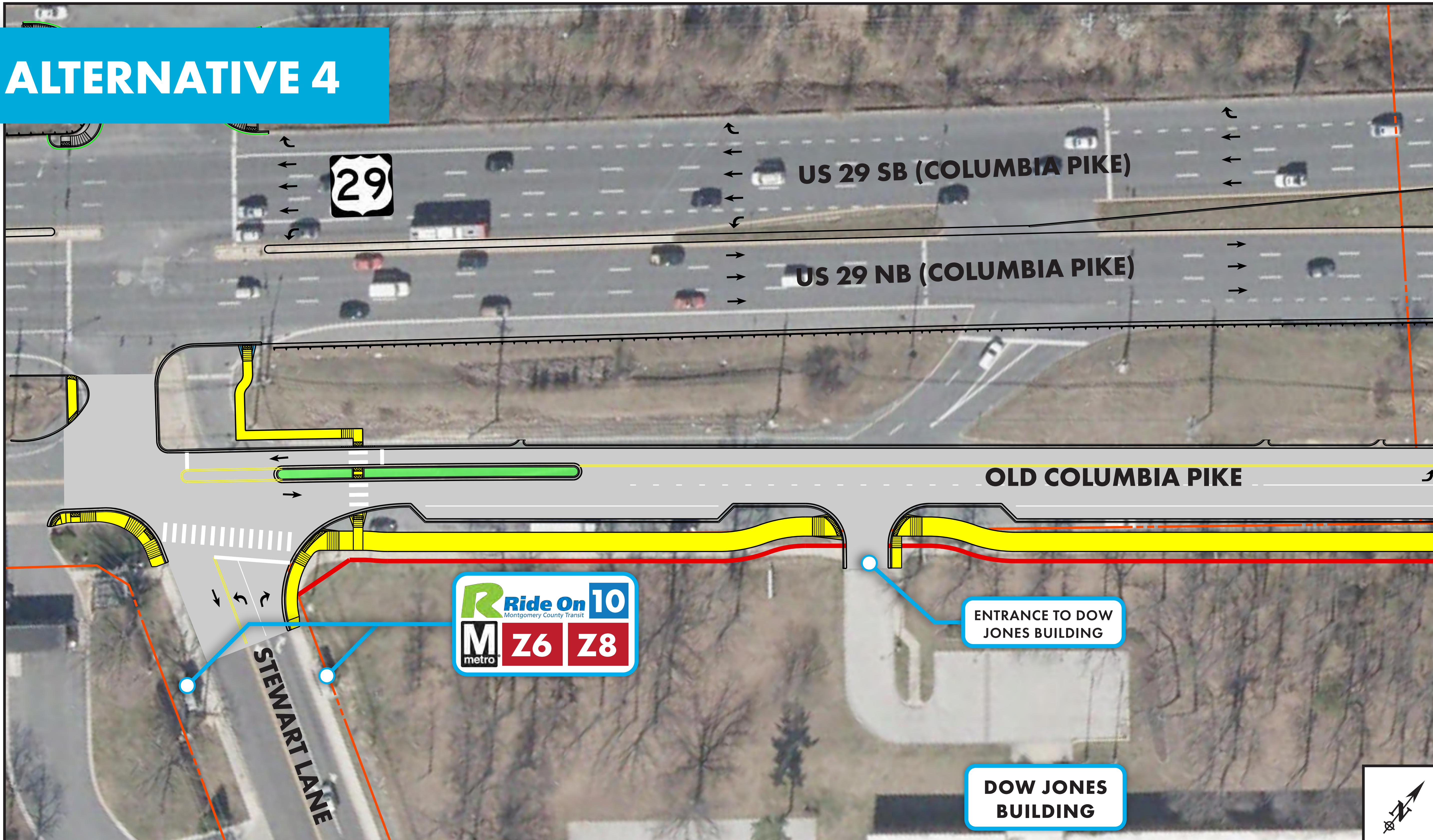
ALTERNATIVE 3



LEGEND | Roadway Pavement | Sidewalk | Sidepath | Property Line | Existing Right-of-Way | Temporary Easement

0 25 50
SCALE IN FEET

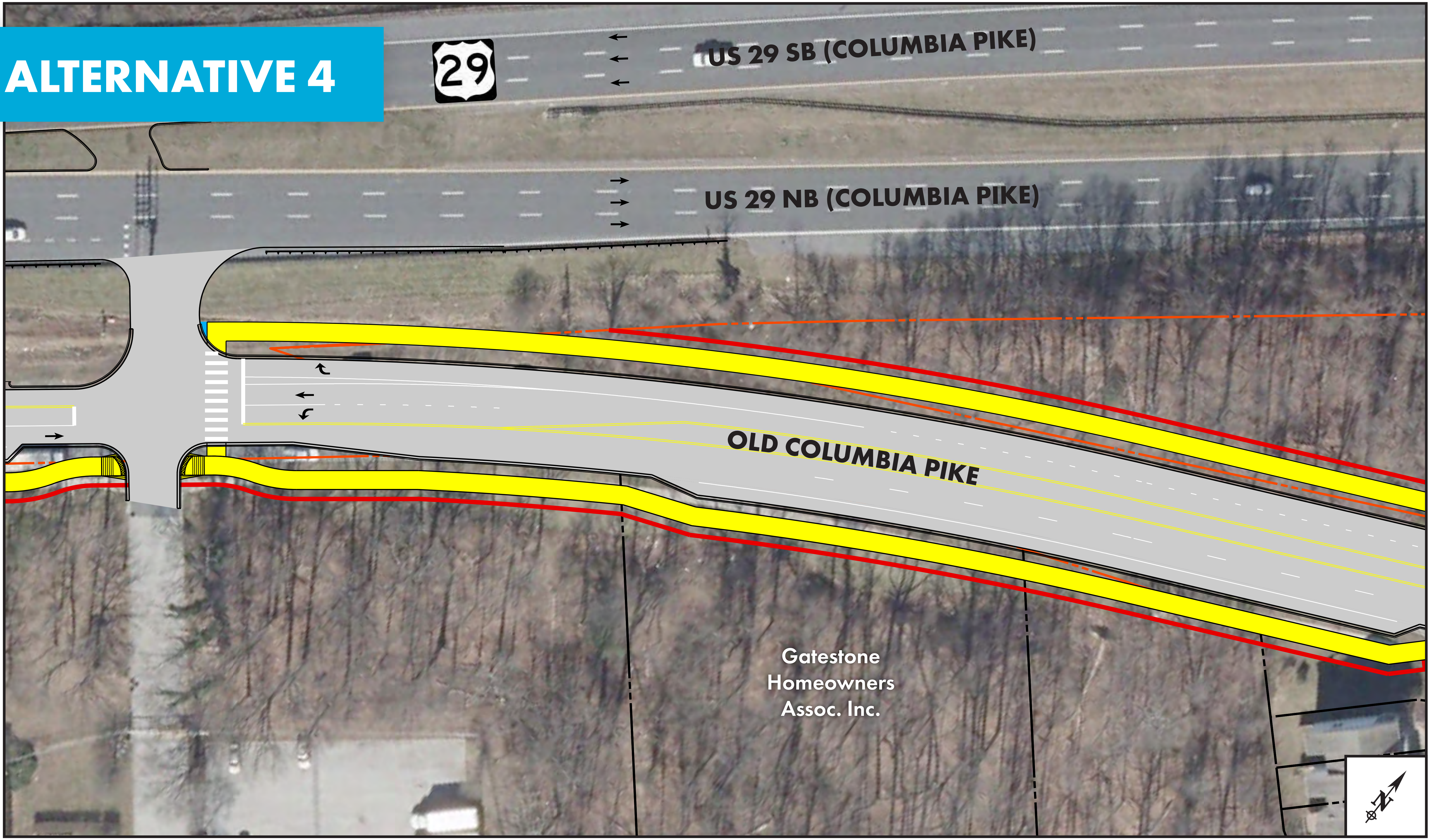
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidepath · Channelizing Island · Property Line · Existing Right-of-Way · Proposed Right-of-Way

