U.S. Department of Transportation
Federal Highway Administration

South Carolina

1835 Assembly Street, Suite 1270
Columbia, South Carolina 29201
803-765-5411
803-253-3989

July 20, 2020

In Reply Refer To:
HDA-SC

Mr. Chad Long
Director Environmental Services Office
South Carolina Department of Transportation (SCDOT)
955 Park Street, P.O. Box 191
Columbia, South Carolina 29202

Subject: I-26 Widening and Interchange Improvements; Mile Marker 85 to 101, EA/FONSI Reevaluation and Amended Interchange Modification Report (IMR) Approval; Federal Project Number P029208.

Dear Mr. Long:

The FHWA has received your request for a Reevaluation of the FONSI determination for the subject project. Based on the information provided to complete the environmental process the FHWA finds that the project revisions do not affect the FHWA's original determination; therefore, the FONSI determination remains valid.

We have also reviewed the amended Interchange Modification Report (IMR) submitted on June 10, 2020, for an Interstate access revision at Exit 91. Based on our review, the modifications, as recommended, are acceptable. As the selected alternative contained in the approved NEPA document is consistent with the IMR, the proposed access revision to the Interstate System is approved. Please note that the approved access revision is valid for a period of three years and must be re-assessed if not advanced to construction within this timeframe.

Please address any questions to Mr. J. Shane Belcher at jeffrey.belcher@dot.gov /803-253-3187 or Mr. Jim Martin at james.martin@dot.gov /803-765-5693.

Sincerely,

EMILY OLDHAM LAWTON
Digitally signed by EMILY OLDHAM LAWTON
Date: 2020.07.20 13:23:04 -04'00'

Emily O. Lawton
Division Administrator

Enclosure

ec: Mr. Will McGoldrick, SCDOT Design-Build NEPA Coordinator
Mr. Brad Reynolds, SCDOT Design-Build Program Manager

Interstate 26 Widening MM 85-101

Design-Build Project

Project ID P029208

Richland, Lexington, and Newberry Counties

NEPA RE-EVALAUTION

June 2020

ARCHER UNITED JOINT VENTURE

in association with

INFRASTRUCTURE CONSULTING & ENGINEERING

ENVIRONMENTAL RE-EVALUATION FORM

FHWA South Carolina

State File #	Fed Project #	Project ID	Route	County
	P029208	P029208	I-26	Richland

Project Name/Description

I-26 Widening MM 85-101 in Newberry, Lexington, and Richland Counties. The project would widen Interstate 26 (I-26) from approximately 1.6 miles west of the SC Highway 202 (SC 202) interchange (exit 85) to approximately 0.4 mile west of the US Highway 176 (US 176) interchange (exit 101). The project would also reconstruct interchanges along exits 85, 91, and 97.

1. DOCUMENT TYPE: ☐ EIS ☒ EA ☐ CE (non Programmatic) ☐ PCE (No FHWA Approval Required)

A. Other Actions Associated with the Project:

- ☐ Section 4(f) Evaluation
- ☒ Section 106 Compliance
- ☒ Wetland Finding/Section 404 Compliance
- ☒ T & E Species Biological Assessment
- ☐ None

2. DOCUMENT APPROVAL DATE: August 22, 2018

3. DATE(S) OF PRIOR RE-EVALUATIONS: March 30, 2020 (2 bridges)

4. PROJECT DEVELOPMENT STAGE:

- ☒ Final Design
- ☐ ROW
- ☐ Construction
- ☒ Other, Specify: Design-Build contract, currently finalizing ROW and final design

5. HAS DESIGN OR ROW CHANGED SINCE THE LAST APPROVAL?: (if "NO" then Go To Item 7) ☒ YES ☐ NO

6. DESCRIPTION OF CURRENT PROJECT/DESIGN CHANGES:

Design configuration at Exit 91 has been revised and the PSA has expanded. Additional design changes at overpass bridges; bridges will now be closed and detours required. See attached.

7. HAVE THERE BEEN SIGNIFICANT CHANGES IN THE AFFECTED ENVIRONMENT OR HAVE THE ENVIRONMENTAL STUDIES BEEN UPDATED SINCE THE LAST PROJECT APPROVAL?: (If "NO" to both Items 5 and 7, Go To Item 10) ☒ YES ☐ NO

8. APPROVED DOCUMENT(S) RE-EVALUATION:

A. REVIEW OF EFFECTS: (Complete this section if "YES" to either Item 5 or Item 7)

SOCIAL ENVIRONMENT	CHANGE		REMARKS
1. Land Use	☐ YES	☒ NO	
2. Community	☐ YES	☒ NO	
3. Relocations	☒ YES	☐ NO	Relocations decreased, see attached pg 12
4. Churches/Institutions	☐ YES	☒ NO	
5. Title VI/E.O. 12898	☐ YES	☒ NO	
6. Economic	☐ YES	☒ NO	
7. Controversy	☐ YES	☒ NO	
8. Other; Specify	☐ YES	☒ NO	

NATURAL ENVIRONMENT	CHANGE		REMARKS
1. Wetlands	☒ YES	☐ NO	The PSA expanded around exit 91, see JD
2. Water Quality	☐ YES	☒ NO	
3. Wild/Scenic Rivers	☐ YES	☒ NO	
4. Farmland	☐ YES	☒ NO	
5. T & E Species	☐ YES	☒ NO	
6. Floodplains	☐ YES	☒ NO	
7. Other; Specify	☐ YES	☒ NO	

PHYSICAL ENVIRONMENT	CHANGE		REMARKS
1. Noise	☒ YES	☐ NO	Reduction in noise impacts; see attached
2. Air Quality	☐ YES	☒ NO	
3. Energy/Mineral Resources	☐ YES	☒ NO	
4. Construction/Utilities	☐ YES	☒ NO	
5. UST's	☐ YES	☒ NO	
6. Hazardous Waste Sites	☐ YES	☒ NO	
7. Other; Specify	☐ YES	☒ NO	

CULTURAL ENVIRONMENT	CHANGE		REMARKS
1. Historic Sites	☐ YES	☒ NO	
2. Archaeological Resources	☐ YES	☒ NO	
7. Other; Specify	☐ YES	☒ NO	

PERMITS	CHANGE		REMARKS
1. U.S. Coast Guard	☐ YES	☒ NO	
2. Forest Service/USACE/USFWS Land	☐ YES	☒ NO	
3. Section 404	☐ YES	☒ NO	IP is pending; submitted December 2019
4. Other; Specify	☐ YES	☒ NO	

Have the required permits been obtained? ☐ YES ☐ NO

If "YES" what is the expiration date?

***If permits have expired, permits will need updated and attached to re-evaluation.**

9. NEED FOR PUBLIC INVOLVMENT:

☒ A public hearing/public information meeting was held for the project on: PH: 05/13/2018; stakeholder mtg: 10/29/19

☒ There have been no changes in project design or environmental effects which would require a public hearing [or additional public hearing if one has already been held] or public information meeting.

☐ The change(s) in project design and/or effects require(s) an additional public hearing/public information meeting. The meeting is scheduled for:

10. FINDINGS/CONCLUSIONS:

☒ Based on the analysis contained in this re-evaluation, it has been determined that the change in project design and/or environmental effects would not significantly alter the conclusions reached in the approved environmental document and/or previous re-evaluation(s).

☐ There have been no changes in the design/ROW of this project nor have there been changes in project effects or the affected environment. Therefore, the conclusions reached in the approved environmental document and/or previous re-evaluation(s) remain valid.

Prepared By: Will McGoldrick Date 6-30-20

Will McGoldrick Digitally signed by Will McGoldrick DN: cn=Will McGoldrick, o=SCDOT, ou=ESO, email=mcgoldriwr@scdot.org, c=US Date: 2020.06.30 16:56:06 -04'00'

For Non Programmatic CEs:

Concurred (FHWA): EMILY OLDHAM LAWTON Digitally signed by EMILY OLDHAM LAWTON Date: 2020.07.16 17:54:41 -04'00' Date

Date: 06/15/2020

NEPA ENVIRONMENTAL COMMITMENTS FORM

Project ID : P029208 | County : Richland | District : District 1 | Doc Type: RE-Eval | Total # of Commitments: 1

Project Name: I-26 Widening MM 85-101

The Environmental Commitment **Contractor Responsible** measures listed below **are to be included in the contract and must be implemented**. It is the responsibility of the Program Manager to make sure the Environmental Commitment **SCDOT Responsible** measures are adhered to. If there are questions regarding the commitments listed please contact:

CONTACT NAME: Bradley S. Reynolds, PE, DBIA **PHONE #:** (803) 737-1440

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | NEPA Doc Ref: Page: 24 Paragraph: 02 | Responsibility: SCDOT

Public Outreach/Detour Notices

Postcards will be mailed to property owners along the detour routes and road signs will be posted at Old Hilton Road Bridge, Peak Street Bridge, and SC 202 Bridge 30 days prior to construction to notify the public of the bridge closures and detours. Information will also be posted on the project website at scdotmidlandsconnection.com.

☒ Special Provision

NEPA Doc Ref: Page: XX Paragraph: XX | Responsibility:

☐ Special Provision

NEPA Doc Ref: Page: XX Paragraph: XX | Responsibility:

☐ Special Provision

Date: 06/16/2020

NEPA ENVIRONMENTAL COMMITMENTS FORM

Project ID : P029208 | County : Richland | District : District 1 | Doc Type: EA | Total # of Commitments: 18

Project Name: I-26 Widening MM 85-101

The Environmental Commitment **Contractor Responsible** measures listed below **are to be included in the contract and must be implemented**. It is the responsibility of the Program Manager to make sure the Environmental Commitment **SCDOT Responsible** measures are adhered to. If there are questions regarding the commitments listed please contact:

CONTACT NAME: Bradley S. Reynolds, PE, DBIA **PHONE #:** (803)-737-1440

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | NEPA Doc Ref: EA Page: 46 Paragraph: 2 | Responsibility: CONTRACTOR

Conservation Easement

Three parcels located within the PSA (TMS 01700-10-04, 01700-10-22, and 01700-10-26) are held in a Richland County conservation easement . Impacts to the tracts should be minimized to the maximum extent practicable during final design. The Richland County Conservation Division has indicated that to impact the property, ROW would need to be acquired through eminent domain and possibly condemnation. Any ROW acquisition or use of the property will need to be coordinated with the property owner and Richland County.

☐ Special Provision

Water Quality | NEPA Doc Ref: EA Page: 52 Paragraph: 2 | Responsibility: CONTRACTOR

The contractor will be required to minimize possible water quality impacts through implementation of BMPs, reflecting policies contained in 23 CFR 650B and the Department's Supplemental Specification on Erosion Control Measures (latest edition) and Supplemental Technical Specifications on Seeding (latest edition). Other measures including seeding, silt fences, sediment basins, etc. as appropriate will be implemented during construction to minimize impacts to water quality.

☐ Special Provision

Stormwater | NEPA Doc Ref: EA Page: 52 Paragraph: 3 | Responsibility: CONTRACTOR

Stormwater control measures, both during construction and post-construction, are required for SCDOT projects with land disturbance and/or constructed in the vicinity of 303(d), TMDL, ORW, tidal, and other sensitive waters in accordance with the SCDOT's MS4 Permit. The selected contractor would be required to minimize potential stormwater impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seed and Erosion Control Measures (latest edition).

☐ Special Provision

Project ID : P029208	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | NEPA Doc Ref: EA Page: 59 Paragraph: 2 | Responsibility: SCDOT/CONTRACTOR

Individual Permit

Impacts to jurisdictional waters will be permitted under a Department of the Army Section 404 permit from the U.S. Army Corps of Engineers. Based on preliminary design, it is anticipated that the proposed project would be permitted under an Individual Army Corps of Engineers Permit (IP). SCDOT will provide the Army Corps with information regarding any proposed demolition activities during the Section 404 permitting process. The required mitigation for this project will be determined through consultation with the USACE and other resource agencies. The Contractor is responsible for obtaining the Section 404 permit and required mitigation, in consultation with SCDOT.

☐ Special Provision

Non-Standard Commitment | NEPA Doc Ref: Page:59,60 Paragraph:5,3 | Responsibility: CONTRACTOR

Invasive Species Management

SCDOT will comply with the intent of EO 13112 regarding Invasive Species by actively stabilizing all temporarily disturbed areas with measures and/or seed mixtures that would not include invasive species. Best Management Practices contained in the SCDOT Standard Specifications for Highway Construction would be used to reduce the introduction or spread of invasive species. Cleared areas would be seeded with both temporary and permanent seed mixtures. Vegetative matting and/ or other techniques may also be used to stabilize areas that are cleared of vegetation, preventing the growth or spread of invasive species.

☐ Special Provision

Floodplains | NEPA Doc Ref: EA Page: 62 Paragraph: 2 | Responsibility: SCDOT

The Engineer of Record will send a set of final plans and request for floodplain management compliance to the local

County Floodplain Administrator prior to the project letting date.

☐ Special Provision

Project ID : P029208	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Migratory Bird Treaty Act | NEPA Doc Ref: EA Page: 64 Paragraph: 2 | Responsibility: SCDOT

The federal Migratory Bird Treaty Act, 16 USC § 703-711, states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. The South Carolina Department of Transportation (SCDOT) will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests.

The contractor shall notify the Resident Construction Engineer (RCE) at least four (4) weeks prior to construction/demolition/maintenance of bridges and box culverts. The RCE will coordinate with SCDOT Environmental Services Office (ESO), Compliance Division, to determine if there are any active birds using the structure. After this coordination, it will be determined when construction/demolition/maintenance can begin. If a nest is observed that was not discovered after construction/demolition/maintenance has begun, the contractor will cease work and immediately notify the RCE, who will notify the ESO Compliance Division. The ESO Compliance Division will determine the next course of action.

The use of any deterrents by the contractor designed to prevent birds from nesting, shall be approved by the RCE with coordination from the ESO Compliance Division. The cost for any contractor provided deterrents will be provided at no additional cost to SCDOT.

☐ Special Provision

Non-Standard Commitment | NEPA Doc Ref: Page: 77 Paragraph: 2-5 | Responsibility: CONTRACTOR

Air Quality

State and local regulations regarding dust control and other air quality emission reduction controls will be followed. In order to minimize the amount of construction dust generated, current state best management practices, will be followed during the construction of the project. These include covering earth-moving trucks to keep dust levels down, watering haul roads, and refraining from open burning, except as may be permitted by local regulations. The construction equipment would also produce slight amounts of exhaust emissions. The EPA has listed a number of approved diesel retrofit technologies which may be deployed as emissions mitigation measures for equipment used in construction at the discretion of the Contractor, in consultation with SCDOT.

☐ Special Provision

Non-Standard Commitment | NEPA Doc Ref: FONSI Pg:12, Paragraph:7 | Responsibility: SCDOT/CONTRACTOR

Noise Barrier Walls

Based on the studies thus far accomplished, SCDOT intends to install highway traffic noise abatement measures in the form of a barrier at NAA 5 and 6 (Westcott Ridge and Arbor Springs). These preliminary indications of likely abatement measures are based upon preliminary design for a barrier cost of $35.00 per square foot that will reduce the noise level by at least 5 dB(A) for residences. If it subsequently develops during final design that these conditions have substantially changed, the abatement measures might not be provided. A final decision of the installation of the abatement measure(s) will be made upon completion of the project's design.