0 25 50
SCALE IN FEET

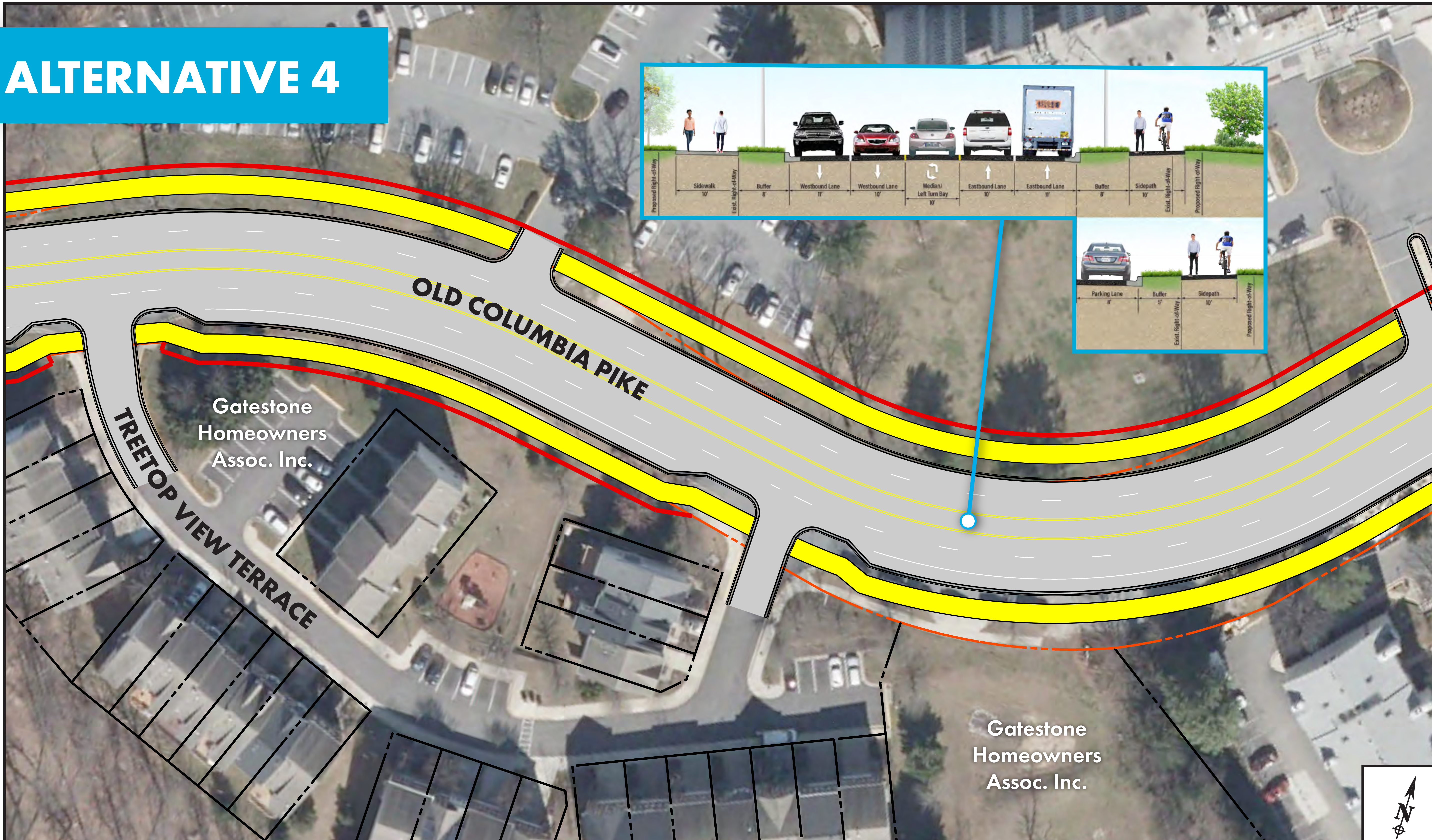
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidepath · Property Line · Existing Right-of-Way · Proposed Right-of-Way

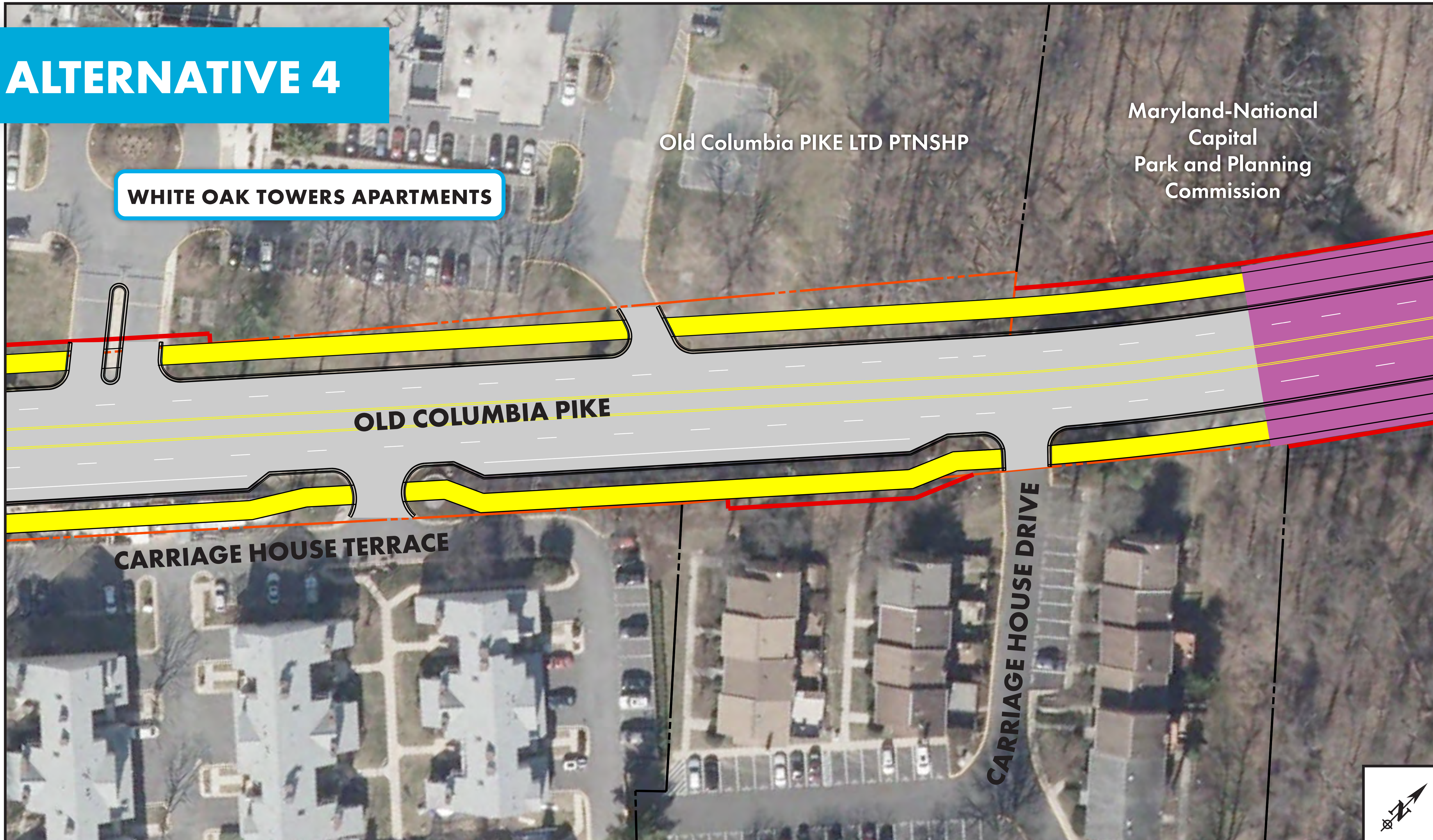
0 25 50
SCALE IN FEET

ALTERNATIVE 4



LEGEND | Roadway Pavement | Sidepath | Property Line | Existing Right-of-Way | Proposed Right-of-Way

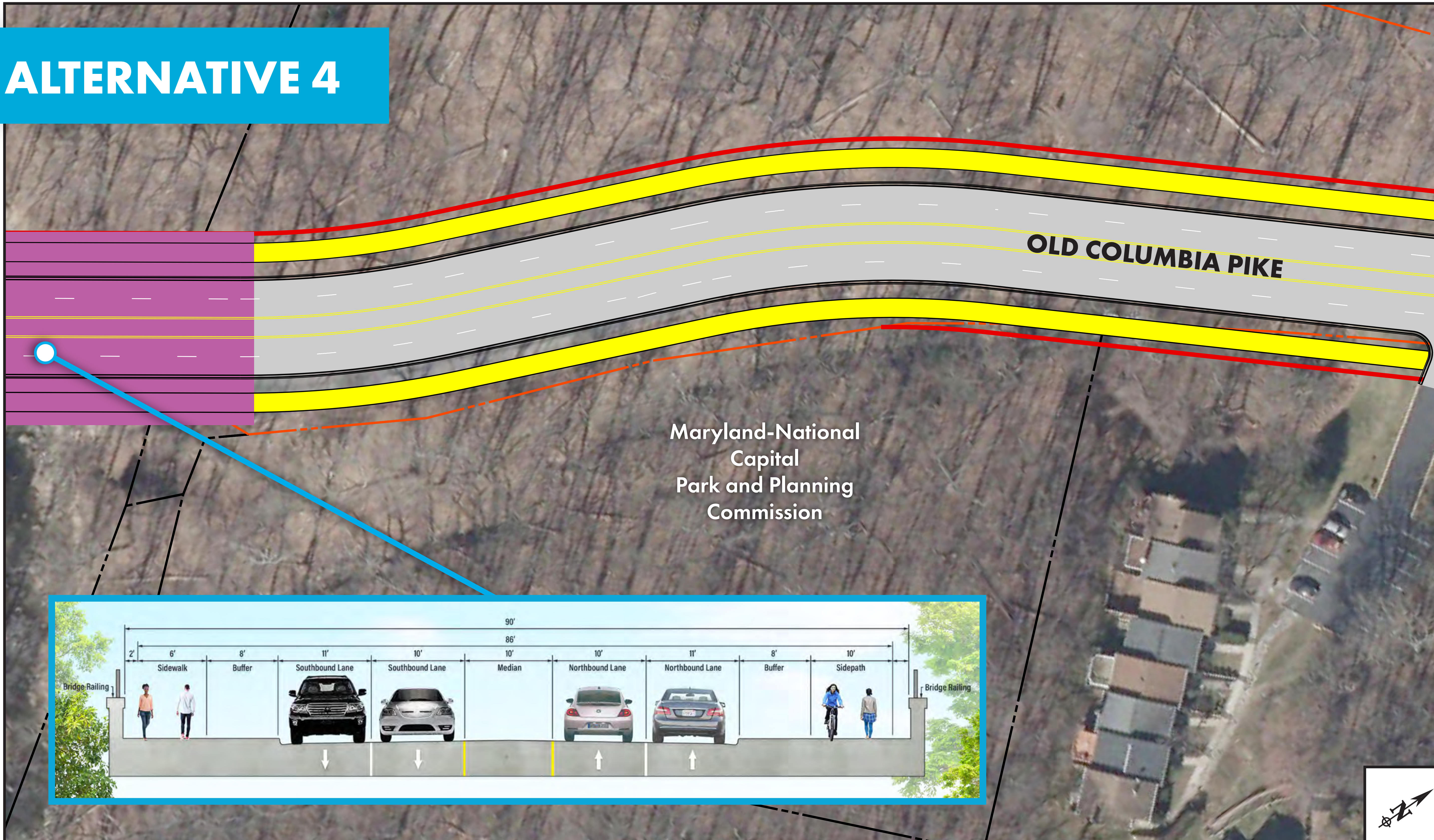
ALTERNATIVE 4



LEGEND | Roadway Pavement | Sidepath | New Bridge | Property Line | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

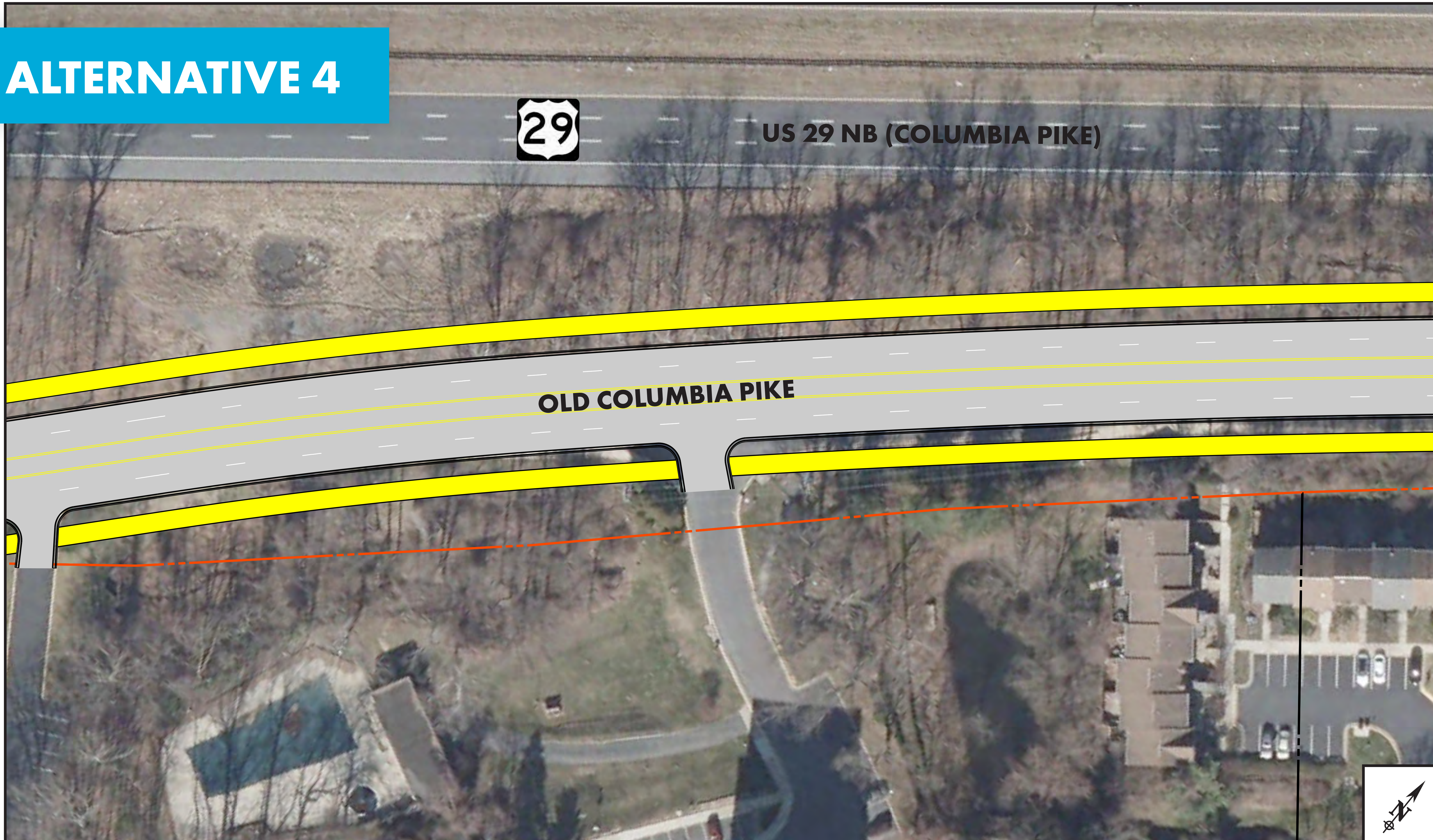
ALTERNATIVE 4



LEGEND | Roadway Pavement | Sidepath | New Bridge | Property Line | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

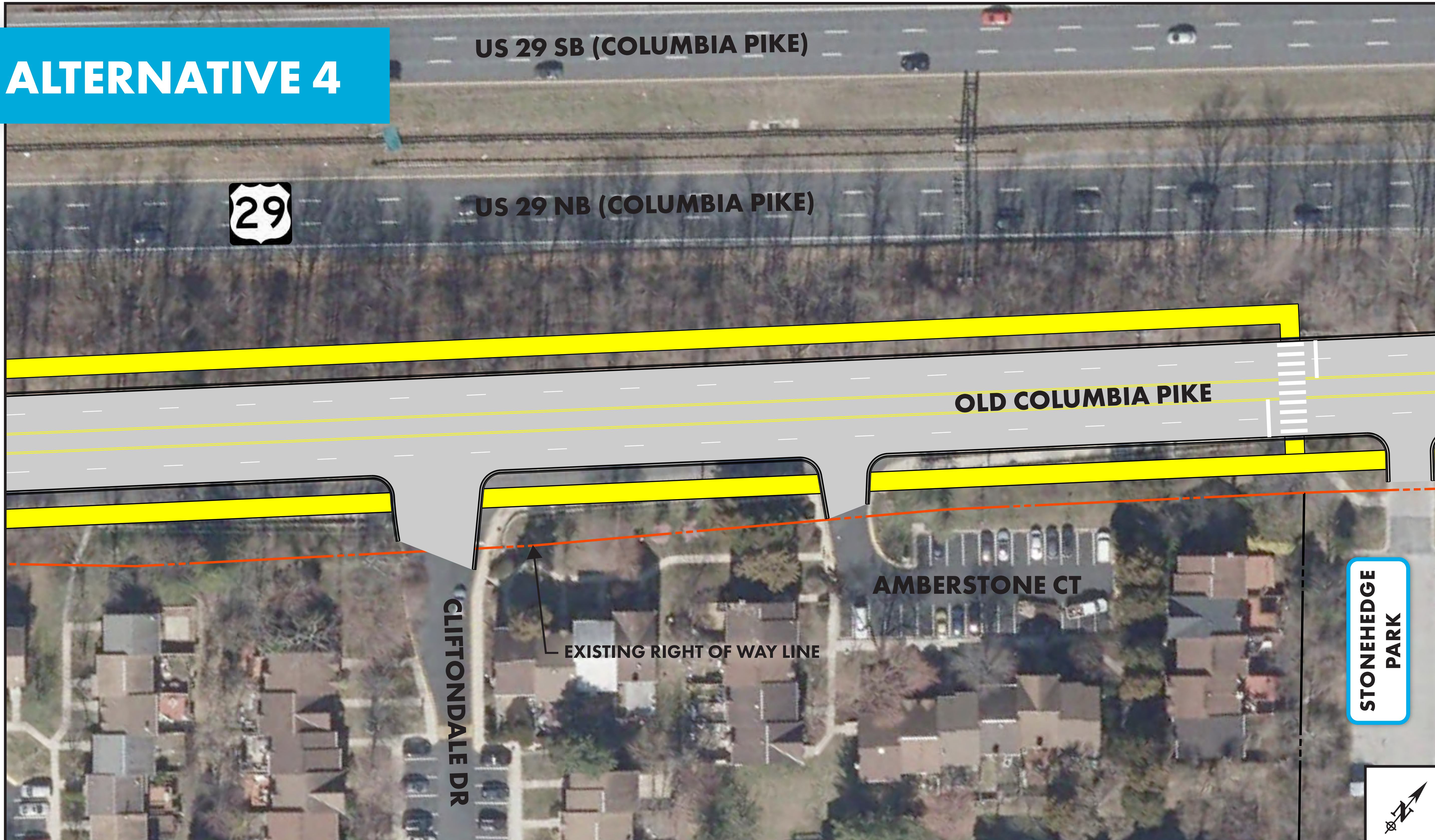
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidepath · Property Line · Existing Right-of-Way