☒ Special Provision

Project ID : P029208	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | NEPA Doc Ref: EA Page: 96 Paragraph: 2 | Responsibility: CONTRACTOR

Noise - Traffic

It will be necessary that some work be required during non-peak traffic hours in nights and/or weekends. These activities may impact adjacent residential areas and thus a specific work plan will be necessary regarding work during these time periods and will be submitted for approval by the SCDOT Resident Construction Engineer prior to its undertaking.

☐ Special Provision

USTs/Hazardous Materials | NEPA Doc Ref: Page: 100 Paragraph: 2 | Responsibility: SCDOT

If avoidance of hazardous materials is not a viable alternative and soils that appear to be contaminated are encountered during construction, the South Carolina Department of Health and Environmental Control (SCDHEC) will be informed. Hazardous materials will be tested and removed and/or treated in accordance with the United States Environmental Protection Agency and the SCDHEC requirements, if necessary.

☐ Special Provision

Non-Standard Commitment | NEPA Doc Ref: Page: 103 Paragraph: 1 | Responsibility: SCDOT

Lead-Based Paint

The existing structures shall be removed and disposed of by the Contractor in accordance with Subsection 202.4.2 of the Standard Specifications. The Contractor's attention is called to the fact that this project may require removal and disposal of structural components containing lead-based paints. Removal and disposal of structural components containing lead-based paints shall comply with all applicable Federal, State, and Local requirements for lead as waste, lead in air, lead in water, lead in soil, and worker health and safety.

☒ Special Provision

Project ID : P029208	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | NEPA Doc Ref: Page: 103 Paragraph: 1 | Responsibility: CONTRACTOR

Lead-Based Paint

Lead-based paint surveys must be taken on 6 of the 10 bridges included within the project area. The results should be submitted to SCDOT RCE for review prior to demolition or reconstruction. Excluded from additional surveys are S-167 (Parr Road), S-39 (Holy Trinity Church Road), SC 202, and S-48 (Columbia Ave) which have already tested positive for the presence of lead-based paint.

☒ Special Provision

Non-Standard Commitment | NEPA Doc Ref: Page: 102 Paragraph: 2 | Responsibility: CONTRACTOR

Asbestos

SCDOT has surveyed the existing bridges for Asbestos Containing Material (ACM). The 10 bridges in the project corridor contain ACM. Potential removal of ACM would be coordinated with the SCDHEC Bureau of Air Quality, Asbestos Section prior to demolition or disturbances to the existing bridges.

☒ Special Provision

Non-Standard Commitment | NEPA Doc Ref: Page: 108 Paragraph: 3 | Responsibility: SCDOT/CONTRACTOR

Cultural Resources - Cemeteries

The Department will ensure that the existing known limits of the Comalander and Summer-Counts Cemeteries are identified and delineated in the field. Prior to construction activities near these cemeteries, a construction barrier fence or other appropriate barrier will be erected a minimum of 10 feet beyond the known cemetery limits. This will ensure that these cemeteries and any potential unmarked graves associated with them will be protected. As currently designed, these cemeteries are not proposed to be impacted by the project. However, if construction would need to impede into a delineated area, the Department will provide an archaeologist on site to monitor all ground disturbing activities near the affected area(s).

☒ Special Provision

Project ID : P029208	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Non-Standard Commitment | NEPA Doc Ref: Page: 109 Paragraph: 1 | Responsibility: CONTRACTOR

Cultural Resources

The contractor and subcontractors must notify their workers to watch for the presence of any prehistoric or historic remains, including but not limited to arrowheads, pottery, ceramics, flakes, bones, graves, gravestones, or brick concentrations during the construction phase of the project. If any such remains are encountered, the Resident Construction Engineer (RCE) will be immediately notified and all work in the vicinity of the discovered material shall cease until the SCDOT Archaeologist directs otherwise.

☐ Special Provision

Non-Standard Commitment | NEPA Doc Ref: Page: 110 Paragraph: 5 | Responsibility: SCDOT/CONTRACTOR

Displacements

SCDOT, and/or contractor will acquire all new right-of-way and process any relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C 4601 et seq.). The purpose of these regulations is to ensure that owners of real property to be acquired for Federal and federally assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owner, to minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally assisted land-acquisition programs.

☐ Special Provision

NEPA Doc Ref: | Responsibility:

☐ Special Provision

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ENVIRONMENTAL RE-EVALUATION

SUPPORTING DOCUMENTATION

I-26 Widening and Interchange Improvements
Mile Marker 85 to 101
Newberry, Lexington, and Richland Counties, South Carolina
Project ID P029208

Project Description

The South Carolina Department of Transportation (SCDOT) proposes improvements and upgrades to Interstate 26 (I-26) in Richland, Lexington, and Newberry Counties to support increasing traffic. SCDOT proposes widening I-26 and reconstructing three interchanges between mile marker (MM) 85 near Little Mountain and MM 101 near Irmo. Improvements would take place from 1.6 miles west of the SC 202 (Exit 85) interchange to the US 176 (Exit 101) interchange (Figure 1). The improvements would widen to a total of six lanes, three in each direction from Exit 85 to Exit 97 and to eight lanes, four in each direction from Exit 97 to Exit 101. The widening would be constructed towards the existing median. Interchange improvements would occur at Exits 85, 91, and 97. A total of seven overpasses that cross I-26 would be replaced, including Parr Road (S-32-49), Holy Trinity Church Road (S-36-39), Peak Street (S-32-49), Old Hilton Road (S-40-405), Mt Vernon Church Road (S-40-234), Shady Grove Road (S-40-80), and Koon Road (S-40-58). The overpasses at the Exit 85 (SC 202), Exit 91, and Exit 97 interchanges will also be replaced. The truck weigh station near MM 94 would be improved as a weigh-in-motion station.

The project is consistent with the Central Midlands Council of Governments Long Range Transportation Plan and is included in the Statewide Transportation and Rehabilitation Program (STIP) for Richland, Lexington, and Newberry Counties. The federal National Highway Performance Program (NHPP) identifies funds for construction in the system upgrade interstate program. The federal Advanced Construction program identifies funds for construction, also in the system upgrade interstate program. Additionally, funds are identified in the NHPP for with construction from the pavement and reconstruction program. Currently, $530 million dollars are allocated in the STIP for the project.

An environmental assessment (EA) was prepared to comply with the National Environmental Policy Act (NEPA) of 1969, as amended, and in accordance with Federal Highway Administration (FHWA). Regulations in 23 Code of Federal Regulations (CFR) Part 771 and Council on Environmental Quality (CEQ) regulations in 40 CFR §§ 1500-1508. The EA was approved by FHWA on February 20, 2018 with a subsequent finding of no significant impact (FONSI) issued on August 22, 2018. A NEPA re-evaluation associated with the replacement of the S-36-167 (Parr Road) and the S-36-39 (Holy Trinity Church Road) overpass bridges was approved in March 2020.

FIGURE 1. PROJECT STUDY AREA

Date: 05.07.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Project Study Area

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

1 inch= 1.11 miles

N W E S

Revisions Since Issuance of the FONSI

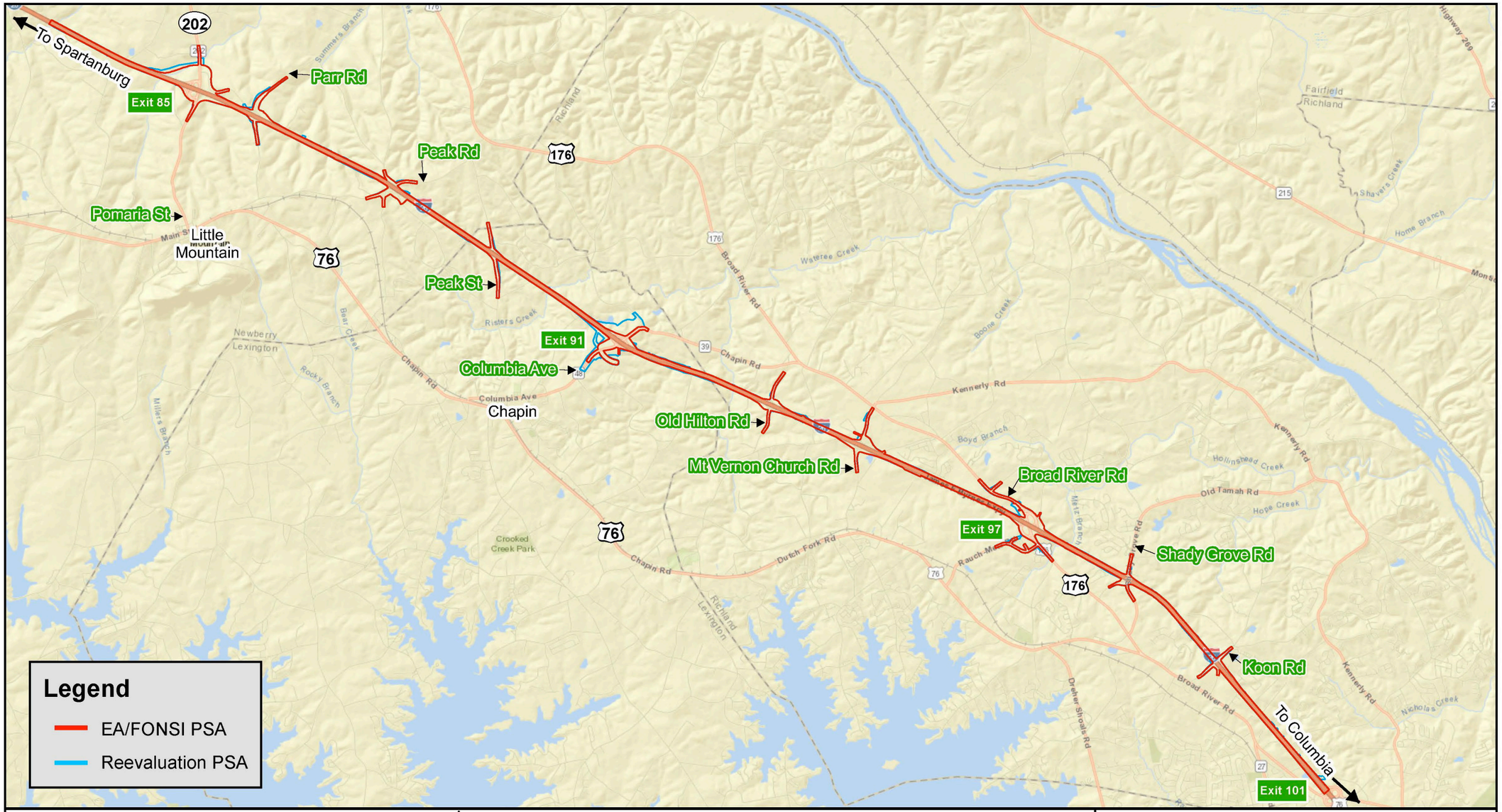
Following issuance of the FONSI, SCDOT secured final delivery of the project through a Design-Build contract, which includes the final design and construction of the project. The Design-Build Team (DBT) has slightly modified various design elements of the Preferred Alternative to provide the most efficient and economical solution to SCDOT while minimizing impacts and complying with the EA and FONSI. In addition, the DBT developed specific means and methods and access for construction of the new bridges and roadway approaches. Therefore, since the FONSI, the Preferred Alternative has been modified by the DBT in conjunction with SCDOT and represents the "proposed project."

Design Modifications

Final design and delivery of the project included project enhancements (including wider shoulders and increased design speed for vertical curves) that increased the project footprint for the length of the project, resulting in an expanded project study area (PSA) (Figure 2) and additional environmental impacts. The FONSI design assumed a 10-foot-wide inside shoulder, while the final design modified shoulders to 12-feet-wide, which resulted in a 4-foot increase in the project footprint over the length of the project. The increased design speed required the profile to be raised to flatten the vertical curves, resulting in higher fill embankment and a wider footprint. These design enhancements resulted in expansion of the jurisdictional determination (JD) study area, and increased stream impacts from the FONSI design but will ultimately provide a safer and more desirable facility. The 12-foot shoulder widths provide additional area for emergency pull-offs, thus providing greater separation from the travel lanes. The 12-foot-wide shoulder would also function as a full width emergency travel lane that could accommodate emergency travel and first responders which would improve response times and minimize congestion and traffic delays. The additional shoulder width also increases area for vehicle recovery further enhancing the safety and operation of the facility (see I-26 mainline typical sections, Figures 3 and 4).

The impacts documented in the FONSI were based largely on preliminary roadway and drainage design. The environmental impacts increased during the final design development based on the complexity, size, and overall scope of the project. Final hydrology design included the need for armoring (rip-rap) the crossline pipes and culverts, which expanded the PSA and JD study area, and resulted in additional impacts to waters of the U.S. Final roadway design resulted in additional impacts as a result of incorporating final design criteria, including additional turn lanes for commercial development and required access points.

FIGURE 2. EA/FONSI PSA AND RE-EVALUATION PSA



Date: 05.07.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Project Study Areas