0 25 50
SCALE IN FEET

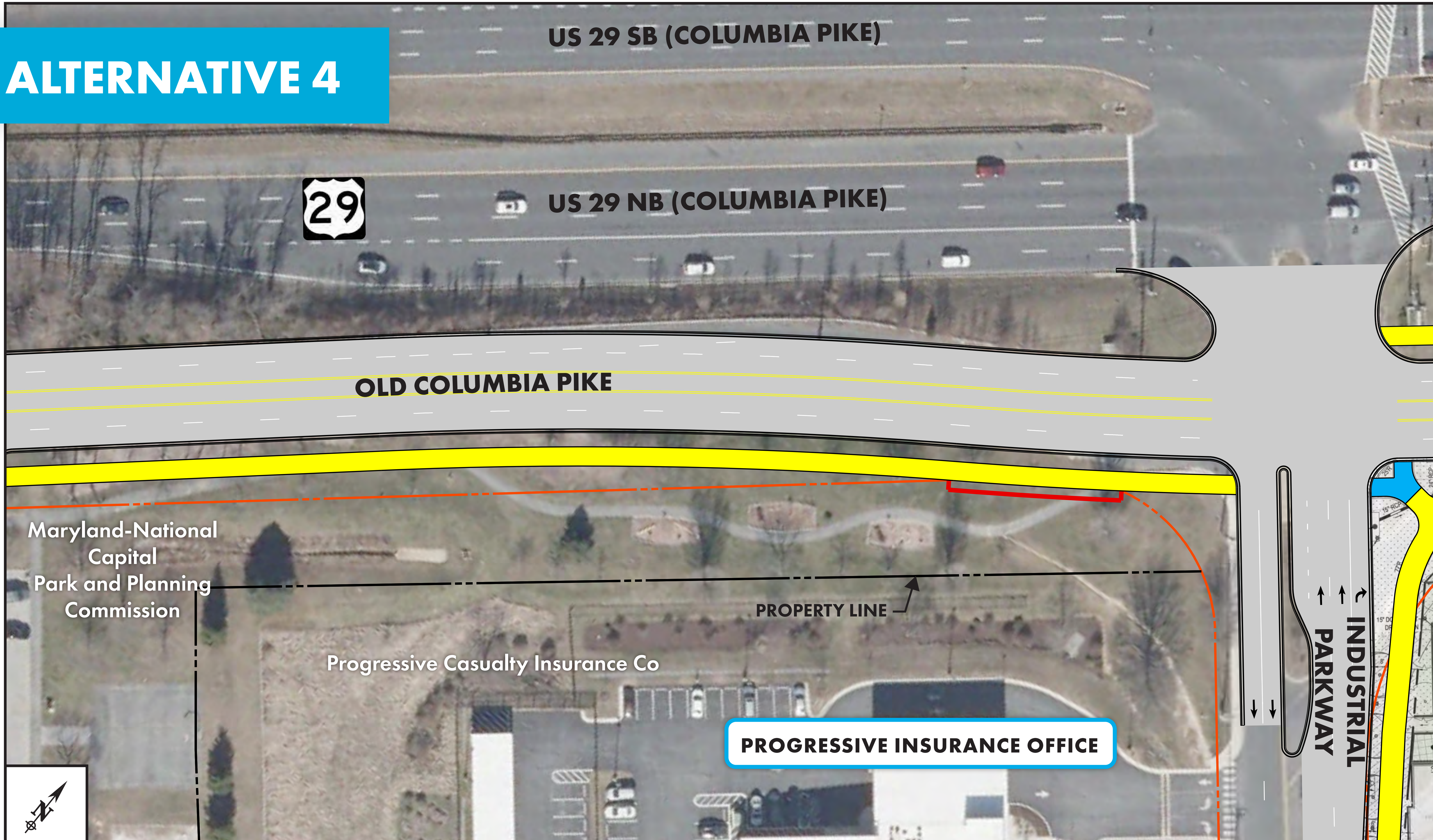
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidepath · Property Line · Existing Right-of-Way

0 25 50
SCALE IN FEET

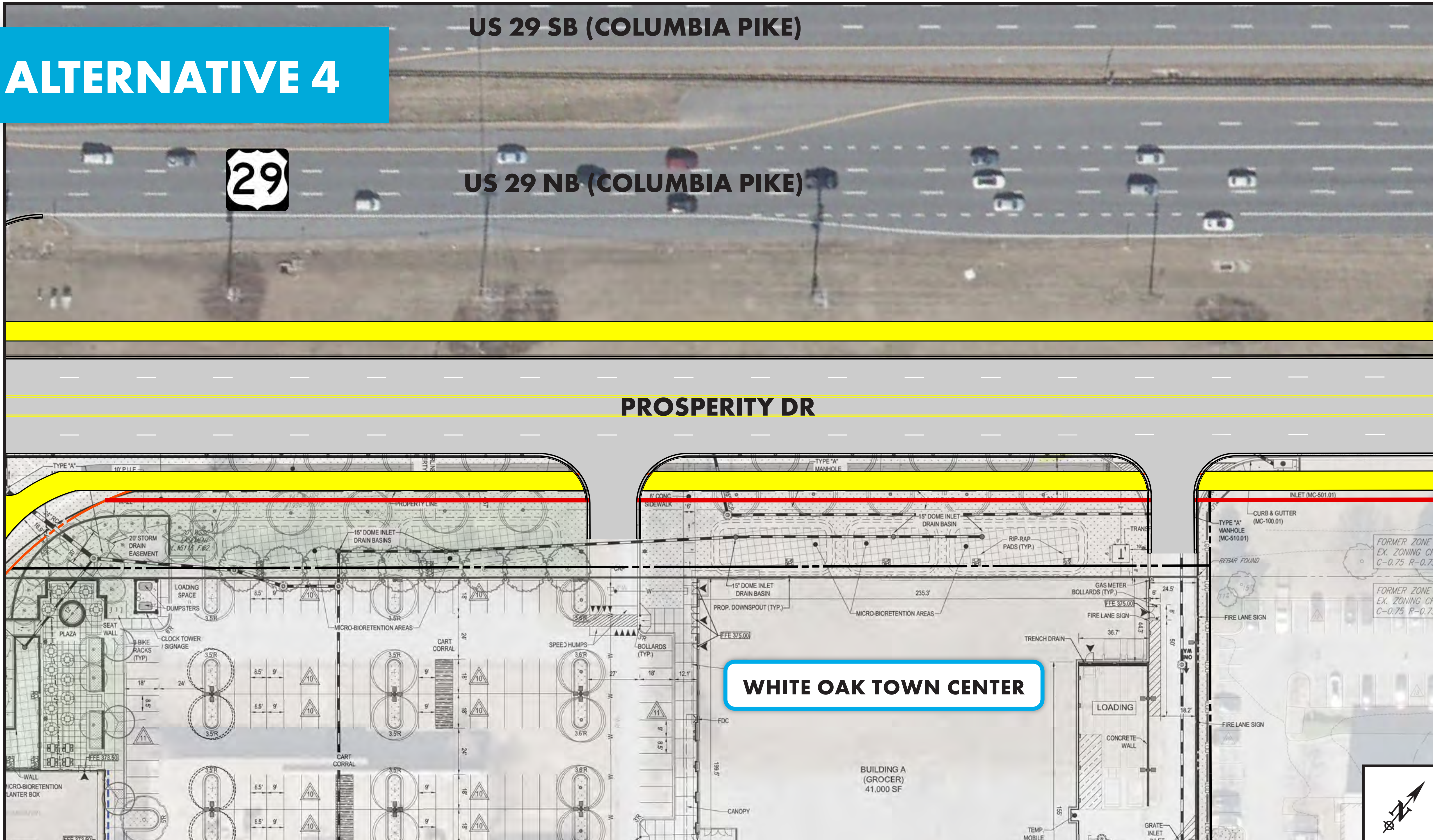
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidewalk · Sidepath · Property Line · Existing Right-of-Way · Proposed Right-of-Way