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

1 inch= 1.11 miles

N W E S

FIGURE 3. I-26 MAINLINE 6-LANE TYPICAL SECTION

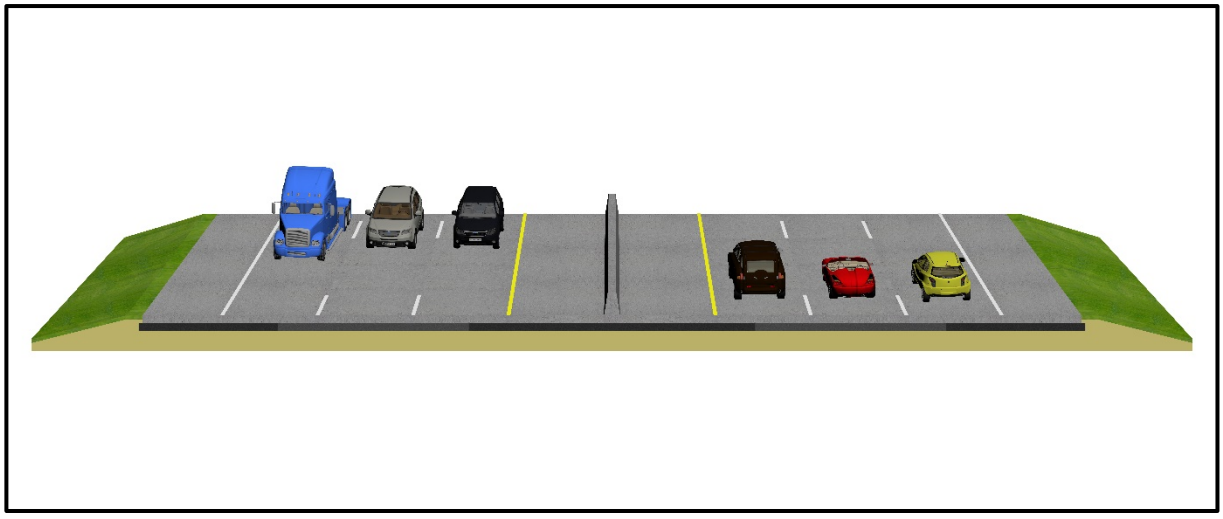


FIGURE 4. I-26 MAINLINE 8-LANE TYPICAL SECTION

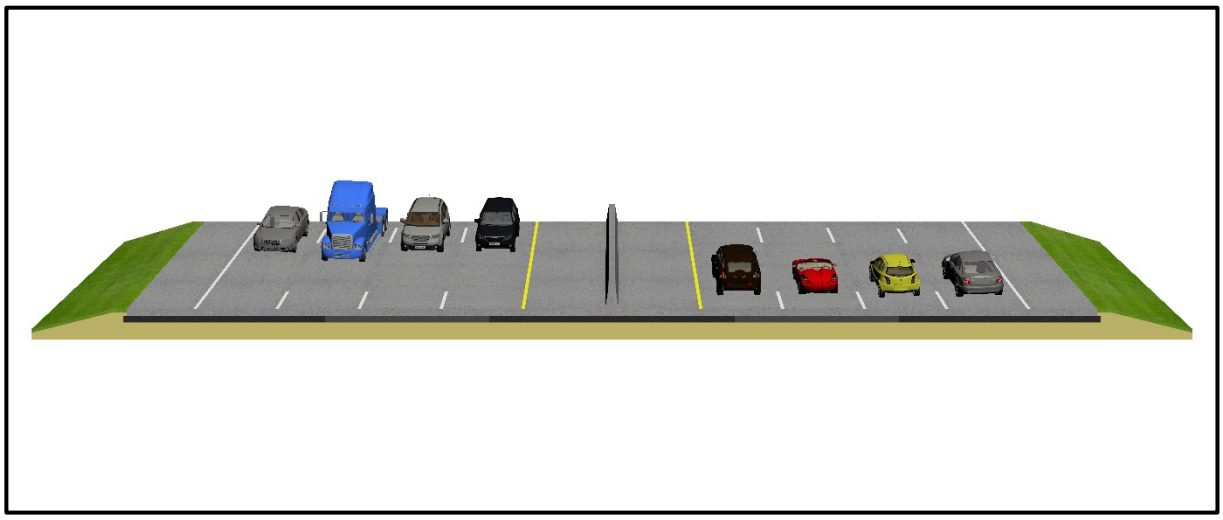
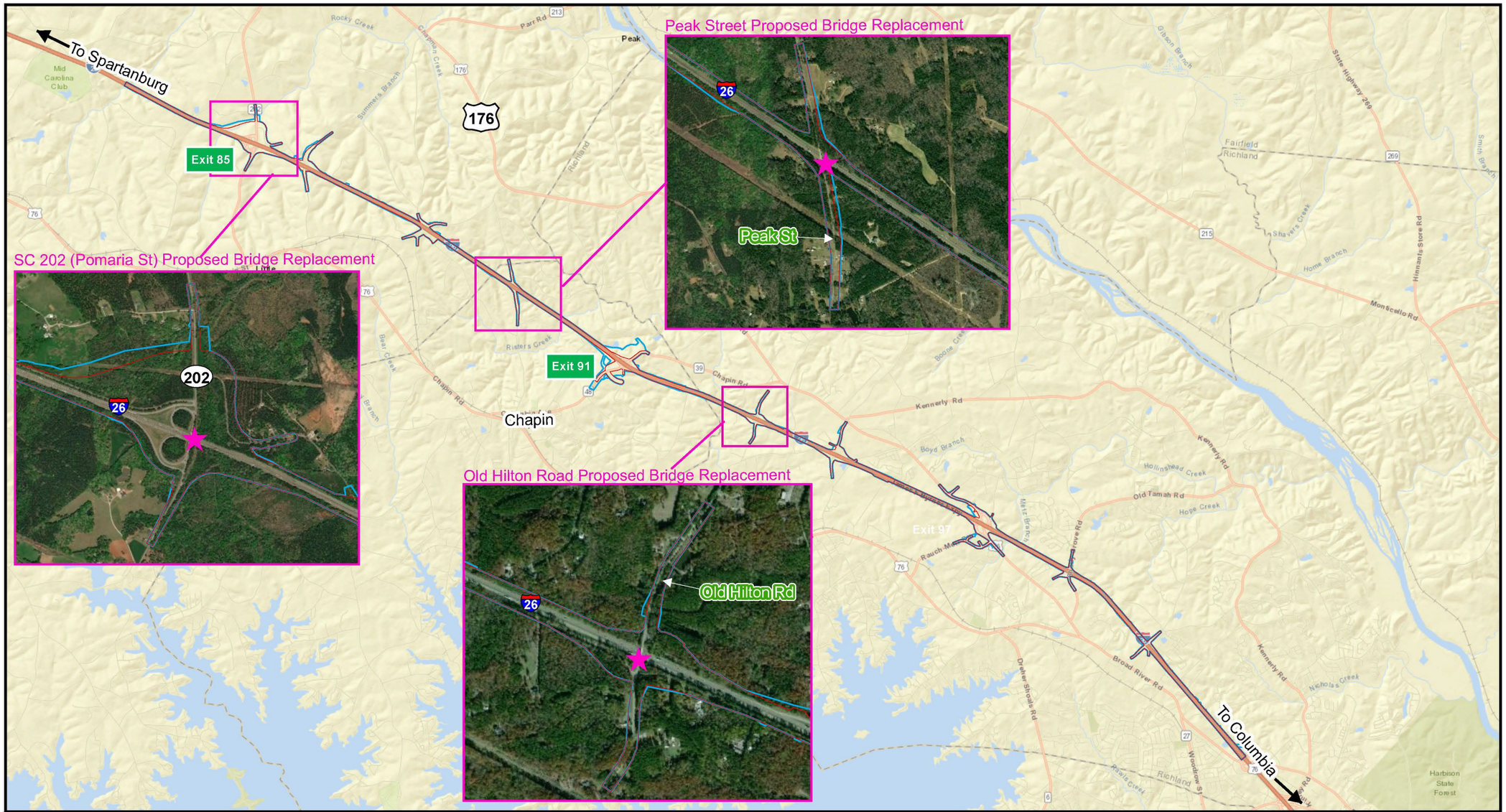


FIGURE 5. PSA AND BRIDGE LOCATIONS



Constructability/Bridge Replacements

The proposed project presents numerous challenges in constructability. Traffic disruptions are to be minimized due to the importance of the I-26 corridor and the associated interchanges. In addition, the DB contract details the specific restrictions and requirements that ultimately impact construction access, management of traffic, staging, etc. To improve constructability, safety, and efficiencies, several of the bridge overpasses were shifted from off-alignment to on-alignment construction. Since the bridges will be built on existing alignment, no new environmental impacts will result from the change in alignment. This shift in alignment would require bridge closures and detours, resulting in temporary interruptions for the traveling public. The bridge detours and construction are discussed in more detail below.

As previously mentioned, the DBT has developed specific means and methods and access for construction of the new bridges and roadway approaches. Since the FONSI, the replacement of five bridges (Holy Trinity Church Road, Parr Road, Old Hilton Road, Peak Street, and SC 202/Exit 85 interchange) have been modified from off-alignment to on-alignment bridge replacements with detours or have been modified to require detours. Two of the bridges (Holy Trinity Church Road and Parr Road bridges) were included in a previous re-evaluation (signed on March 30, 2020) due to an accelerated construction schedule. Old Hilton Road, Peak Street, and SC 202 (Exit 85) bridges over I-26 are included in this document (Figure 5).

The overall design and dimensions of the bridges would be similar to the preliminary design and will accommodate required minimum vertical clearance (17 feet) for I-26 traffic.

Old Hilton Road Bridge: The EA/FONSI documented that the Old Hilton Road bridge would be replaced off alignment, east of the existing bridge. The proposed bridge design is consistent with the EA/FONSI and would extend 176 feet long and approximately 41 feet wide and accommodate two 12-foot-wide travel lanes with 6-foot-wide shoulders. The bridge is proposed to be constructed off alignment but will now require a detour to accommodate construction staging.

Peak Street Road Bridge: The EA/FONSI documented that the Peak Street bridge would be replaced east of the existing bridge. The proposed activity would replace the Peak Street bridge on alignment while closing and detouring traffic. This alignment would avoid the alignment shift along Peak Street and minimize adjacent ROW impacts. The proposed design of the bridge is consistent with the EA/FONSI and would extend 250 feet long and approximately 41 feet wide and accommodate two 12-foot-wide travel lanes with 6-foot-wide shoulders.

SC 202 (Exit 85) Bridge: The EA/FONSI documented that the SC 202 bridge at Exit 85 would be replaced east of the existing bridge and would also require realignment of the roadway approaches, ramps, and side roads—Meadow Brook Road and State Road S-36-370—to accommodate a new diamond with partial cloverleaf interchange. The proposed activity would

replace the SC 202 bridge off alignment while closing and detouring traffic. The proposed design of the bridge is consistent with the EA/FONSI and would extend 176 feet long and approximately 62 feet wide and accommodate two 12-foot-wide travel lanes with 6-foot-wide shoulders.

There are several advantages of replacing the bridges on existing alignment:

- Minimizes area of new ROW
- Avoids additional utility relocations and disruptions
- More efficient and economical construction—shortens construction schedule; minimizes new fill embankments
- Safer conditions for motorists and workers during construction—avoids traffic shifts and other controls (i.e. barrier walls); removes traffic from work zone.

Exit 91 Interchange

The most substantial change in the proposed design is an alternate design configuration for the Exit 91 interchange (Columbia Avenue). SCDOT and the DBT identified an alternate interchange design that provides for improved operation while avoiding and minimizing business relocations. The new interchange configuration at Exit 91 results in the need for additional environmental studies due to the expanded PSA and change in impacts.

The proposed Exit 91 interchange design was revised from a diverging diamond interchange (DDI) to a partial cloverleaf to the west of the existing interchange (see Figures 6 and 7). A partial cloverleaf interchange was evaluated as a reasonable alternative (Alternative 2) in the EA/FONSI and presented to the public but determined not to be the preferred largely due to having the greatest impact to wetlands and streams. The DDI (Alternative 3) was selected as the Preferred Alternative in the EA/FONSI. However, since issuance of the FONSI, the proposed partial cloverleaf design was developed as a result of further analysis regarding constructability, maintenance of traffic, operational conditions, and impacts to local businesses. In addition, the proposed design and location differ from the preliminary partial cloverleaf design evaluated in the EA/FONSI and as a result, avoids and minimizes impacts. The proposed design was also included as a Formal Alternative Technical Concept (FATC) during the project procurement process, which required submittal and review of support documentation.

FIGURE 6. REVISED EXIT 91 INTERCHANGE DESIGN (PROPOSED PROJECT)

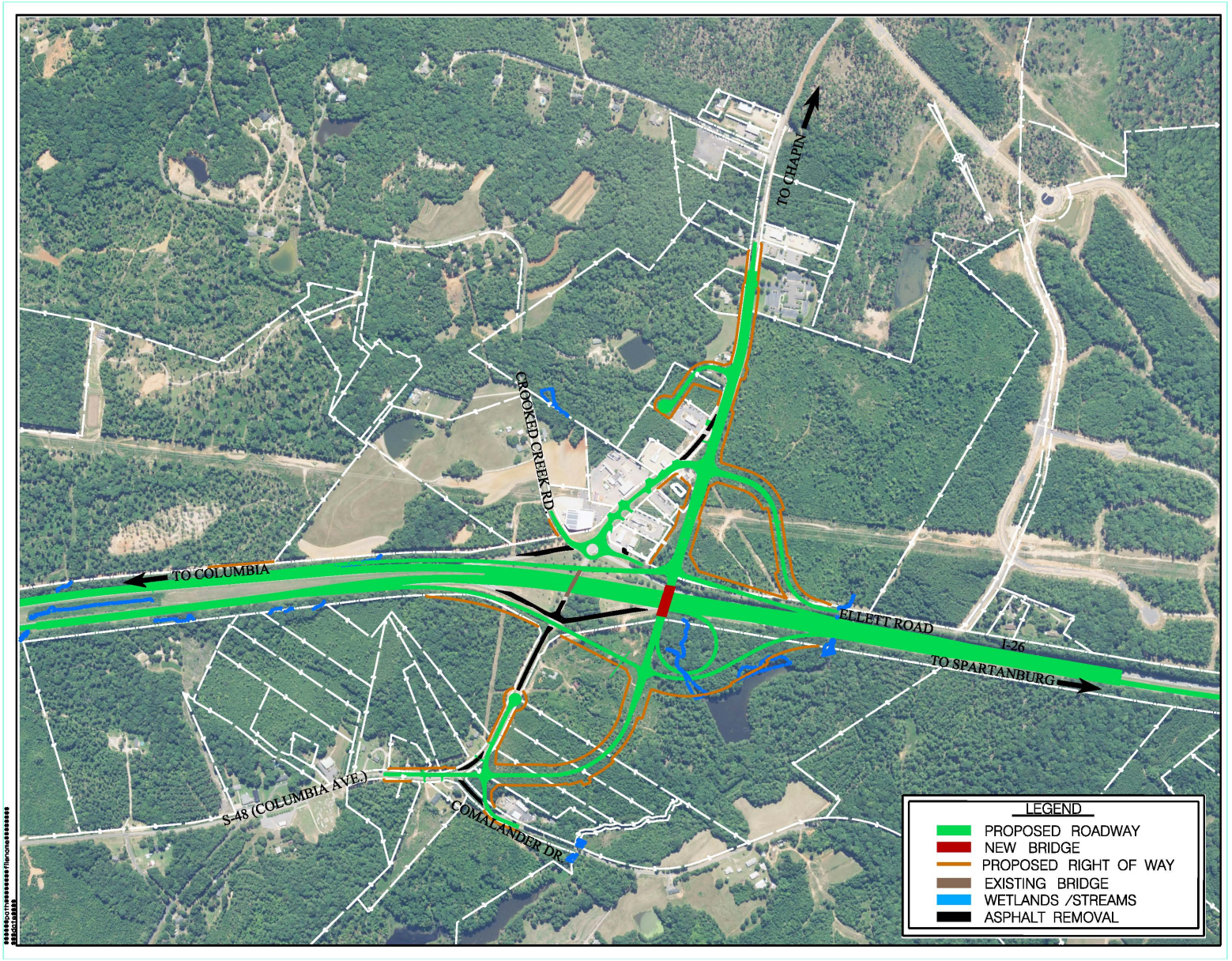
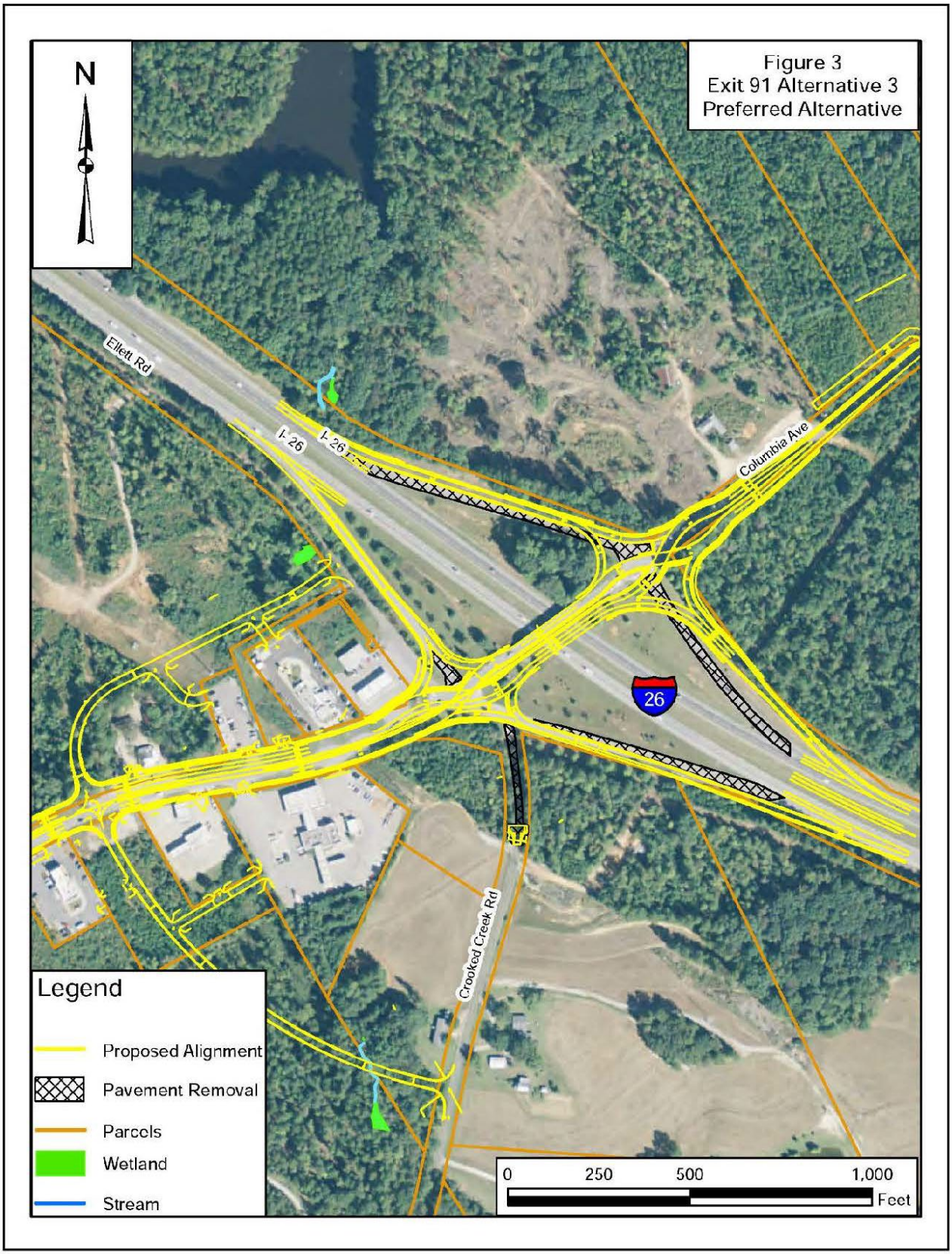


FIGURE 7. PREFERRED ALTERNATIVE EXIT 91 INTERCHANGE DESIGN (FROM FONSI)



The constructability review associated with the preferred DDI presented numerous challenges since this configuration would require the interchange to be constructed along the existing interchange. This would require complicated staging and undesirable traffic patterns that would compromise safety and extend construction time. The new bridge would also be higher, resulting in additional obstructions and narrower lane widths. This results in new bridge construction activity taking place close to traffic, greatly increasing safety concerns. In addition, upon progressing the DDI design based on SCDOT requirements, it was determined that five commercial businesses along Columbia Avenue would have to be relocated. These relocations were not initially identified in the EA but resulted from final design and Request for Proposal criteria for the DDI. As a result of these challenges, an alternate design was developed that would allow the existing interchange to remain open throughout construction, avoided four of the business relocations, reduced construction time, and improved operational function of the interchange. A new interchange modification report was completed for the new interchange design (*Interchange Modification Report for the Columbia Avenue [S-32-48] Over I-26 Interchange Improvement Project, April 2020*) and is included as Attachment G.

The Exit 91 interchange would consist of a partial cloverleaf interchange approximately 1,000 feet west of the existing interchange and realign Columbia Avenue accordingly. In addition, Ellett Road and Comalander Drive would be relocated. The existing interchange, including overpass bridge, would be abandoned and demolished and a roundabout/cul-de-sac are proposed that would maintain access along existing Columbia Avenue. The proposed alternative would be constructed in one stage with traffic utilizing the existing interchange throughout construction. This would provide a more efficient construction schedule (10 months compared to 20 months for the DDI) and provide a safer environment for both the traveling public and the construction team.

Additional traffic analysis of the proposed design was conducted and included in the new (April 2020) interchange modification report. This analysis concludes that the proposed design would improve the intersection operation (level of service, or LOS) for all movements in the 2044 design year from LOS E-F (no-build) to LOS A-C (build), which are summarized in Table 1. LOS is a quality measure describing operational conditions within a traffic stream, generally in terms of speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS is represented by six letter designations ranging between LOS A and LOS F. LOS A describes completely free-flowing conditions and LOS F describes very unstable flow conditions. In addition, the proposed design provides a slight improvement in traffic operation over the DDI. Specifically, the I-26 eastbound ramps would operate at LOS B while the DDI movement operates at LOS C. The mainline movements, including merge/diverge, for the proposed design would operate at LOS D or better, which is similar to the anticipated DDI conditions. The westbound intersection is expected to continue to operate at LOS C for the afternoon peak hour, but with improved delay.

TABLE 1. EXIT 91 INTERSECTION LOS

Intersection	2044 no-build conditions (LOS)		2044 build conditions (LOS)	
	a.m.	p.m.	a.m.	p.m.
Columbia Avenue & Ellet Road/Crooked Creek Road	F	F	C	C
Columbia Ave & I-26 eastbound ramps	F	F	B	B
Columbia Ave. & I-26 westbound ramps	F	F	C	C
Columbia Ave & Comalander Drive	E	F	C	C
Crooked Creek Road & I-26 eastbound on-ramp	F	E	-	-
New Frontage Road & Crooked Creek Road	-	-	A	A

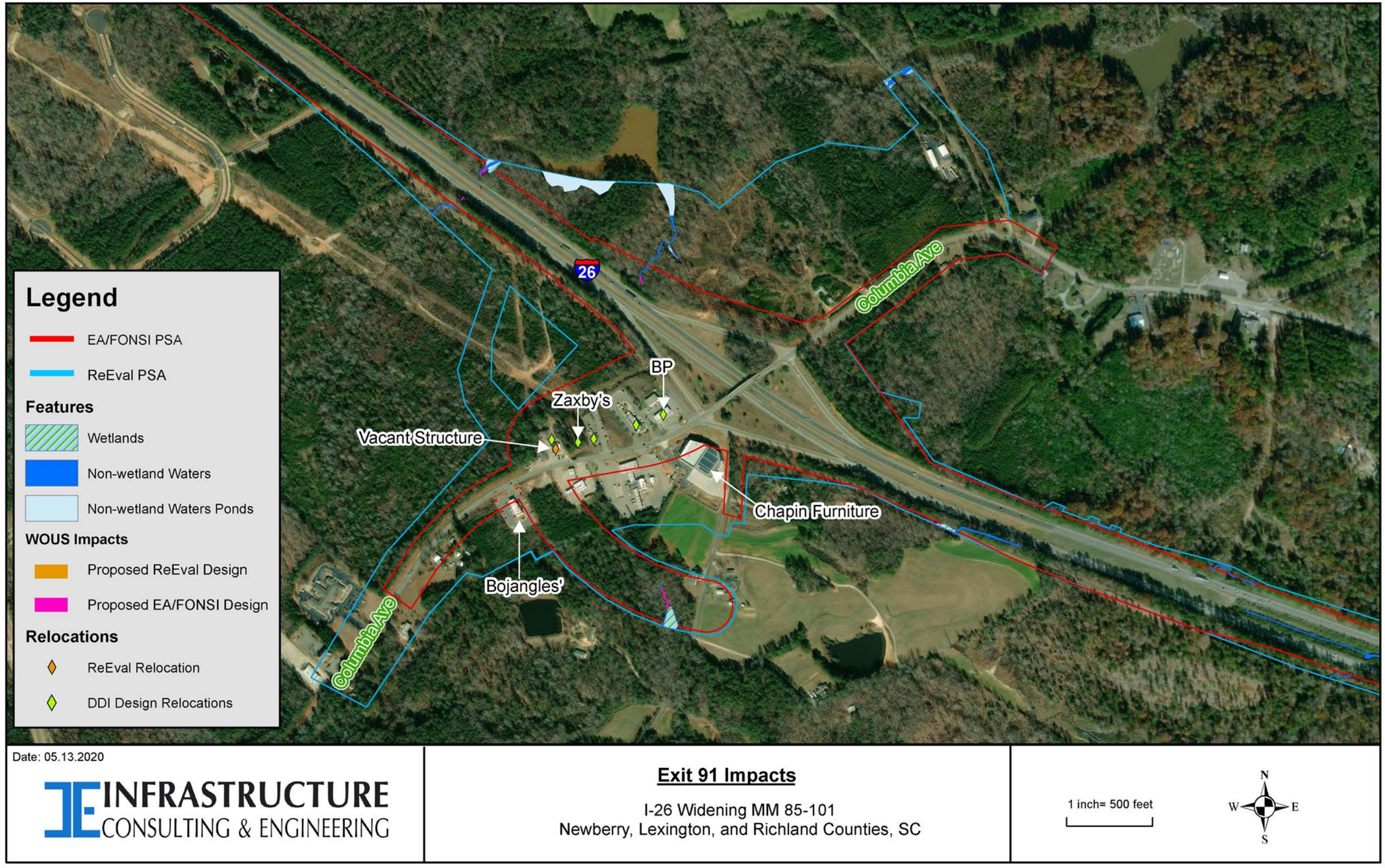
The revised design of the Exit 91 interchange would result in an increase in impacts to waters of the U.S. but avoids four business relocations/displacements, as shown in Figure 8. To accommodate access for commercial buildings, the revised design also impacts three outbuildings associated with a former large residential property that has been rezoned to general commercial. While this alternative reduces impacts to businesses, it will result in an increase of approximately 117 linear feet of stream impacts, 0.014 acre of wetland, and 0.306 acre of open water due the construction of the loop ramp along the westbound off-ramp. Based on the overall benefits to the public and local businesses, this proposed design was determined to be the least environmentally damaging alternative.

As a result of the design change to the Exit 91 interchange, the PSA around the Exit 91 interchange was expanded, and additional environmental studies were conducted and are outlined in the Summary of Impacts Associated with the Final Project

Revisions to PSA

The previous PSA (EA/FONSI PSA) was approximately 1,073 acres and included an approximate 75-foot-wide buffer from the roadway centerline. The final project design has resulted in the expansion of the PSA to approximately 1,213 acres, which includes changes associated with the project enhancements, final drainage and roadway design, the new interchange configuration at Exit 91, and minimization of conflicts with SCDOT's Carolina Crossroads (CCR) project. Additional environmental studies were required as a result of the design changes and expansion of the PSA and are described in the following section. The expanded PSA for the entire project corridor is shown in Figure 2.

FIGURE 8. EXIT 91 INTERCHANGE IMPACTS FOR PROPOSED PROJECT



Summary of Impacts Associated with the Final Project

This section includes a summary of the anticipated beneficial and adverse environmental impacts of the proposed project on the human and natural environment. The proposed project modifications result in changes to environmental impacts since the FONSI, specifically related to the additional PSA around Exit 91, as shown in Figure 8.

Community/Traveling Public

The proposed project modifications result in changes to the final bridge design. The bridge replacements on existing alignment will result in bridge closures and detours around the area, which will affect the traveling public/communities. The current traffic volumes and detour routes are conducive to a close and detour, with the detour routes approved by SCDOT (Attachment A). Detour routes for each bridge closure were developed by SCDOT and are illustrated in Figures 9, 10, and 11. The detour for the Old Hilton Road Bridge will be 4.50 miles. The detour route for Peak Street Bridge will be 7.81 miles and the detour route for SC 202/Pomaria (Exit 85) bridge will be 11.50 miles. The detours are anticipated to last approximately 8 months for the bridges, with the detours for Peak Street and SC 202 (Exit 85) ending by May 2021 and the detour for Old Hilton Road bridge ending by November 2022. Additional details are documented in the *Technical Memorandum: Traffic Detour Plans for I-26 Design-Build Project, Richland, Lexington, and Newberry Counties, SC* (Attachment A).