0 25 50
SCALE IN FEET

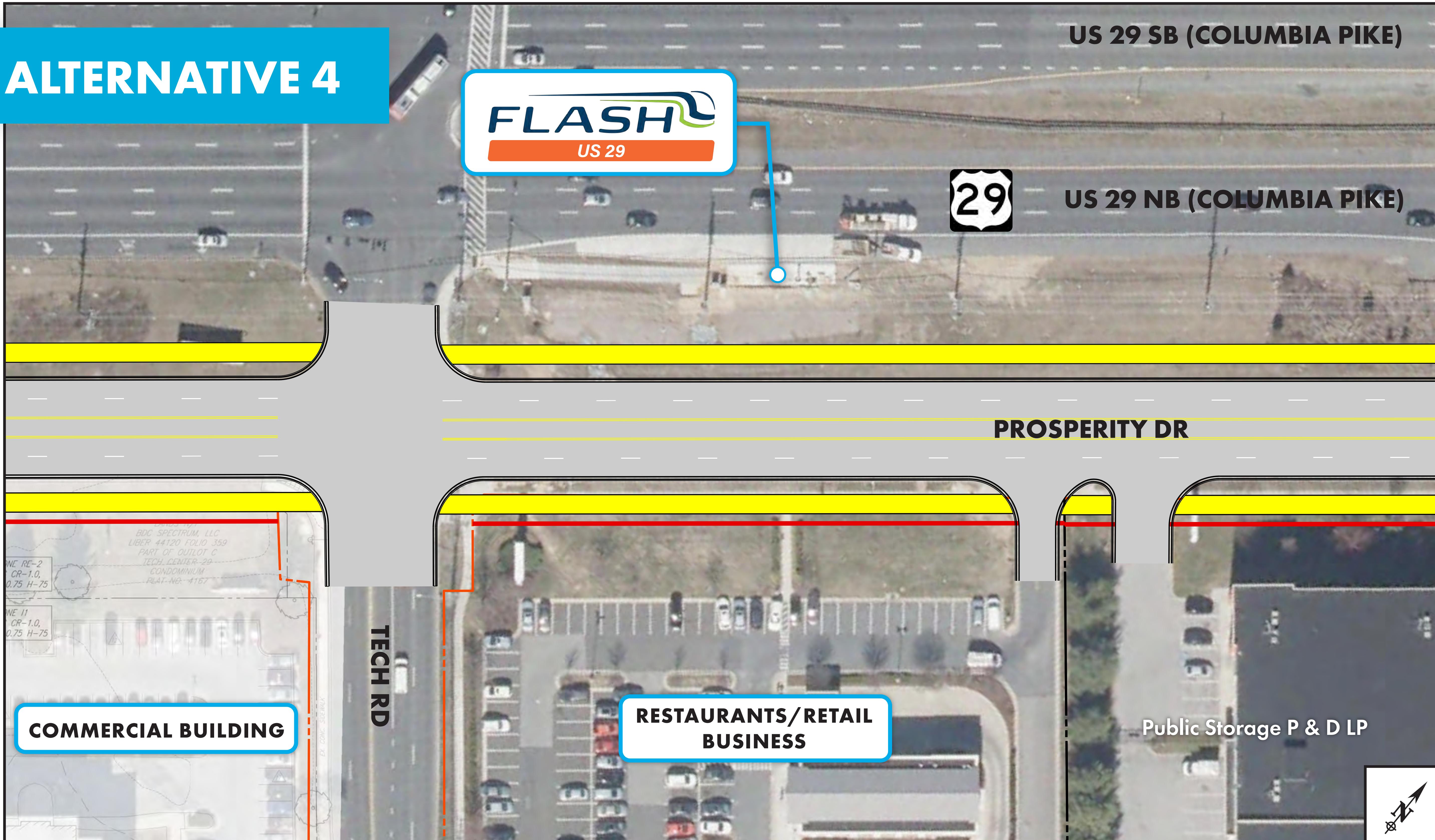
ALTERNATIVE 4



LEGEND | Roadway Pavement — Sidepath — Property Line — Existing Right-of-Way — Proposed Right-of-Way

0 25 50
SCALE IN FEET

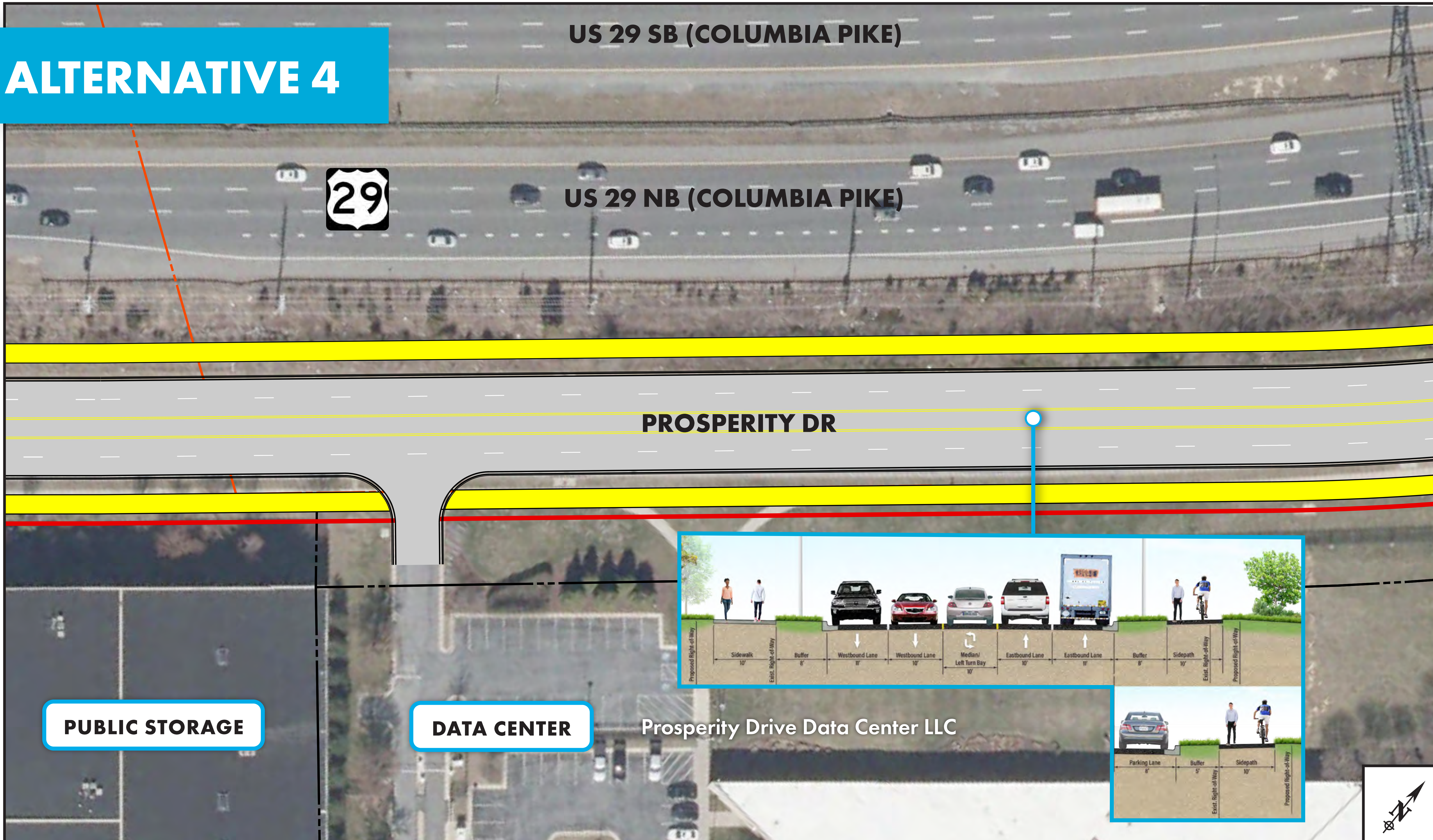
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidepath · Property Line · Existing Right-of-Way · Proposed Right-of-Way

0 25 50
SCALE IN FEET

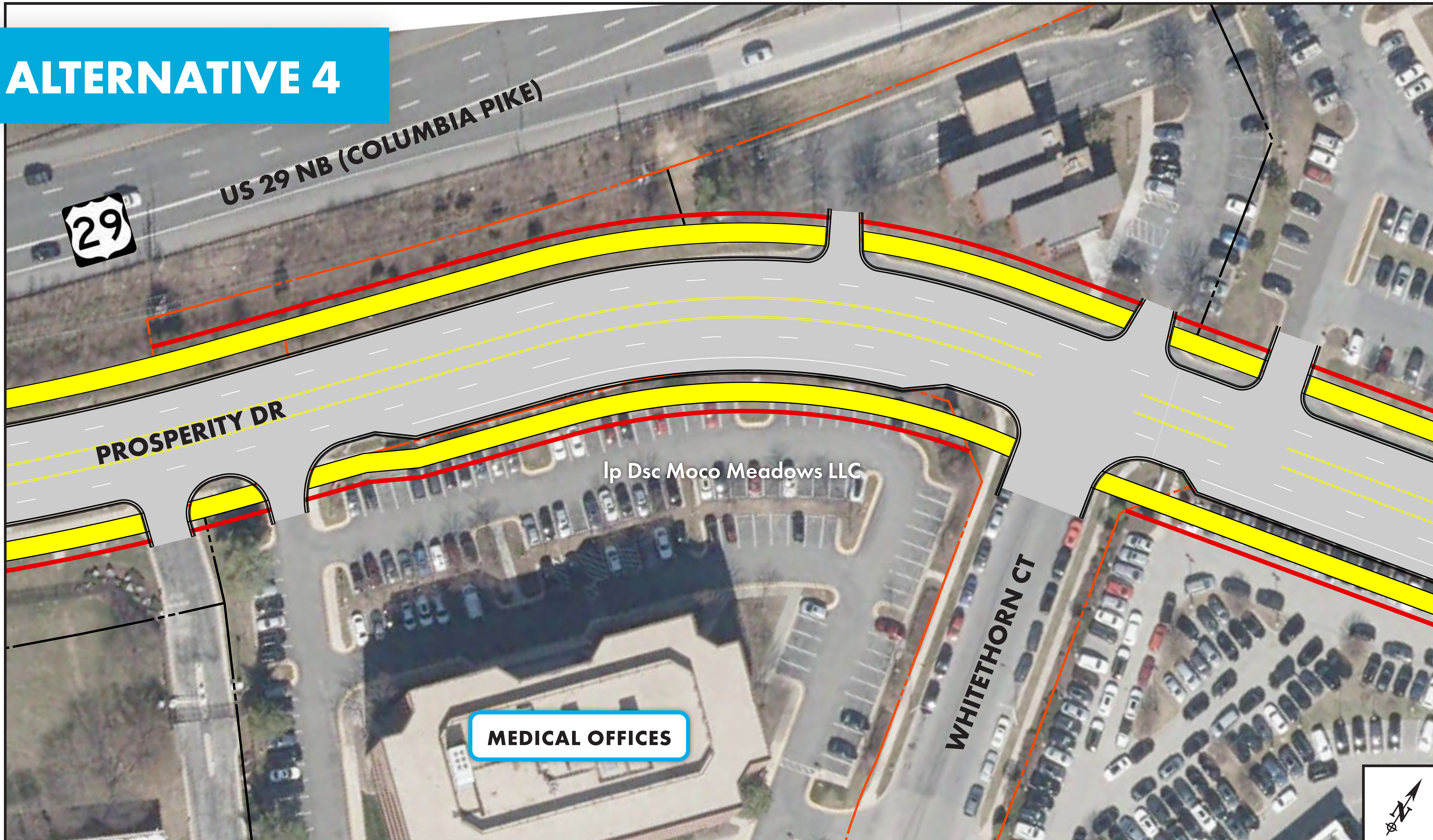
ALTERNATIVE 4



LEGEND | Roadway Pavement | Sidepath | Property Line | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