FIGURE 9. OLD HILTON ROAD BRIDGE DETOUR ROUTE

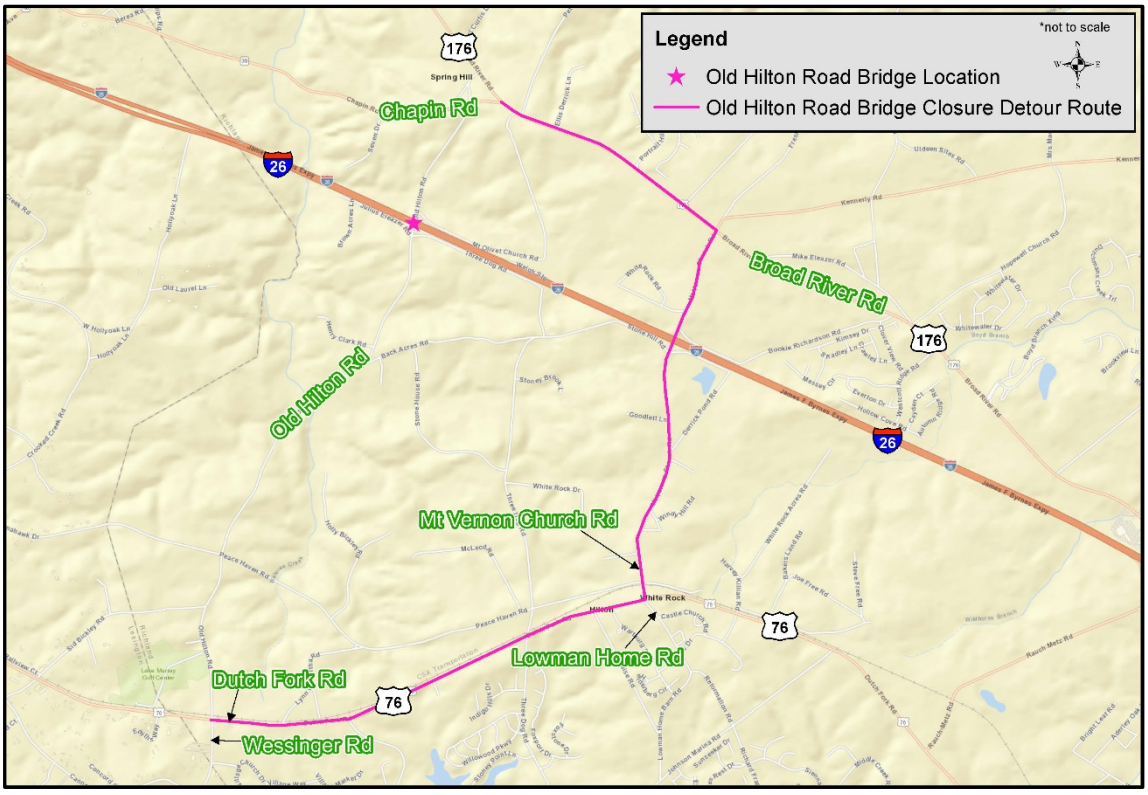


FIGURE 10. PEAK STREET BRIDGE DETOUR ROUTE

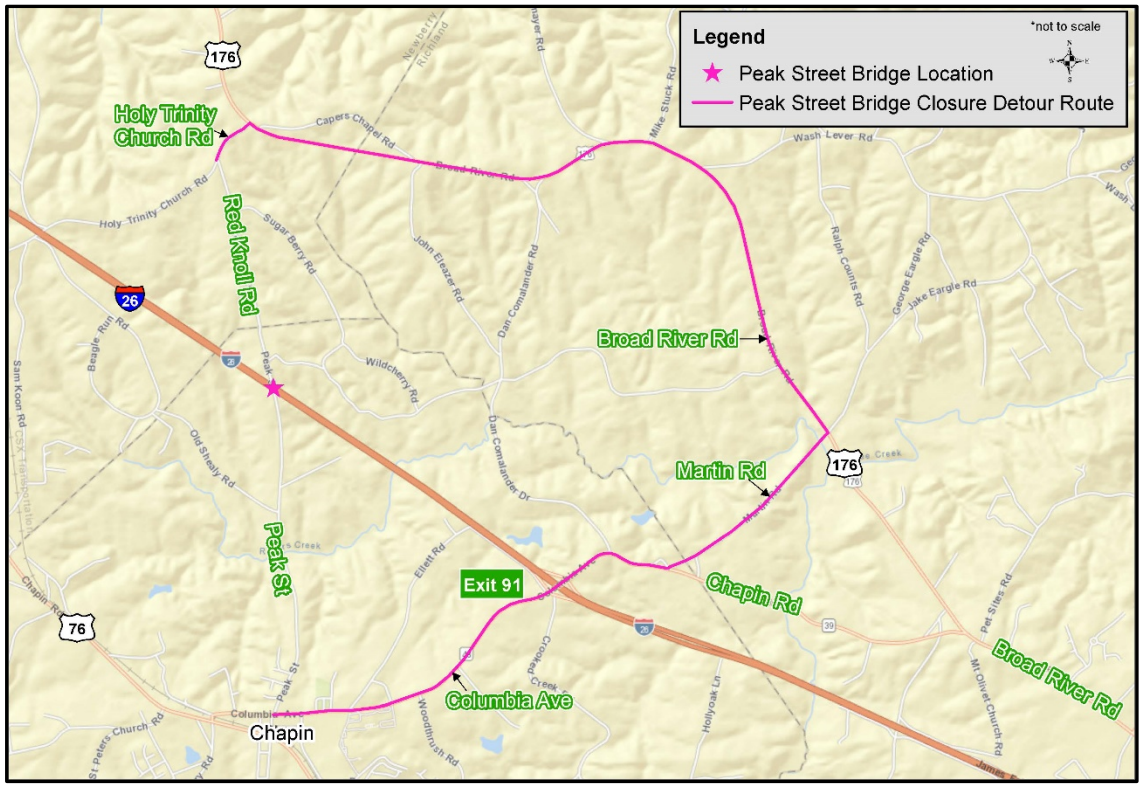
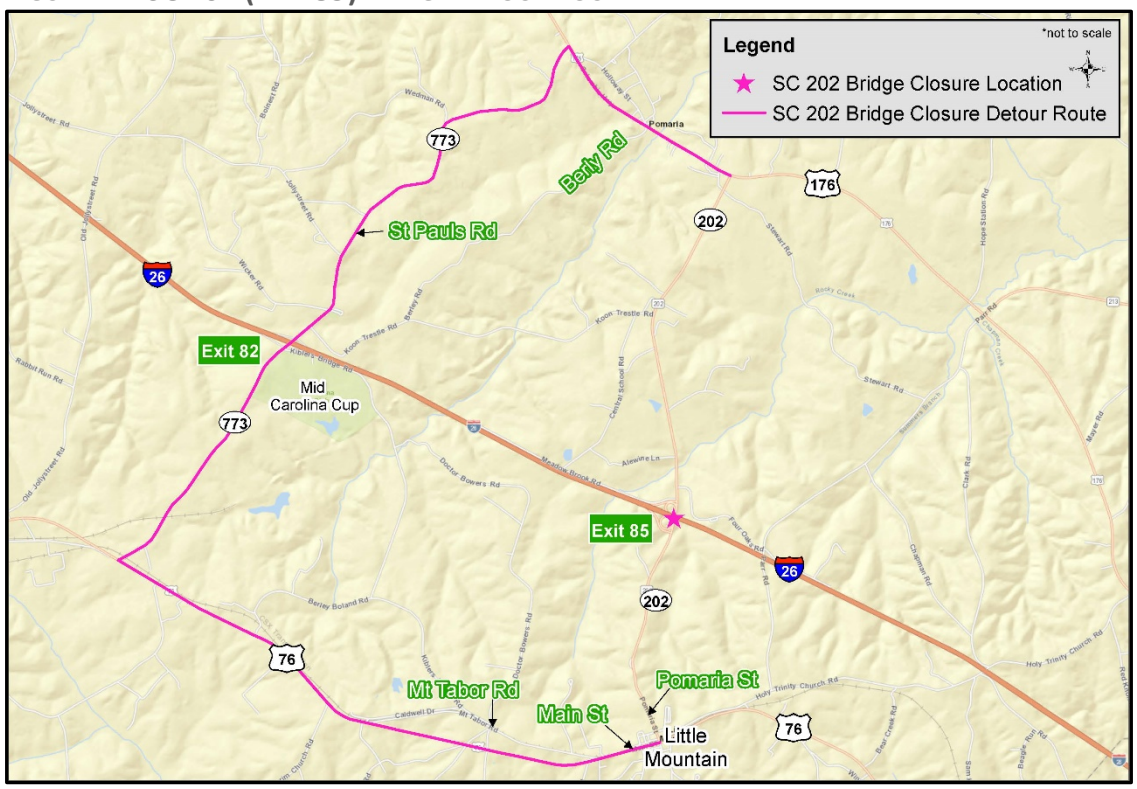


FIGURE 11. SC 202 (EXIT 85) BRIDGE DETOUR ROUTE



As indicated in the traffic detour memo, existing traffic volumes were obtained from SCDOT's Traffic Count ArcGIS Online Portal. The 2018 average annual daily traffic (AADT) volume for the Old Hilton Road bridge is 1,350 vehicles per day. The AADT for Peak Street bridge is 1,300 vehicles per day and the AADT for SC 202 bridge is 2,400 vehicles per day. To determine the effects of the detour route on existing roads, a traffic analysis of the detour routes was conducted. The bridge detour traffic volumes were determined by applying the approved detour routes to existing conditions traffic volumes. Intersection operational analyses of the signalized and major unsignalized intersections were conducted along each detour route. The operational analysis results show that intersections would operate at or below traffic capacity in both morning and afternoon peak hours (see Attachment A).

For the Old Hilton Road bridge detour, the detour route conditions result in slight intersection delay increases compared to the existing conditions. Improvement recommendations have been made to provide more acceptable operations during the planned detour for Old Hilton Road. It is recommended that signal phasing be modified to include protected/permitted eastbound left turns. With these traffic signal modifications at the intersections, the traffic delays would be minimized along the detour routes. All other intersections along the proposed detour routes are projected to have acceptable delays or not significantly impact existing traffic operations. Therefore, no other modifications are required during the other planned detours. Appendices B-E of the traffic detour memo (Attachment A) included detailed intersection count data, turning movement count calculations, intersection LOS results, and detour route volume calculations, which support the proposed detour routes. Due to size those appendices are not included as part of Attachment A.

Right-of-Way

The area of proposed right-of-way (ROW) associated with the project enhancements and design modifications increased since issuance of the FONSI and extend beyond the EA/FONSI PSA. These areas of proposed ROW are approximately 0.23 acre for Old Hilton Road, 1.45 acres for Peak Street, and 8.39 acres for SC 202. A total of approximately 10.07 acres of new ROW would be required around the bridges. A few areas of anticipated ROW extend beyond the re-evaluation PSA for drainage improvements and did not warrant additional investigations. These areas of anticipated ROW beyond the re-evaluation PSA is approximately 0.29 acre for SC 202, 0.08 acre for Old Hilton Road, 0.05 acre for Peak Street, and 0.16 acre for Exit 91. As previously mentioned, the number of business relocations/displacements decreased from five to one (vacant structure) as a result of the Exit 91 alternate design (Figure 8).

Cultural Resources

A cultural resources survey report (*Phase I Cultural Resource Survey for Proposed Widening of Interstate 26*) to identify archaeological sites and record and evaluate all historic architectural resources (buildings, structures, objects, designed landscapes, and/or sites with above-ground components) in the PSA was completed in January 2018. In addition, surveys of Columbia Avenue (S-48) from I-26 to US Highway 76 (Chapin Road) were conducted in 2016 for the S-48 (Columbia Avenue) Corridor Improvements project in Lexington County (*Cultural Resources Survey of S-48 (Columbia*

Avenue) Improvements, Lexington County, South Carolina and *Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvement),* which overlaps this PSA.

As a result of the proposed design change at Exit 91, a second addendum cultural resources survey report to the S-48 (Columbia Avenue) project (*Second Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, Lexington County, South Carolina*) was completed in April 2020 for an additional area that was not surveyed in the previous reports. The additional area is located on the east end of the original Columbia Avenue PSA, at Exit 91 and extends approximately 0.4 mile east and 0.6 mile west of I-26 along Columbia Avenue, including approximately 0.25 mile along Dan Comalander Drive. The additional area was surveyed to identify significant archaeological and historic architectural resources in its area of potential effects (APE). The APE consists of the PSA and its viewshed, which is defined by a 300-foot buffer. For the archaeological survey, the entire PSA was examined. For the architectural resources survey, the entire APE was examined. Background research indicated no previously recorded archaeological resources in the APE. Twenty-one historic architectural resources were previously surveyed within the APE and of those, eighteen remain extant. None were recommended eligible for listing on the NRHP. The archaeological survey of the additional area identified no new sites. The historic architectural survey recorded and evaluated three additional resources. However, the architectural resources lack qualities of significance that would qualify them for listing on the NRHP. Therefore, the State Historic Preservation Office (SHPO) concurred with the findings on April 20, 2020. Subsequent concurrences were received from the applicable Tribal Historic Preservation Offices (THPO). A copy of the *Second Addendum* and the concurrences are included as. Attachment B

Waters of the United States

The additional areas outside the EA/FONSI PSA were evaluated for wetlands and other waters of the U.S. (WOUS).

Impacts and Permitting

The project would result in unavoidable impacts to WOUS. The current projected impacts to WOUS based on final design is higher than the estimated impacts discussed in the FONSI. Based on preliminary design, the mainline widening and interchange improvements to I-26 was estimated to impact 0.599 acre of wetlands and 4,389 linear feet of streams. These impacts were calculated from approximate construction and ROW limits and were modified during final design. Total impacts to WOUS for the proposed project, including the increased impacts from final design, are estimated to be 1.061 acre of wetlands and 5,092 linear feet of non-wetland waters; an increase of 0.462 acre of wetland impacts and 703 linear feet of stream impacts. These additional impacts would result from widening the road, extending existing culverts, armoring (rip-rap), and replacing or constructing bridges, as illustrated in Tables 1-3.

Project design enhancements during final design, such as wider shoulders and changes to the vertical roadway profile, resulted in approximately 140 linear feet of additional stream impacts. Final hydrology design resulted the greatest increase in impacts due to the need for armoring (rip-rap) the

crossline pipes and culverts to reduce scour. It is estimated that final hydrology and rip-rap requirements resulted in 568 linear feet of stream impacts that were not captured in the EA/FONSI. The revised interchange design at Exit 91 results in an increase of approximately 117 linear feet of stream impacts, 0.014 acre of wetland impacts, and 0.23 acre of open water impacts. However, the proposed design was also able to minimize various impact areas through design strategies, mainly retaining walls and culvert construction. Tables 2, 3, and 4 summarize the impacts to WOUS within the expanded PSA and the changes since the FONSI.

TABLE 2. ESTIMATED WOUS IMPACTS FOR THE PREFERRED ALTERNATIVE BASED ON FINAL DESIGN

WOUS type	Impact quantity
Stream (linear feet)	5,092
Wetland (acres)	1.061

TABLE 3. ESTIMATED STREAM IMPACTS AND REVISIONS SINCE THE FONSI

Impact site number	FONSI impact quantity (LF)	Revised impact quantity (LF)	Notes
Non-wetland Water 4	50.4	147	Rip-rap, culvert extension
Non-wetland Water 7A	31.8	81	Rip-rap, culvert extension
Non-wetland Water 8A	65.6	17	Rip-rap
Non-wetland Water 8B	59.3	55	Rip-rap, roadway fill
Non-wetland Water 8C	73.5	0	No impact proposed
Non-wetland Water 10	3.7	0	Feature eliminated by JD revision
Non-wetland Water 12	177.3	137	Rip-rap, culvert extension
Non-wetland Water 13	82.9	159	Rip-rap, culvert extension
Non-wetland Water 15	32.6	49	Rip-rap
Non-wetland Water 17	375.8	121	Rip-rap, culvert extension, roadway fill
Non-wetland Water 18	22.9	77	Rip-rap, culvert extension
Non-wetland Water 19A	27.3	94	Rip-rap, culvert extension
Non-wetland Water 20	30.7	242	Rip-rap, culvert extension
Non-wetland Water 25A	55.1	0	Feature eliminated by JD revision
Non-wetland Water 26	36.1	150	Rip-rap, culvert extension
Non-wetland Water 27	18.9	132	Rip-rap, culvert extension, roadway fill
Non-wetland Water 28	41.9	113	Rip-rap, culvert extension
Non-wetland Water 29	30.3	0	No impact proposed
Non-wetland Water 30A	43.6	123	Rip-rap, culvert extension, roadway fill
Non-wetland Water 30B	1.9	0	No impact proposed
Non-wetland Water 32	26.6	0	Feature eliminated by JD revision
Non-wetland Water 33A	3.7	0	Feature eliminated by JD revision
Non-wetland Water 36A	302.1	60	Rip-rap, culvert extension

Impact site number	FONSI impact quantity (LF)	Revised impact quantity (LF)	Notes
Non-wetland Water 36B	17.1	145	Roadway fill
Non-wetland Water 36D	30.8	27	Rip-rap
Non-wetland Water 38A	42.2	0	No Impact proposed
Non-wetland Water 38B	10.3	0	No Impact proposed
Non-wetland Water 38D	8.1	0	No Impact proposed
Non-wetland Water 39A	61.8	0	Feature eliminated by JD revision
Non-wetland Water 40A	342.4	594	Rip-rap, culvert extension, roadway fill
Non-wetland Water 40D	60.1	0	Feature eliminated by JD revision
Non-wetland Water 40E	60.2	0	Feature eliminated by JD revision
Non-wetland Water 43	22.3	37	Rip-rap, culvert extension
Non-wetland Water 45A	339.4	321	Rip-rap, culvert extension
Non-wetland Water 45B	275.8	0	No Impact proposed
Non-wetland Water 54A	21.2	62	Rip-rap, pipe
Non-wetland Water 54B	12.9	55	Rip-rap, culvert extension
Non-wetland Water 54C	185.1	0	Feature eliminated by JD revision
Non-wetland Water 60	363.2	168	Culvert, roadway fill
Non-wetland Water 103	47.5	35	Rip-rap
Non-wetland Water 104	86.6	0	Feature eliminated by JD revision
Non-wetland Water 107	363.9	406	Roadway fill
Non-wetland Water 110	75.3	141	Rip-rap, culvert extension
Non-wetland Water D	102.4	0	No impact proposed
Non-wetland Water HA	51.4	53	Rip-rap, culvert extension
Non-wetland Water J	55.1	94	Rip-rap, culvert extension
Tributary 4 (NWW N)	142.6	0	No impact proposed
Non-wetland Water CB		22	Rip-rap, feature added by JD revision
Non-wetland Water 1A		50	Rip-rap
Non-wetland Water 2		16	Rip-rap
Non-wetland Water 9		17	Rip-rap
Non-wetland Water HB		26	Rip-rap, pipe
Non-wetland Water 25B		8	Pipe
Non-wetland Water CC		17	Rip-rap, feature added by JD revision
Non-wetland Water 6T		221	Pipe, impact due to reconfiguration of Exit 91
Non-wetland Water 31		104	Rip-rap, pipe
Non-wetland Water 33B		14	Rip-rap
Non-wetland Water 35		23	Rip-rap
Non-wetland Water 37		23	Rip-rap
Non-wetland Water 59		78	Pipe

Impact site number	FONSI impact quantity (LF)	Revised impact quantity (LF)	Notes
Non-wetland Water 47		555	Roadway fill
Non-wetland Water 109		23	Rip-rap, pipe
Total	**4,371.7***	**5,092**	
Re-evaluation delta		**703***	

**Note: FONSI States 4,389 but math from FONSI Table 4 does not match.*

TABLE 4. ESTIMATED WETLAND IMPACTS AND REVISIONS SINCE THE FONSI

Impact site number (permit sheet #)	FONSI impact quantity (ac)	Revised impact quantity (ac)	Notes
Wetland B	0.1		No proposed impact
Wetland C	0.05		No proposed impact
Wetland D	0.197		No proposed impact
Wetland E	0.012		No proposed impact
Wetland G	0.01		No proposed impact
Wetland I	0.002		No proposed impact
Wetland J	0.009	0.027	Fill, clearing
Wetland L	0.001		No proposed impact
Wetland M	0.111		No proposed impact
Wetland O	0.057		No proposed impact
Wetland P	0.05		No proposed impact
Wetland F	0	0.004	Fill
Wetland H	0	0.048	Fill, clearing
Wetland M	0	0.293	Fill
Wetland CH	0	0.041	Fill, clearing
Wetland CF	0	0.013	Fill, clearing
Non-wetland Water Pond CA	0	0.306	Fill, feature added from JD revision
Wetland CC	0	0.025	Fill, clearing
Wetland CA	0	0.292	Fill
Wetland CB	0	0.011	Fill
Wetland K	0	0.001	Fill
Total	**0.599**	**1.061**	
Re-evaluation delta		**0.462**	

An individual permit application through Section 404 of the Clean Water Act was submitted on December 16, 2019 to the U.S. Army Corps of Engineers (USACE) for the unavoidable impacts to WOUS and subsequently put on public notice on January 23, 2020. Comments were received from USACE and

other agencies. Revisions to the permit application were requested in response to the comments received from the public notice and as a result of project updates and revisions from final design. The response to the comments and revisions to the permit application package as a result of final project design was submitted on May 22, 2020. ().

Jurisdictional Determination

USACE issued a preliminary jurisdictional determination (PJD) for the proposed project (SAC-2018-00748) on August 2, 2018 associated with the original 1,073-acre PSA, which was documented in the FONSI. As a result of the expanded PSA and proposed design changes for the project, SCDOT requested to revise the previously issued PJD to include additional areas fully encompassing the proposed construction limits based on further finalized design, map existing features more accurately, and to revise previously identified aquatic features. The expanded portions of the JD study area were surveyed, and aquatic features were delineated and included in a revised JD. The PSA for the PJD was revised from 1,078 acres to 1,210 acres and includes seven newly identified wetlands, four linear non-wetland waters, and one open water non-wetland water. The mapping of previously identified aquatic features was updated based on project topographic survey and other supplemental survey to reflect field conditions and project design more accurately. In addition, 26 previously identified aquatic features were re-evaluated and determined nonaquatic features based on hydrologic conditions, origin, and function. Site visits were conducted in 2019 to further evaluate and document WOUS. A field evaluation with USACE in September 2019 confirmed 72 non-wetland waters, 4 non-wetland water ponds, and 15 wetlands. These features total 24,806.73 linear feet (LF) of non-wetland waters, 1.24 acre of non-wetland water ponds and 2.45 acres of wetlands. The linear feet of non-wetland waters was reduced by 1,607.82 linear feet, the wetlands increased by 0.62 acre, and the open waters increased by 0.70 acre from the August 2018 PJD. USACE issued a revised PJD approval letter associated with SAC-2018-00748 on February 18, 2020, which is attached in Attachment D (as an appendix to the Natural Resource Technical Memorandum Update).

Final design associated with the project has progressed since issuance of the revised February 2020 PJD, with the identification of three isolated work areas that extend beyond the EA/FONSI PSA that was documented in the PJD approval. These areas total approximately 3 acres and have been subsequently identified and documented as “delineation only” areas or areas covered under the CCR project (SAC 2015-01080) in conjunction with the Section 404 permit application. The additional PSA areas are shown in the permit submittal package and in the Natural Resource Technical Memorandum (NRTM) Update (Attachment D). In summary, the three additional areas are as follows:

- Additional PSA Area 1: This area is 1.78 acres and extends from the updated PSA north along Western Lane. This area was included in the PSA of the ongoing CCR project (SAC 2015-01080) with a PJD issued in June 2015. It was determined that work along westbound I-26 would need to be implemented with the proposed project to avoid reconstruction during the CCR project. Therefore, Tributary 2 and Freshwater Wetlands 56 and 57 were included in the additional

area and are shown on the CCR permit sheets (November 26, 2019 CCR public notice) and identified in the Section 404 permit application.

- Additional PSA Area 2 is 1.38 acres and is south of the I-26 mainline along Columbia Avenue and extends from the updated PSA southeast behind Bojangles. This area was expanded due to the need for an access road to Bojangles meet traffic requirements. This area was verified during an April 2020 desktop review to be uplands and has been documented as "delineation only" in the Section 404 permit application.
- Additional PSA Area 2 is 0.01 acre and extends from the updated PSA south along Non-wetland Water 59 (NWW 59). This area was added due to the need for an additional ditch to redirect the flows of NWW 59 more effectively into the proposed pipe extension inlet. NWW 59 was extended approximately 12 linear feet in this location. The area has also been documented as "delineation only" in the Section 404 permit application.

In summary, the February 2020 PJD revision totals include 2.45 acres of wetlands, 1.24 acres of open water, and 24,806.76 linear feet of non-wetland waters. Since the February 2020 PJD revision, 3 acres were added to the JD study area (to bring the PSA total to 1,213 acres) and NWW 59 was extended from 69.89 linear feet to 82.12 linear feet (increase of 12.23 linear feet) and added as "delineation only." Additionally, CCR Tributary 2 (42 linear feet), Wetland 56 (0.004 acre), and Wetland 57 (0.075 acre) were added in their entirety and are included in the individual permit application resubmitted in May 2020.

Floodplains

The EA/FONSI included the following environmental commitment regarding floodplain compliance:

> *The selected contractor will send a set of final plans and request for floodplain management compliance o the local County Floodplain Administrator.*

This coordination effort has been completed with the determination that the project would result in no impact to regulated floodplains, with copies of the correspondences included in Attachment C.

Threatened and Endangered Species

The EA/FONSI identified nine federally protected species known to occur or that have a possibility of occurring in Lexington, Newberry, and/or Richland County. These species include the red-cockaded woodpecker (*Picoides borealis*), wood stork (*Mycteria americana*), Atlantic Sturgeon (*Acispenser oxyrinchus*), shortnose sturgeon (*Acipenser brevirostrum*), Canby's dropwort (*Oxypolis canbyi*), Michaux's sumac (*Rhus michauxii*), rough-leaved loosestrife (*Lysimachia asperulaefolia*), smooth coneflower (*Echinacea laevigata*), and the bald eagle (*Haliaeetus leucocephalus*). The bald eagle is no longer protected by the Endangered Species Act but is protected by the Bald and Golden Eagle Protection Act.

The EA/FONSI determined the project to have "no effect" on species identified as state and/or federally threatened or endangered. Updated species lists (updated April 27, 2020) for Lexington, Richland, and Newberry Counties were acquired from the U.S. Fish and Wildlife Service (USFWS). The updated lists show that Michaux's sumac and Atlantic sturgeon have been delisted for the applicable counties. In addition, a USFWS Information for Planning and Consultation (IPaC) report was generated from USFWS on March 10, 2020 for use in evaluating the expanded PSA. The IPaC species list identified five species as potentially occurring within the PSA: red-cockaded woodpecker, wood stork, Canby's dropwort, rough-leaved loosestrife, and smooth coneflower. The updated counties species lists and IPaC report can be found in the NRTM Update in Attachment D.

The data collected from online resources and databases, in addition to the field site visits, did not identify any species that may be found within or directly adjacent to the revised PSA. Suitable habitat for protected species was not identified in the PSA. It is recommended that the proposed project, including the revised PSA be determined to have "no effect" on species identified as state and/or federally threatened or endangered, like the original determination in the EA/FONSI.

Hazardous Materials

No additional hazardous sites were identified as a result of the design changes. Asbestos and lead-based paint surveys and a re-evaluation of the previously identified/documented sites will be conducted in the form of a Phase II Environmental Site Assessment prior to construction or demolition activities to evaluate the presence, or absence of, petroleum products or hazardous substances in the subsurface of the sites.

Noise

A noise addendum to the detailed noise analysis (Traffic Noise Analysis Report completed in January 2018 for the EA/FONSI) was completed to document the changes proposed from final design and the analysis and resulting changes to the design of two noise barriers. The noise barrier analysis for two walls (noise barrier 5 and 6) has been updated, including wall layout and requirements, as a result of the final roadway design information. The reasonableness and feasibleness and design of noise barriers 5 and 6 were re-evaluated. Noise barrier 5 would have a small decrease in square footage and length compared to the design from the 2018 noise analysis, and the construction cost for the wall would decrease. In addition, the number of impacted receivers decreased from 90 to 87 and the number of benefitted receivers increased from 138 to 188 due to the Exit 91 design change. Noise barrier 6 would have a minor decrease in square footage and length as well as construction costs compared to the design from the 2018 analysis. In addition, the total number of impacted receivers decreased from 41 to 37 and the number of benefitted receivers decreased from 68 to 64 due to the design change at Exit 91. In summary, the final design of noise barriers 5 and 6 would achieve an increase in 46 benefitted receivers (an increase of 50 benefitted receivers for noise barrier 5 and a net decrease of 4 benefitted receivers for noise barrier 6).

As a result of the design change for Exit 91, the number of noise impacts changed. Approximately 12 receivers that were impacted under the 2018 noise analysis were found to no longer be impacted. One receiver that was not impacted under the 2018 noise analysis was found to be impacted under the final design. Impacts to the remaining receivers did not change. In summary, the number of total receivers impacted as a result of the design change at Exit 91 decreased from 13 to 2. Therefore, there is an overall reduction in project level impacts from 271 to 260 as a result of the alternate design at Exit 91. The total number of benefitted receivers increased from 206 to 252. The noise addendum is attached for reference (Attachment E).

Public Involvement

To notify the public of the change in bridge construction and the resulting detours in the PSA, SCDOT will post signs at each bridge 30 days prior to construction, mail post cards to property owners along the detour routes 15 days prior to commencement of the detours, and will provide information regarding the bridge closures and detours on the project website: scdotmidlandsconnection.com. Coordination with the Town of Chapin has been conducted and is ongoing. A stakeholder meeting was held on October 29, 2019 for the Exit 91 interchange modifications. The stakeholder meeting was attended by nine people. No conflicts or opposition was raised regarding the proposed design (see stakeholder meeting summary in Attachment F).

Environmental Commitments

SCDOT and FHWA previously identified various environmental commitments to avoid and minimize impacts to the surrounding human and natural environments. These commitments are documented in the EA/FONSI as well as the contract documents associated with the design-build procurement. Additional environmental commitments regarding the detour notices and implementation has also been added. The comprehensive list of environmental commitments is included in the front of this document. An Environmental Compliance Plan (ECP) specific to the project has been drafted and will be completed upon acquisition of the permits. The ECP ensures compliance with all commitments, and the Environmental Commitment Form will be updated and maintained accordingly.

ATTACHMENT A:

TECHNICAL MEMORANDUM: TRAFFIC DETOUR PLANS FOR I-26 DESIGN-BUILD PROJECT, RICHLAND, LEXINGTON, AND NEWBERRY COUNTIES, SC

ARCADIS

Technical Memorandum

FROM: Jonathan Reid, PE (#37192), PTOE (Arcadis)

DATE: April 14, 2020

SUBJECT: Traffic Detour Analysis for I-26 Design-Build Project – Final Report
Richland & Lexington Counties, SC

Introduction

This memorandum documents the methodology, analysis and conclusions from the study conducted to determine the impacts of temporary bridge closures during construction of the I-26 Design-Build project, located in Richland and Lexington Counties, northwest of Columbia SC. There are six bridges crossing I-26 that will be closed while a replacement bridge is built in place. The bridge closures will occur in two phases (1A and 1B). Note that per RFI 0006, the Holy Trinity Church Road and Parr Road bridges closures, though consecutive crossings of I-26, can occur at the same time (in Phase 1A), as detour traffic is served by detour routes that do not overlap. Table 1 below lists each bridge name, construction phase and the annual average daily traffic (AADT) being served by each bridge.

Table 1: Routes with Bridge Detours

No	Route Bridge Serves	Closure Phase	2018 AADT
1	Koon Road Bridge	Phase 1A	7,600
2	Old Hilton Road Bridge	Phase 1A	1,350
3	Peak Street Bridge	Phase 1B	1,300
4	Holy Trinity Church Road Bridge	Phase 1A	475
5	Parr Road Bridge	Phase 1A	850
6	SC 202 (Pomaria St) Bridge	Phase 1B	2,400

Development of Detour Routes

Detour routes for each bridge closure were developed and approved by SCDOT and each route is displayed in **Appendix A**. Intersection operational analyses at signalized and major unsignalized intersections along each detour route were conducted using Synchro under both current (Existing) and bridge closure detour (Bridge Detour) conditions. Detour route signing plans for each route are being developed separately and will be submitted with final design plans for each phase of the project.