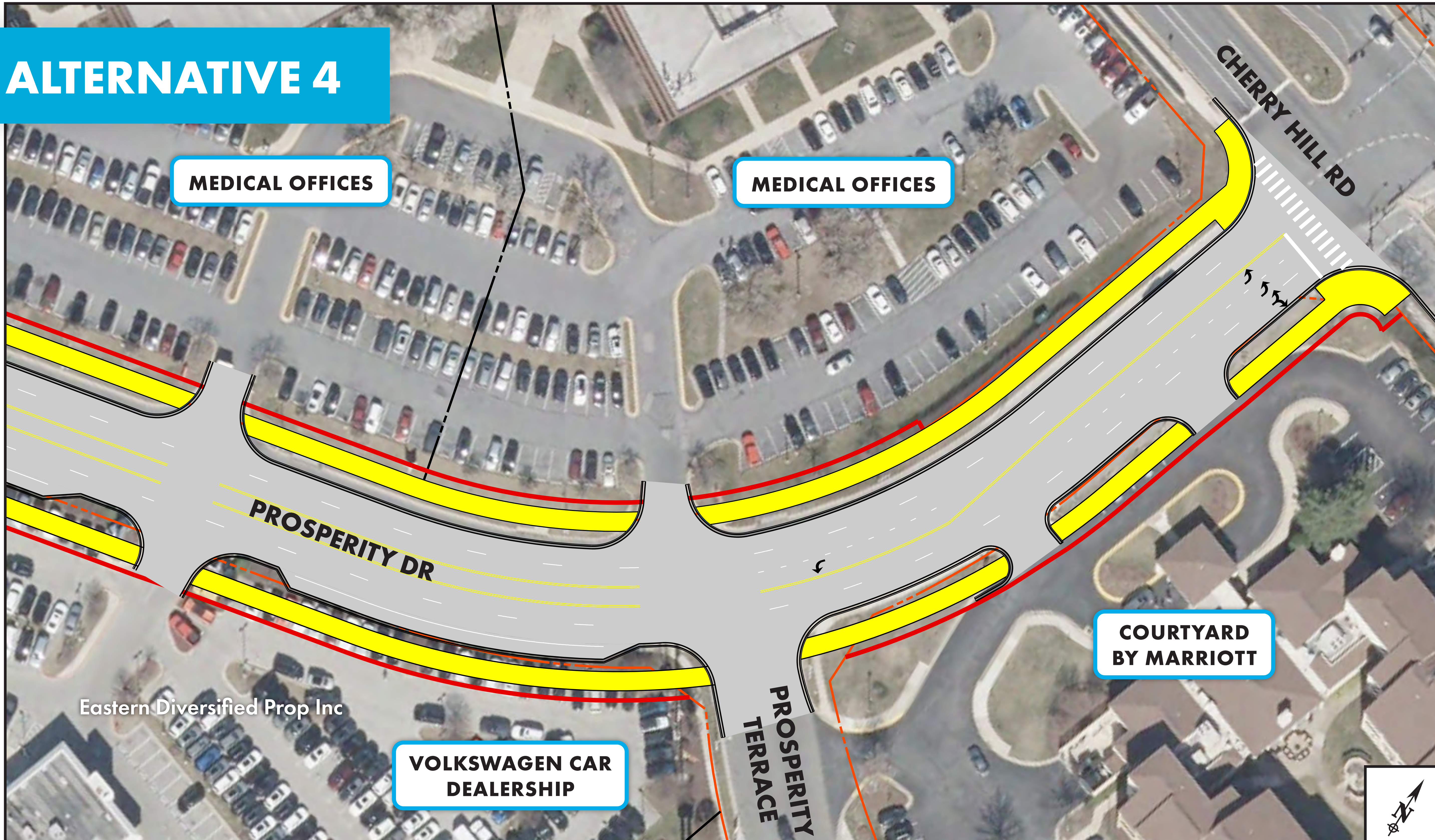
ALTERNATIVE 4



LEGEND | Roadway Pavement · Sidepath · Property Line · Existing Right-of-Way · Proposed Right-of-Way

0 25 50
SCALE IN FEET

ALTERNATIVE 4



LEGEND | Roadway Pavement | Sidepath | Property Line | Existing Right-of-Way | Proposed Right-of-Way

0 25 50
SCALE IN FEET

Appendix H

Benefit-Cost Ratio Analysis

USDOT Benefit-Cost Analysis Spreadsheet Template

What is the USDOT Benefit-Cost Analysis Spreadsheet Template?

The USDOT Benefit-Cost Analysis Spreadsheet Template is being offered as a resource to applicants to help them get started on their BCA. Applicants are NOT required to use this template, it is simply offered as a convenience.

What You Need

- Understanding of the project and the problem it is intended to solve.
- The estimated costs of the project.
- Information needed to estimate the benefits of the project (e.g., number users, baseline conditions, measures of effectiveness, expected service life).

See USDOT BCA Guidance for full details.

Notes

- Input, Optional, and No-Input cells.
  - o Green, bold, and underlined cells represent user input cells. These cells are available for input from the user.
  - o Blue and *italic* cells represent cells where the user may want to edit the formula depending on their project details
  - o Gray and plain text cells represent a cell that does not require user input, and should not be edited.
- Build vs No Build. If you only have data for the difference between the Build and No Build scenarios, enter this data into the "Build" column and leave the "No Build" values at $0. This will still appropriately estimate the benefit
- Deleting a Tab. Do not delete tabs. If a tab is not needed, simply skip it.
- Parameter Values. This template provides a copy of the Appendix A tables from the USDOT BCA guidance document in a spreadsheet format, located on the "Parameter Values" sheet.

Model Base Year	2022
Model Date	1/31/2024

Project Information

Applicants should fill out this sheet first, before moving on to the remainder of the template sheets.

-

Table 1. Project Information

Variable	Value
Model Base Year	2022
First Year of Project Development/Construction	2025
Length of Construction/Project Development Period (in Years)	3
Opening Year	2028
Operational Period Length	28
Final Analysis Year	2055

Capital Costs

In this "Capital Costs" sheet, values should be entered as year-of-expenditure dollars. The template will automatically apply discounting to all costs and benefits

-

3%	Annual Inflation Rate Used to Convert Constant Dollars to Year-of-Expenditure Dollars
$0	Previously Incurred Costs (in 2022 $)

-

Table 1. Capital Costs

Year	Capital Cost in Year-of-Expenditure Dollars	Cost in Constant Dollars (2022 $)
2025	$10,000,000	$9,151,417
2026	$15,000,000	$13,327,306
2027	$20,400,000	$17,597,219
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0
	$0	$0

Safety

Note that not all projects will have benefits in all categories. In such cases, simply leave the input values in that sheet as zeros and move to the next sheet.

-

All values entered into input cells in this sheet should be entered as undiscounted 2022 dollar values. The template will automatically apply discounting to all costs and benefits for you.

-

Table 1. Recommended Monetization Values

KABCO Level	Monetized Value (2022 $)
O - No Injury	$5,000
C - Possible Injury	$111,700
B - Non-incapacitating	$233,800
A - Incapacitating	$1,188,200
K - Killed	$12,500,000
U - Injured (Severity Unknown)	$217,600

-

Crash Type	
PDO Crash	$9,100
Injury Crash	$313,000
Fatal Crash	$14,022,900

-

Table 2. Safety

Year	No Build Safety Costs	Build Safety Costs	Safety Benefits
2028	$0	($92,110)	$92,110
2029	$0	($92,110)	$92,110
2030	$0	($92,110)	$92,110
2031	$0	($92,110)	$92,110
2032	$0	($92,110)	$92,110
2033	$0	($92,110)	$92,110
2034	$0	($92,110)	$92,110
2035	$0	($92,110)	$92,110
2036	$0	($92,110)	$92,110
2037	$0	($92,110)	$92,110
2038	$0	($92,110)	$92,110
2039	$0	($92,110)	$92,110
2040	$0	($92,110)	$92,110
2041	$0	($92,110)	$92,110
2042	$0	($92,110)	$92,110
2043	$0	($92,110)	$92,110
2044	$0	($92,110)	$92,110
2045	$0	($92,110)	$92,110
2046	$0	($92,110)	$92,110
2047	$0	($92,110)	$92,110
2048	$0	($92,110)	$92,110
2049	$0	($92,110)	$92,110
2050	$0	($92,110)	$92,110
2051	$0	($92,110)	$92,110
2052	$0	($92,110)	$92,110
2053	$0	($92,110)	$92,110
2054	$0	($92,110)	$92,110
2055	$0	($92,110)	$92,110
	$0	$0	$0
	$0	$0	$0

7 crashes (4 injury) in 5 years at 2 proposed signalized intersections

Injury Seve	Estimated .	Crash Mod	Estimated .	Annual Reduction in Crashes
K	0	0.64	0	0
A	0	0.64	0	0
B	0.8	0.64	0.512	0.288
C	0	0.64	0	0
O	0.6	0.64	0.384	0.216
Total	1.4		0.896	0.504

Travel Time Savings

Note that not all projects will have benefits in all categories. In such cases, simply leave the input values in that sheet as zeros and move to the next sheet.