Determination of Traffic Volumes

Peak hour turning movement counts (TMC's) were collected at 13 intersections (12 signalized and 1 unsignalized) during the week of February 16, 2020 and used for analysis. The intersection count data collected is included in **Appendix B**. The intersections counted include:

Signalized:

- Koon Rd at US 76
- Broad River Rd at US 76
- Broad River Rd at Shady Grove Rd
- Koon Rd at Old Tamah Rd
- Portrait Hill Dr at US 176
- Mt Vernon Church Rd at US 176
- Mt Vernon Church Rd at US 76
- Three Dog Rd at US 76
- Wessinger/Old Hilton Rd at US 76
- Columbia Ave at I-26 WB Ramps
- Columbia Ave/Amicks Ferry Rd at US 76
- SC 773 at US 76

Unsignalized:

- Columbia Ave at I-26 EB Ramps

The remaining intersections are low volume intersections where peak hour TMC data are not available and only AADT data are available. For these intersections, peak hour turn movement volumes were estimated using NCDOT's Intersection Analysis Utility (IAU) spreadsheet tool. The IAU spreadsheet provides peak hour volumes based on AADT, daily turn volumes, K, D and peak direction assumptions. The assumptions for K, D and peak direction. The AADT data for each route were obtained from the SCDOT Traffic Count ArcGIS Online Portal. The AADT volumes were converted to peak hour volumes using a conservative assumption for the K and D factors for different AADT threshold as shown below:

- for AADT > 5,000, K = 0.10 and D = 60%
- for AADT between 5,000 and 1,000, K = 0.11 and D = 65%
- for AADT < 1,000, K = 0.12 and D = 70%

The daily turn volumes were estimated utilizing another NCDOT spreadsheet tool called Intersection Analysis Buddy (IAB). This tool is based on NCHRP 255 report's nondirectional volume method for estimating two-way turn movement volume and produces two-way turning volumes at an intersection given two-way link volumes and an estimate of the total vehicle turning percentage. The IAB spreadsheet has sliders for NW & SE and NE & SW quadrants which allow shifting daily traffic between the respective set of turn and through volumes and thus letting the user choose total vehicle turning percentage indirectly. For the purpose of this study, the sliders for both set of quadrants were set at zero, the default value for the tool, which implies 60% through and 40% turns as proportion of the total entering and exiting (two-way link) intersection volume. These calculations are provided in **Appendix C**. The collected and derived existing AM and PM peak hour intersection volumes are summarized in Table 2.

The Bridge Detour Conditions traffic volumes were determined by applying the approved detour routes to Existing conditions traffic volumes. For each bridge detour route, three figures in **Appendix D** illustrate 1) existing intersection and link ADT volumes, 2) turning movement changes due to the detour and 3) intersection and link ADT volumes with the detour in place. The AM and PM peak hour intersection turning movement volumes with the detour routes in place are also provided in Table 2.

Intersection Analysis and Operational Results

The Existing Conditions and Bridge Detour Conditions intersection volumes were used as the basis for intersection operational analysis in Synchro. Current geometry at each intersection location was coded into a Synchro network to conduct intersection operational analysis. Current intersection geometry and intersection controls (TWSC or signal) and phasing were input into the Synchro model. Signal phase splits and offsets were optimized at each intersection. The SCDOT Synchro defaults listed in Figure 1 were used where no overriding data was available.

Network Settings

- Peak Hour Factor – 0.90
- Yellow – 4 seconds
- Red – 2 seconds
- Offset style – Beginning of Yellow
- Simulation taper length – 100 feet
- Crosswalk width – 10 feet
- Minimum green time for through phases – 22 seconds
- Minimum green time for left turn phases – 15 seconds
- Consider Lead/Lag optimization only if no left turn trap situation
- If no system in place set, as Actuated uncoordinated; If system in place, set as Actuated Coordinated

Detector Templates

- Left turn lane– Detector 1 - 0 feet from stop bar, length - 30 feet
- Generally, for side streets, use loops at stop bar (leading to 0)
- Edit template phases – 2 Southbound, 4 Westbound or as shown on signal plan

SimTraffic Intervals and Volumes:

- Seed 10 min*, record 60 or record 4 15-minute intervals; large networks seeding should cover saturating network

All other default settings within Synchro should be used unless approved by SCDOT.

(Source: SCDOT-TSM Manual 2018, Page 6-10)

Figure 1: SCDOT Synchro Defaults

Table 2: AM & PM Peak Hour Intersection Volumes for Existing and Detour Conditions

Intersection / Closure *Koon Road Bridge Detour Route*	AM Peak Hour – Existing Conditions													PM Peak Hour – Existing Conditions												AM Peak Hour – Bridge Detour Conditions												PM Peak Hour – Bridge Detour Conditions											
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total
1. Coolger Rd @ Koon Rd	12	220	190	12	290	5	10	8	17	88	5	60	917	15	165	74	4	188	8	5	5	9	161	8	15	657	0	0	0	210	0	18	27	8	0	0	5	148	416	0	0	0	75	0	23	14	5	0	0	8	176	301
2. US-76 (Broad River) @ Koon Rd	10	15	10	146	14	235	301	856	2	7	344	106	2046	26	12	13	115	13	230	183	648	3	15	827	59	2144	25	0	10	0	0	0	0	1007	20	7	450	0	1519	38	0	13	0	0	0	0	727	12	15	886	0	1691
3. US-76 (Broad River) @ Farming Creek	91	0	277	0	0	0	0	950	54	79	510	0	1961	60	0	90	0	0	0	0	710	98	135	938	0	2031	163	0	205	0	0	0	0	866	86	47	428	0	1795	80	0	70	0	0	0	0	635	127	106	808	0	1826
4. US-76 (Broad River) @ Broad River Rd	50	74	68	264	57	10	53	504	65	70	283	196	1694	85	72	55	253	68	13	9	555	99	86	563	280	2138	50	74	68	427	57	10	53	257	65	70	80	389	1600	85	72	55	334	68	13	9	399	99	86	362	371	1953
5. Shady Grove Rd @ Broad River Rd	60	199	13	162	173	71	11	166	145	64	175	83	1322	132	204	9	114	177	36	28	197	150	47	200	131	1425	60	446	13	325	407	71	11	166	145	64	175	276	2159	132	360	9	195	321	36	28	197	150	47	200	222	1897
6. Shady Grove Rd @ Old Tamah Rd	56	317	0	0	442	100	22	0	106	0	0	0	1043	70	152	0	0	233	39	38	0	181	0	0	0	713	56	708	0	0	703	100	22	0	106	0	0	0	1695	70	310	0	0	369	39	38	0	181	0	0	0	1007
7. Old Tamah Rd @ Koon Rd	200	102	215	115	282	157	76	218	65	64	185	52	1731	89	18	75	22	22	25	7	94	89	88	139	18	686	217	57	121	115	71	369	76	447	227	32	217	52	2000	170	9	38	22	11	36	7	254	86	44	183	18	878
8. US-76 (Dutch Fork) @ Shady Grove Rd	5	33	10	166	30	186	150	442	10	16	206	89	1343	10	56	10	160	20	194	138	525	5	10	480	151	1759	5	33	10	166	30	420	397	195	10	16	3	89	1374	10	56	10	160	20	338	294	369	5	10	279	151	1702
Old Hilton Road Bridge Detour Route																																																				
1. Chapin Rd @ Old Hilton Rd	44	3	83	19	8	6	4	142	79	102	96	8	594	79	8	102	8	3	4	6	96	44	83	142	19	594	0	0	0	19	0	6	4	221	0	0	200	8	458	0	0	0	8	0	4	6	140	0	0	166	19	343
2. Chapin Rd @ US-176 (Broad River)	139	228	0	0	352	44	45	0	221	0	0	0	1029	223	353	0	0	229	42	41	0	141	0	0	0	1029	141	236	0	0	352	44	22	0	240	0	0	0	1035	164	357	0	0	229	42	23	0	112	0	0	0	926
3. US-176 (Broad River) @ Portrait Hill Dr	150	4	230	66	7	26	5	356	263	193	269	41	1610	27	1	53	57	1	13	21	316	15	41	412	82	1039	150	4	230	66	7	26	5	375	263	193	279	41	1639	27	1	53	57	1	13	21	287	15	41	357	82	955
4. US-176 (Broad River) @ Mt Vernon CH	181	51	222	34	131	109	48	357	182	185	406	6	1912	57	28	91	26	19	27	56	318	71	285	444	26	1448	293	51	450	34	131	109	48	297	261	287	304	6	2271	85	28	110	26	19	27	56	245	115	368	361	26	1466
5. US-76 (Dutch Fork) @ Mt Vernon CH	60	92	9	109	40	79	110	727	37	7	331	124	1725	47	25	21	54	39	189	63	541	22	10	741	49	1801	60	92	9	109	40	260	442	727	37	7	323	132	2238	47	25	21	54	39	316	106	541	22	10	737	53	1971
6. US-76 (Dutch Fork) @ Three Dog Rd	209	131	266	0	164	9	22	671	199	45	381	2	2099	88	14	41	5	35	26	13	595	94	72	891	5	1879	209	131	266	0	164	9	22	1003	199	45	554	2	2604	88	14	41	5	35	26	13	638	94	72	1014	5	2045
7. US-76 (Dutch Fork) @ Old Hilton	82	228	350	6	21	62	104	460	16	106	444	8	1887	59	19	158	7	118	41	24	482	76	304	553	4	1845	82	0	578	0	0	0	0	564	16	106	625	0	1971	59	0	177	0	0	0	0	506	76	304	680	0	1802
Peak Street Bridge Detour Route																																																			
1. Holy Trinity Church Rd @ Peak Street	20	0	32	0	0	0	0	70	46	35	32	0	235	46	0	35	0	0	0	0	32	20	32	70	0	235	0	0	0	0	0	0	0	116	0	0	61	0	177	0	0	0	0	0	0	0	52	0	0	111	0	163
2. US-176 (Broad River) @ Holy Trinity CH	46	0	59	0	0	0	0	125	42	29	68	0	369	42	0	29	0	0	0	0	68	45	59	125	0	368	46	0	105	0	0	0	0	167	0	29	251	0	598	42	0	49	0	0	0	0	113	0	41	191	0	436
3. US-176 (Broad River) @ Martin Road	47	0	57	16	0	19	8	388	102	78	247	6	968	101	0	79	6	0	8	16	246	46	57	388	19	966	259	0	57	16	0	19	8	388	190	107	218	6	1268	208	0	79	6	0	8	16	246	111	116	329	19	1138
4. Columbia Ave @ Martin Road	0	0	0	58	0	101	61	208	0	0	208	64	700	0	0	0	63	0	61	101	114	0	0	114	58	511	0	0	0	58	0	218	93	208	0	0	28	244	849	0	0	0	63	0	185	154	114	0	0	60	112	688
5. Columbia Ave @ I-26W Ramps	424	1	12	0	0	0	88	279	0	0	286	54	1144	664	0	13	0	0	0	86	182	0	0	135	11	1091	424	1	12	0	0	0	88	311	0	0	223	54	1113	664	0	13	0	0	0	86	235	0	0	205	11	1214
6. Columbia Ave @ I-26E Ramps	3	0	24	10	3	72	0	333	679	21	689	0	1834	0	0	7	25	10	61	0	236	459	34	765	0	1597	3	0	24	10	3	72	0	365	679	21	626	0	1803	0	0	7	25	10	61	0	289	459	34	835	0	1720
7. Columbia Ave @ E Boundary St	66	0	50	0	0	0	0	645	54	26	364	0	1205	51	0	30	0	0	0	0	308	61	55	555	0	1060	66	0	50	0	0	0	0	677	54	26	301	0	1174	51	0	30	0	0	0	0	361	61	55	625	0	1183
8. Columbia Ave @ Peak St / Clark St	8	3	62	51	12	44	29	586	22	87	163	180	1247	19	12	88	20	3	28	41	261	7	63	489	54	1085	8	0	65	0	0	0	0	615	22	87	280	0	1077	19	0	100	0	0	0	0	302	7	63	613	0	1104
Holy Trinity Church Bridge Detour Route																																																			
1. Holy Trinity CH at Cumlander Crossing	9	0	11	0	0	0	0	87	24	15	44	0	191	24	0	16	0	0	0	0	44	8	11	87	0	191	46	0	0	0	0	0	0	0	111	0	0	0	157	106	0	0	0	0	0	0	0	52	0	0	0	158
2. US-76 at Cumlander Crossing	0	0	0	21	0	20	11	327	0	0	214	8	602	0	0	0	9	0	9	17	215	0	0	326	24	601	0	0	0	108	0	20	0	338	0	0	229	45	741	0	0	0	53	0	9	0	232	0	0	337	106	738
3. US-76 at St Peters Church	146	0	84	0	0	0	0	507	128	33	280	0	1178	127	0	80	0	0	0	0	439	144	121	507	0	1418	146	0	84	0	0	0	0	605	128	33	332	0	1328	127	0	80	0	0	0	0	500	144	121	600	0	1572
4. US-76 at Columbia Ave/Amicks Ferry	21	400	157	12	96	87	244	339	8	130	205	24	1723	30	165	136	16	285	199	141	353	25	206	399	16	1971	21	400	157	12	96	139	342	339	8	130	205	24	1873	30	165	136	16	285	292	202	353	25	206	399	16	2125
5. Columbia Ave at Peak St	8	3	62	51	12	44	29	586	22	87	163	180	1247	19	12	88	20	3	28	41	261	7	63	489	54	1085	8	3	62	51	12	76	127	586	22	87	183	160	1377	19	12	88	20	3	98	102	261	7	63	535	31	1239
6. Holy Trinity Church Rd at Peak St	20	0	32	0	0	0	0	70	46	35	32	0	235	46	0	35	0	0	0	0	32	20	32	70	0	235	0	0	130	0	0	0	0	0	0	67	0	0	197	0	0	96	0	0	0	0	0	0	102	0	0	198
Parr Road Bridge Detour Route																																																			
1 Holy Trinity Church Rd at Parr Road	0	0	0	39	0	24	19	78	0	0	43	17	220	0	0	0	19	0	21	23	43	0	0	78	37	221	0	0	0	0	0	0	0	132	0	0	60	0	192	0	0	0	0	0	0	0	65	0	0	115	0	180
2. Church Road at Pomaria St (SC 202)	0	95	29	66	41	0	0	0	0	10	0	56	297	0	41	10	56	95	0	0	0	0	28	0	66	296	0	95	29	101	53	0	0	0	0	10	0	73	361	0	41	10	55	107	0	0	0	0	28	0	103	344
3. I-26E Ramps at Pomaria St (SC 202)	198	96	0	0	82	56	26	0	34	0	0	0	492	24	62	0	0	109	25	36	0	41	0	0	0	297	198	113	0	0	129	56	26	0	34	0	0	0	556	24	99	0	0	120	25	36	0	41	0	0	0	345
4. I-26W Ramps at Pomaria St (SC 202)	62	61	0	0	117	22	11	0	21	0	0	0	294	18	81	0	0	57	60	38	0	77	0	0	0	331	62	78	0	0	164	22	11	0	21	0	0	0	358	18	118	0	0	68	60	38	0	77	0	0	0	379
5. US-176 at Pomaria St (SC 202)	27	0	37	0	0	0	0	151	63	41	74	0	393	63	0	41	0	0	0	0	74	27	37	151	0	393	27	0	54	0	0	0	0	151	63	88	74	0	457	63	0	78	0	0	0	0	90	11	64	151	0	457
6. US-176 at Parr Road (SC 213)	12	25	20	126	65	77	86	68	35	22	26	54	616	35	65	22	54	25	86	77	26	12	20	68	126	616	5	10	8	126	30	112	103	87	16	10	38	54	599	16	31	10	54	10	101	114	49	5	8	80	126	604
SC 202 (Pomaria St) Bridge Detour Route																																																			
1. US-76 (Main St) @ Pomaria (SC 202)	6	8	15	90	5	77	130	244	6	8	131	82	802	6	5	8	82	8	129	77	131	6	15	244	90	801	6	8	15	90	5	77	95	244	6	8	193	21	767	6	5	8	82	8	129	31	131	6	15	262	72	755
2. US-76 (Main St) @ Mountain Dr	0	0	0	26	0	23	13	329	0	0	215	9	615	0	0	0	11	0	11	20	216	0	0	328	29	615	0	0	0	26	0	23	13	294	0	0	277	9	641	0	0	0	11	0	11	20	170	0	0	346	29	587
3. US-76 (Main St) @ Mt Pilgrim Church	21	0	24	0	0	0	0	318	38	27	207	0	635	35	0	30	0	0	0	0	207	19	26	319	0	636	21	0	24	0	0	0	0	283	38	27	269	0	661	35	0	30	0	0	0	0	161	19	26	337	0	608
4. US-76 (Main St) @ SC 773	0	0	0	186	0	60	117	287	0	0	241	99	990	1	0	1	47	0	90	96	128	0	0	142	25	530	0	0	0	186	0	60	152	252	0	0	241	161	1052	1	0	1	47	0	90	142	82	0	0	142	43	548
5. I-26W Ramps @ SC 773	0	147	99	72	273	0	25	1	44	0	0	0	661	0	115	71	62	206	0	65	2	30	0	0	0	551	0	244	99	210	273	0	51	1	44	0	0	0	922	0	179	71	196	206	0	101	2	30	0	0	0	785
6. I-26E Ramps @ SC 773	39	134	0	0	254	83	0	0	0	91	3	76	680	13	167	0	0	192	62	0	0	0	76	2	115	627	101	195	0	0	254	83	0	0	0	229	3	76	941	31	249	0	0	192	62	0	0	0	210	2	115	861
7. US-176 (Broad River) @ SC 773	68	0	89	0	0	0	0	76	133	97	42	0	505	133	0	97	0	0	0	0	42	68	89	76	0	505	68	0	150	0	0	0	0	76	133	97	42	0	566	133	0	179	0	0	0	0	42	68	89	76	0	587
8. US-176 (Broad River) @ SC 202	29	0	41	0	0	0	0	142	59	46	78	0	395	59	0	46	0	0	0	0	78	29	42	142	0	396	29	0	41	0	0	0	0	203	59	46	78	0	456	59	0	46	0	0	0	0	160	29	42	142	0	478
9. I-26W Ramps @ SC 202	62	61	0	0	117	22	11	0	21	0	0	0	294	18	81	0	0	57	60	38	0	77	0	0	0	331	0	0	0	0	0	139	11	0	0	0	0	0	150	0	0	0	0	0	117	38	0	0	0	0	0	155
10. I-26E Ramps @ SC 202	198	96	0	0	82	56	26	0	34	0	0	0	492	24	62	0	0	109	25	36	0	41	0	0	0	297	198	0	0	0	0	0	0	0	172	0	0	0	370	24	0	0	0	0	0	0	0	175	0	0	0	199