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All values entered into input cells in this sheet should be entered as undiscounted 2022 dollar values. The template will automatically apply discounting to all costs and benefits for you.

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Table 1. Recommended Monetization Values

Category	Hourly Value (2022 $)
Personal	$17.90
Business	$32.30
All Purpose	$19.60
Walking, Cycling, Waiting, Standing, and Transfer Time	$35.80
Commercial Vehicle Operators	
Truck Drivers	$33.50
Bus Drivers	$36.50
Transit Rail Operators	$63.30
Locomotive Engineers	$53.50

-

Table 2. Travel Time Savings

Year	No Build Travel Time Costs	Build Travel Time Costs	Travel Time Benefits
2028	$0	$ (1,502,340.00)	$1,502,340
2029	$0	$ (1,502,340.00)	$1,502,340
2030	$0	$ (1,502,340.00)	$1,502,340
2031	$0	$ (1,502,340.00)	$1,502,340
2032	$0	$ (1,502,340.00)	$1,502,340
2033	$0	$ (1,502,340.00)	$1,502,340
2034	$0	$ (1,502,340.00)	$1,502,340
2035	$0	$ (1,502,340.00)	$1,502,340
2036	$0	$ (1,502,340.00)	$1,502,340
2037	$0	$ (1,502,340.00)	$1,502,340
2038	$0	$ (1,502,340.00)	$1,502,340
2039	$0	$ (1,502,340.00)	$1,502,340
2040	$0	$ (1,502,340.00)	$1,502,340
2041	$0	$ (1,502,340.00)	$1,502,340
2042	$0	$ (1,502,340.00)	$1,502,340
2043	$0	$ (1,502,340.00)	$1,502,340
2044	$0	$ (1,502,340.00)	$1,502,340
2045	$0	$ (1,502,340.00)	$1,502,340
2046	$0	$ (1,502,340.00)	$1,502,340
2047	$0	$ (1,502,340.00)	$1,502,340
2048	$0	$ (1,502,340.00)	$1,502,340
2049	$0	$ (1,502,340.00)	$1,502,340
2050	$0	$ (1,502,340.00)	$1,502,340
2051	$0	$ (1,502,340.00)	$1,502,340
2052	$0	$ (1,502,340.00)	$1,502,340
2053	$0	$ (1,502,340.00)	$1,502,340
2054	$0	$ (1,502,340.00)	$1,502,340
2055	$0	$ (1,502,340.00)	$1,502,340
	$0	$0	$0
	$0	$0	$0

Workspace - Applicants may create new sheets for more space

Peak Hour Bridge Volume (AM+PM) per Traffic Study Figure = 620 veh
2 Peak Hours = Approx. 15% Daily Traffic
ADT = 4,200

N side destinations to Stewart Lane - 6 min, 2.2 mi
S side destinations to Industrial Pkwy - 4 min, 1.6 mi

With Bridge Connection:
Approx. 2 min, 0.8 mi

Savings - 3 min, 1.1 mi

ADT	Time Save	AP Cost/hr	Total/Day	Total/yr
4200	3	19.6	$ 4,116.00	$ 1,502,340.00

Vehicle Operating Costs

Note that not all projects will have benefits in all categories. In such cases, simply leave the input values in that sheet as zeros and move to the next sheet.

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All values entered into input cells in this sheet should be entered as undiscounted 2022 dollar values. The template will automatically apply discounting to all costs and benefits for you.

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Table 1. Recommended Monetization Values

Vehicle Type	Recommended Value per Mile (2022 $)
Light Duty Vehicles	$0.52
Commercial Trucks	$1.32
Train and Movement Type	**Recommended Value per Hour (2022 $)**
Idling	Operating Costs
Freight Train	$273
Commuter Train	$299
Amtrak Long-Distance	$747
Amtrak State-Supported	$331
Hauling	Operating Costs
Freight Train	$799
Commuter Train	$778
Amtrak Long-Distance	$1,226
Amtrak State-Supported	$810
All Movements	Operating Costs
Freight Railcar	$1.03

-

Table 2. Vehicle Operating Costs

Year	No Build Vehicle Operating Costs	Build Vehicle Operating Costs	Vehicle Operating Cost Savings
2028	$0	$ (890,906.02)	$890,906
2029	$0	$ (890,906.02)	$890,906
2030	$0	$ (890,906.02)	$890,906
2031	$0	$ (890,906.02)	$890,906
2032	$0	$ (890,906.02)	$890,906
2033	$0	$ (890,906.02)	$890,906
2034	$0	$ (890,906.02)	$890,906
2035	$0	$ (890,906.02)	$890,906
2036	$0	$ (890,906.02)	$890,906
2037	$0	$ (890,906.02)	$890,906
2038	$0	$ (890,906.02)	$890,906
2039	$0	$ (890,906.02)	$890,906
2040	$0	$ (890,906.02)	$890,906
2041	$0	$ (890,906.02)	$890,906
2042	$0	$ (890,906.02)	$890,906
2043	$0	$ (890,906.02)	$890,906
2044	$0	$ (890,906.02)	$890,906
2045	$0	$ (890,906.02)	$890,906
2046	$0	$ (890,906.02)	$890,906
2047	$0	$ (890,906.02)	$890,906
2048	$0	$ (890,906.02)	$890,906
2049	$0	$ (890,906.02)	$890,906
2050	$0	$ (890,906.02)	$890,906
2051	$0	$ (890,906.02)	$890,906
2052	$0	$ (890,906.02)	$890,906
2053	$0	$ (890,906.02)	$890,906
2054	$0	$ (890,906.02)	$890,906
2055	$0	$ (890,906.02)	$890,906
	$0	$0	$0
	$0	$0	$0

Workspace - Applicants may create new sheets for more space

Peak Hour Bridge Volume (AM+PM) per Traffic Study Figure = 620 veh
2 Peak Hours = Approx. 15% Daily Traffic
ADT = 4,200

N side destinations to Stewart Lane - 6 min, 2.2 mi
S side destinations to Industrial Pkwy - 4 min, 1.6 mi

With Bridge Connection:
Approx. 2 min, 0.8 mi

Savings - 3 min, 1.1 mi

ADT	Mi Save	Light $/mi	Trk $/mi	Truck %	Total/Day	Total/yr
4200	1.1	0.52	1.32	5%	$ 2,440.84	$ 890,906.02

Amenity Benefits

Note that not all projects will have benefits in all categories. In such cases, simply leave the input values in that sheet as zeros and move to the next sheet.

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All values entered into input cells in this sheet should be entered as undiscounted 2022 dollar values. The template will automatically apply discounting to all costs and benefits for you.

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For recommended monetization values, please refer to the Parameter Values tab directly.

There are numerous potential values for pedestrian facilities, bicycle facilities, transit vehicles, and transit stations.

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Table 2. Amenity Benefits

Year	Amenity Benefits
2028	$ 133,026.20
2029	$ 133,026.20
2030	$ 133,026.20
2031	$ 133,026.20
2032	$ 133,026.20
2033	$ 133,026.20
2034	$ 133,026.20
2035	$ 133,026.20
2036	$ 133,026.20
2037	$ 133,026.20
2038	$ 133,026.20
2039	$ 133,026.20
2040	$ 133,026.20
2041	$ 133,026.20
2042	$ 133,026.20
2043	$ 133,026.20
2044	$ 133,026.20
2045	$ 133,026.20
2046	$ 133,026.20
2047	$ 133,026.20
2048	$ 133,026.20
2049	$ 133,026.20
2050	$ 133,026.20
2051	$ 133,026.20
2052	$ 133,026.20
2053	$ 133,026.20
2054	$ 133,026.20
2055	$ 133,026.20
	$0
	$0

Workspace - Applicants may create new sheets for more space

Table A-8: Pedestrian Facility Improvements Revealed Preference Values

Improvement Type	Recommended Value per Person-Mile Walked (2022 $)[1]
Expand Sidewalk (per foot of added width)[2]	$0.11
Reducing Upslope by 1%	$1.11
Reducing Traffic Speed by 1 mph (for speeds ≤45 mph)	$0.09
Reducing Traffic Volume by 1 Vehicle per Hour (for ADT <55,000)	$0.0010

-

Improvement Type	Recommended Value per Use (2022 $)[1]
Install Marked-Crosswalk on Roadway with Volumes ≥10,000 Vehicle per Day	$0.19
Install Signal for Pedestrian Crossing on Roadway with Volumes ≥13,000 Vehicles per Day	$0.51

1) These values assume an average walking trip speed of 3.2 miles per hour. For the mile-based benefits, the estimated value per user should be capped at 0.86 miles, the average length of a walking trip in the 2017 National Household Travel Survey, unless the applicant has specific documentation suggesting longer trips or that a trip shorter than 0.86 miles is not feasible on the facility in question. In other words, applicants should not assume all pedestrians travel the full distance of a proposed facility if the facility is longer than 0.86 miles without a clear justification for doing so.

2) Value for sidewalk width expansion applicable for sidewalks up to approximately 31 feet, benefits for expansions beyond this width should be described qualitatively.

-

Table A-9: Cycling Facility Improvement Revealed Preference Values

Facility Type	Recommended Value per Cycling Mile (2022 $)[1]
Cycling Path with At-Grade Crossings	$1.57
Cycling Path with no At-Grade Crossings[2]	$1.97
Dedicated Cycling Lane	$1.86
Cycling Boulevard/"Sharrow"	$0.29
Separated Cycle Track	$1.86

1) Values should only be applied over sections for which a comparable parallel facility is not available, and only applies to miles cycled on the project facility. These values assume an average cycling trip speed of 9.8 miles per hour or, in the case of off-street paths with no at-grade crossings, a free-flow cycling speed of 12.1 miles per hour. The estimated value per cyclist should be capped at 2.38 miles, the average length of a cycling trip in the 2017 National Household Travel Survey, unless the applicant has specific documentation suggesting longer trips or that a trip shorter than 2.38 miles is not feasible on the facility in question. In other words, applicants should not assume all cyclists travel the full distance of a proposed facility if the facility is longer than 2.38 miles without a clear justification for doing so.

2) The value for a cycling path with no at-grade intersections is higher due to an assumption of higher average speed of 12.1 miles per hour, resulting in less time on the facility, which lowers journey quality benefits but increases travel time savings.

Segment	Sidepath Length	mi	Sidewalk Length	mi	Use, General	Estimated Peds/Day	% Distance used	Estimated Bikes/Day	% Distance used
Stewart Lane to Bridge	2760	0.52	2780	0.53	Medium; lots of residential, distant commercial, limited US 29 xing	200	50%	100	75%
Bridge to Tech Rd	3950	0.75	700	0.13	High; dense mixed use, park, access to west side of US 29	400	40%	150	75%
Tech Rd to Cherry Hill Rd	2980	0.56	1630	0.31	Low; no residential, "non-walkable" commercial, higher thru trips (bike)	50	30%	40	100%

	Estimated Users
Ped Signal @ Industrial	150
Ped Signal @ Tech	250

	Daily	Yearly	(-seasonal/weather factor)
Expand Sidewalk (per foot of added width)	$ 25.90	$ 6,618.25	
Cycling path with at-grade crossings	$ 290.75	$ 74,285.95	
Install Signal for Pedestrian Crossing on Roadway with Volumes ≥13,000 Vehicles per Day	$ 204.00	$ 52,122.00	
		$ 133,026.20	

Health Benefits

Note that not all projects will have benefits in all categories. In such cases, simply leave the input values in that sheet as zeros and move to the next sheet.

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All values entered into input cells in this sheet should be entered as undiscounted 2022 dollar values. The template will automatically apply discounting to all costs and benefits for you.

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Table 1. Recommended Monetization Values

Mode	Applicable Age Range	Recommended Value per Induced Trip (2022 $)
Walking	Ages 20-74	$7.63
Cycling	Ages 20-64	$6.80

Absent more localized data on the proportion of the expected users falling into the age ranges above, applicants may apply a general assumption of 68% and 59% of overall induced trips falling into the walking and cycling age ranges, respectively, assuming a distribution matching the national average.

Applicants should ensure these monetization values are only applied to trips induced from non-active transportation modes within the relevant age ranges for each mode. Absent more localized data on the proportion of induced trips coming from non-active transportation modes, applicants may apply a general assumption of 89% of induced trips falling into that category, assuming a distribution matching the national average travel pattern.

-

Table 2. Health Benefits

Year	Health Benefits
2028	$ 1,246,465.88
2029	$ 1,246,465.88
2030	$ 1,246,465.88
2031	$ 1,246,465.88
2032	$ 1,246,465.88
2033	$ 1,246,465.88
2034	$ 1,246,465.88
2035	$ 1,246,465.88
2036	$ 1,246,465.88
2037	$ 1,246,465.88
2038	$ 1,246,465.88
2039	$ 1,246,465.88
2040	$ 1,246,465.88
2041	$ 1,246,465.88
2042	$ 1,246,465.88
2043	$ 1,246,465.88
2044	$ 1,246,465.88
2045	$ 1,246,465.88
2046	$ 1,246,465.88
2047	$ 1,246,465.88
2048	$ 1,246,465.88
2049	$ 1,246,465.88
2050	$ 1,246,465.88
2051	$ 1,246,465.88
2052	$ 1,246,465.88
2053	$ 1,246,465.88
2054	$ 1,246,465.88
2055	$ 1,246,465.88
	$0
	$0

Workspace - Applicants may create new sheets for more space

Table A-13: Mortality Reduction Benefits of Induced Active Transportation Values

Mode	Applicable Age Range[3]	Recommended Value per Induced Trip (2022 $)[4]
Walking[1]	Ages 20-74	$7.63
Cycling[2]	Ages 20-64	$6.80

1) Based on an assumed average walking speed of 3.2 miles per hour, an assumed average age of the relevant age range (20-74 years) of 45, a corresponding baseline mortality risk of 267.1 per 100,000, an annual risk reduction of 8.6 percent per daily mile walked, and an average walking trip distance of 0.86 miles.

2) Based on an assumed average cycling speed of 9.8 miles per hour, an assumed average age of the relevant age range (20-64 years) of 42, a corresponding baseline mortality risk of 217.9 per 100,000, an annual risk reduction of 4.3 percent per daily mile cycled, and an average cycling trip distance of 2.38 miles.

3) Absent more localized data on the proportion of the expected users falling into the age ranges above, applicants may apply a general assumption of 68% and 59% of overall induced trips falling into the walking and cycling age ranges, respectively, assuming a distribution matching the national average.

4) Applicants should ensure these monetization values are only applied to trips induced from non-active transportation modes within the relevant age ranges for each mode. Absent more localized data on the proportion of induced trips coming from non-active transportation modes, applicants may apply a general assumption of 89% of induced trips falling into that category, assuming a distribution matching the national average travel pattern.

	Daily	Yearly (-seasonal/weather factor)
Assume 60% of Estimated Walking Trips are Induced	$ 2,975.70	$ 814,597.88
Assume 80% of Estimated Bike Trips are Induced	$ 1,577.60	$ 431,868.00
		$ 1,246,465.88

Summary by Benefit Area

Note that not all projects will have all benefit categories. Conversely, if more categories are needed, applicants may need to add additional columns, but be sure to edit the formula under "Total Benefits" to ensure all benefits are being correctly summed.

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Table 1. Summary of Benefits

Year	Operations and Maintenance	Safety	Travel Time Savings	Vehicle Operating Cost Savings	Non-CO2 Emission Reduction	CO2 Emission Reduction	Avoided Highway Externality	Amenity Benefits	Health Benefits	Residual Value	Total Benefits	Total Discounted Benefits
2028	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$3,217,958
2029	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$3,121,201
2030	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$3,027,353
2031	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,936,327
2032	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,848,038
2033	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,762,403
2034	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,679,344
2035	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,598,782
2036	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,520,642
2037	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,444,851
2038	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,371,340
2039	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,300,039
2040	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,230,881
2041	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,163,803
2042	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,098,742
2043	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$2,035,638
2044	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,974,430
2045	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,915,063
2046	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,857,481
2047	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,801,631
2048	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,747,460
2049	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,694,917
2050	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,643,955
2051	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,594,524
2052	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,546,580
2053	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,500,078
2054	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,454,974
2055	$0	$92,110	$1,502,340	$890,906	$0	$0	$0	$133,026	$1,246,466	$0	*$3,864,848*	$1,411,226
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	*$0*	$0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	*$0*	$0
Undiscounted Total	$0	$2,579,080	$42,065,520	$24,945,368	$0	$0	$0	$3,724,733	$34,901,045	$0	*$108,215,746*	
Discounted Total	$0	$1,465,707	$23,906,089	$14,176,603	$0	$0	$0	$2,116,789	$19,834,474	$0	$61,499,661	$61,499,661

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Table 2. Summary of Costs

Year	Capital Cost	Discounted Capital Cost
2025	$9,151,417	$8,350,497
2026	$13,327,306	$11,795,265
2027	$17,597,219	$15,106,043
2028	$0	$0
2029	$0	$0
2030	$0	$0
2031	$0	$0
2032	$0	$0
2033	$0	$0
2034	$0	$0
2035	$0	$0
2036	$0	$0
2037	$0	$0
2038	$0	$0
2039	$0	$0
Total	$40,075,942	$35,251,805

Benefit Cost Analysis Results

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Table 1. BCA Results

Category	Value
Total Discounted Benefits	$61,499,661
Total Discounted Costs	$35,251,805
Net Present Value	$26,247,856
Benefit Cost Ratio	1.74