Synchro was used to determine intersection delay and level of service (LOS) for existing condition and detour route scenarios during both AM and PM peak. Full intersection LOS analysis results are provided in **Appendix E** and are summarized in Table 3. Intersection LOS is based on a scale of A to F, with A being optimal conditions and F indicating over-capacity intersection operations. At LOS E, the intersection is considered to be operating at capacity, with moderate to significant delays expected in peak periods.

Table 3: Synchro Intersection Operational Analysis Results

	ID	Intersection	Existing Control	Existing Conditions Delay / LOS		With Detour Routes Delay / LOS	
				AM	PM	AM	PM
Koon Rd Bridge Closure (Phase 1A)	1	Coolger Rd @ Koon Rd	4-leg minor stop	4.4 / A	5.6 / A	8.8 / A	8.3 / A
	2	US-76 (Broad River) @ Koon Rd	4-leg signalized	17.7 / B	30.0 / C	6.1 / A	5.6 / A
	3	US-76 (Broad River) @ Farming Creek Rd	3-leg minor stop	45.2 / E	298.4 / F	45.7 / E	42.1 / E
	4	US-76 (Broad River) @ Broad River Rd	4-leg signalized	25.8 / C	27.1 / C	25.6 / C	26.6 / C
	5	Shady Grove Rd @ Broad River Rd	4-leg signalized	14.4 / B	14.1 / B	26.1 / C [32.2 / C]	17.5 / B [23.3 / C]
	6	Shady Grove Rd @ Old Tamah Rd	3-leg minor stop	2.8 / A	5.0 / A	4.0 / A [3.0 / A]	4.8 / A [4.0 / A]
	7	Old Tamah Rd @ Koon Rd	4-leg signalized	17.9 / B	12.1 / B	32.5 / C [22.9 / C]	14.9 / B [15.6 / B]
	8	US-76 (Dutch Fork Rd) @ Shady Grove Rd	4-leg signalized	10.9 / B	11.4 / B	13.2 / B	12.0 / B
Old Hilton Rd Bridge Closure (Phase 1A)	1	Chapin Rd @ Old Hilton Rd	3-leg minor stop	5.2 / A	6.0 / A	0.7 / A	0.5 / A
	2	Chapin Rd @ US-176 (Broad River)	3-leg minor stop	7.3 / A	6.3 / A	6.1 / A	4.2 / A
	3	US-176 (Broad River) @ Portrait Hill Dr	4-leg signalized	14.2 / B	8.1 / A	14.3 / B	8.1 / A
	4	US-176 (Broad River) @ Mt Vernon Ch Rd	4-leg signalized	11.1 / B	7.4 / A	15.5 / B	8.5 / A
	5	US-76 (Dutch Fork) @ Mt Vernon/Lowman	4-leg signalized	15.8 / B	15.0 / B	42.6 / D [26.3 / C]	20.0 / B [19.6 / B]
	6	US-76 (Dutch Fork) @ Three Dog Rd	4-leg signalized	17.5 / B	9.6 / A	31.7 / C	10.8 / B
	7	US-76 (Dutch Fork) @ Wessinger/Old Hilton	4-leg signalized	19.7 / B	17.9 / B	21.2 / C	12.1 / B
Peak St Bridge Closure (Phase 1B)	1	Holy Trinity Church Road @ Peak Street	3-leg minor stop	3.2 / A	4.4 / A	0.0 / A	0.0 / A
	2	US-176 (Broad River) @ Holy Trinity Ch Rd	3-leg minor stop	3.6 / A	3.4 / A	3.4 / A	3.1 / A
	3	US-176 (Broad River) @ Martin Road	4-leg minor stop	4.1 / A	6.7 / A	100.1 / F	54.4 / E
	4	Columbia Ave @ Martin Road	3-leg minor stop	3.9 / A	4.7 / A	5.5 / A	6.8 / A
	5	Columbia Ave @ I-26WRamps	4-leg signalized	16.8 / B	18.9 /B	16.6 / B	22.1 / C
	6	Columbia Ave @ I-26E Ramps	4-leg minor stop	2.2 / A	3.7 / A	2.0 / A	5.4 / A
	7	Columbia Ave @ E Boundary St	3-leg minor stop	3.5 / A	2.5 / A	3.5 / A	2.8 / A
	8	Columbia Ave @ Peak St / Clark St	4-leg minor stop	7.6 / A	4.6 / A	2.3 / A	2.6 / A
Holy Trinity Bridge Closure (Ph 1A)	1	Holy Trinity Ch Rd at Cumlander Crossing	3-leg minor stop	1.6 / A	2.4 / A	2.6 / A	6.1 / A
	2	US-76 at Cumlander Crossing	3-leg minor stop	1.0 / A	0.7 / A	2.8 / A	1.3 / A
	3	US-76 at St Peters Church	3-leg minor stop	6.5 / A	20.3 / C	9.3 / A	38.8 / D
	4	US-76 at Columbia Ave/Amicks Ferry Rd	4-leg signalized	29.0 / C	23.7 / C	39.2 / D	29.8 / C
	5	Columbia Ave at Peak St	3-leg minor stop	7.6 / A	4.6 / A	19.1 / B	7.7 / A
	6	Holy Trinity Church Road at Peak St	3-leg minor stop	3.2 / A	4.4 / A	8.3 / A	8.0 / A
Parr Road Bridge Closure (Phase 1A)	1	Holy Trinity Church Road at Parr Road	3-leg minor stop	3.4 / A	2.5 / A	0.0 / A	0.0 / A
	2	Church Road at Pomaria St (SC 202)	3-leg minor stop	3.8 / A	4.5 / A	4.5 / A	5.0 / A
	3	I-26E Ramps at Pomaria St (SC 202)	3-leg minor stop	5.0 / A	3.2 / A	4.6 / A	2.9 / A
	4	I-26W Ramps at Pomaria St (SC 202)	3-leg minor stop	2.8 / A	3.8 / A	2.3 / A	3.4 / A
	5	US-176 at Pomaria St (SC 202)	3-leg minor stop	2.6 / A	3.7 / A	3.6 / A	4.7 / A
	6	US-176 at Parr Road (SC 213)	4-leg minor stop	10.6 / B	8.0 / A	9.4 / A	6.8 / A
SC 202 (Pomaria St) Bridge Closure (Phase 1B)	1	US-76 (Main St) @ Pomaria St (SC 202)	4-leg minor stop	6.8 / A	6.3 / A	6.5 / A	5.6 / A
	2	US-76 (Main St) @ Mt Tabor/Mountain Dr	3-leg minor stop	1.2 / A	0.8 / A	1.2 / A	0.8 / A
	3	US-76 (Main St) @ Mt Pilgrim Church Rd	3-leg minor stop	1.3 / A	1.7 / A	1.3 / A	1.8 / A
	4	US-76 (Main St) @ SC 773	3-leg signalized	15.5 / B	10.5 / B	14.8 / B	11.2 / B
	5	I-26W Ramps @ SC 773	3-leg minor stop	2.5 / A	3.5 / A	5.7 / A	8.2 / A
	6	I-26E Ramps @ SC 773	3-leg minor stop	4.2 / A	4.1 / A	26.1 / C	12.0 / B
	7	US-176 (Broad River) @ SC 773	3-leg minor stop	5.3 / A	7.3 / A	6.1 / A	8.5 / A
	8	US-176 (Broad River) @ Pomaria (SC 202)	3-leg minor stop	2.8 / A	3.8 / A	2.6 / A	3.4 / A
	9	I-26W Ramps @ SC 202	3-leg Minor Stop	2.7 / A	3.8 / A	0.7 / A	2.2 / A
	10	I-26E Ramps @ SC 202	3-leg Minor Stop	4.8 / A	3.2 / A	8.2 / A	8.8 / A

Note: [0.0 / A] denotes delay/LOS after improvement(s) made

The results in Table 3 show that all existing intersections are operating below capacity (LOS D or better) during both AM and PM peak periods, with the exception of one intersection (discussed in the next section). In some cases, intersection and/or LOS improves during detour operations. In many other cases, intersection delay increases slightly from existing to detour route conditions during one or both peak periods, and in some cases intersection LOS decreases (worsens) by one letter grade. In two cases, the intersection LOS drops two letter grades (but not beyond LOS D), and at one intersection LOS A conditions drops to LOS F / E in the AM / PM peak hour, respectively.

Delay/LOS and SimTraffic Observations and Recommended Mitigation

The Synchro delay/LOS and SimTraffic simulation results were also reviewed to observe any deficiencies created during AM or PM peak hour conditions under the detour route operations. Synchro delay/LOS analysis and SimTraffic observations of all traffic detour models led to improvement recommendations at the following location(s) to provide acceptable operations during the planned detours:

1. Old Tamah at Koon Road

The Koon Road detour reroutes a significant volume of traffic onto Old Tamah Road. This added volume causes operational concerns at the intersection of Old Tamah at Koon Road. At this intersection, the AM peak period delay and LOS is 32.5 / C, indicating acceptable intersection operations during detour operations. However, SimTraffic results show significant queuing in the AM peak period, particularly in the eastbound direction, that extends upstream through the Shady Grove intersection.

With an additional right turn bay on eastbound Old Tamah and a right turn phase overlapping the NB left turn phase, AM peak hour intersection delay decreases from 32.5 to 22.9 average seconds delay (remaining at LOS C) and eastbound queues are significantly reduced, as illustrated in Figure 2 below.

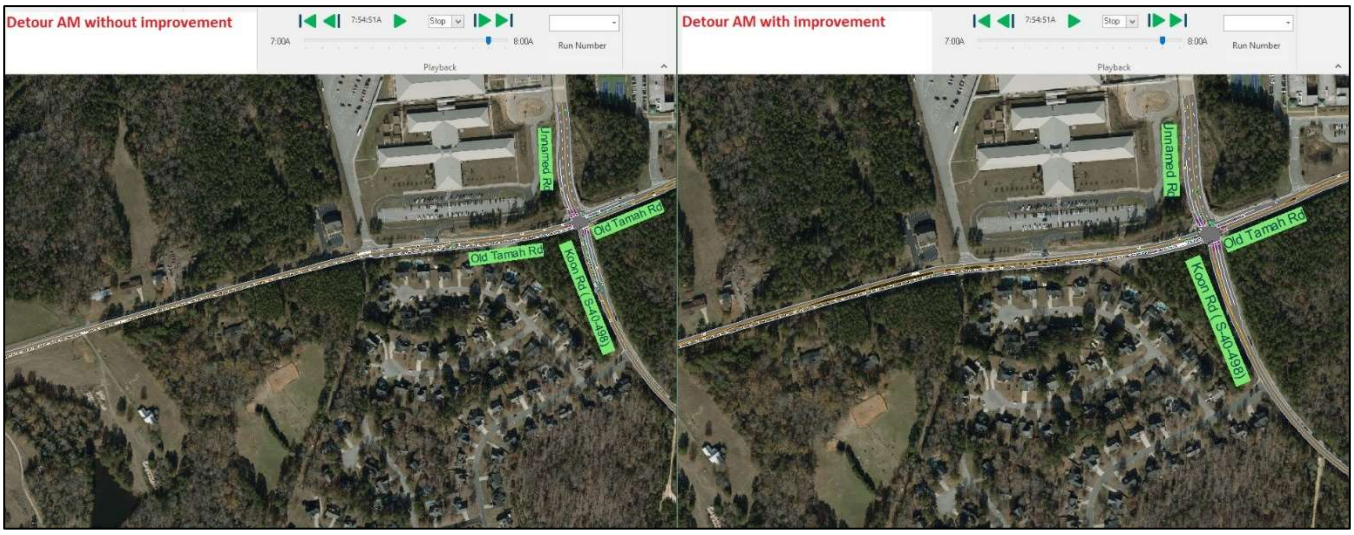


Figure 2: Old Tamah / Koon Road Operations with and without Right Turn Bay Improvement

2. Old Tamah at Shady Grove Road

Due to the same increase in traffic on Old Tamah / Shady Grove Road, the stop-controlled approach on Shady Grove Road operates at LOS F and SimTraffic shows extensive queuing on this intersection approach during detour operations. With the aforementioned Old Tamah/Koon Road improvements and the addition of a southbound left turn bay on Shady Grove Road, overall intersection delay is reduced from 4.0 to 3.0 seconds of average delay, remaining at LOS A. The southbound stop-controlled approach remains at LOS F, but queues are reduced, as illustrated in Figure 3. It should be noted that with the right turn bay, stop-control delays will still exist as there are few gaps on the main roadway (Old Tamah), both currently and with the detour condition in place. A signal warrant study should be conducted at this intersection to determine if signalization is a good long-term solution.

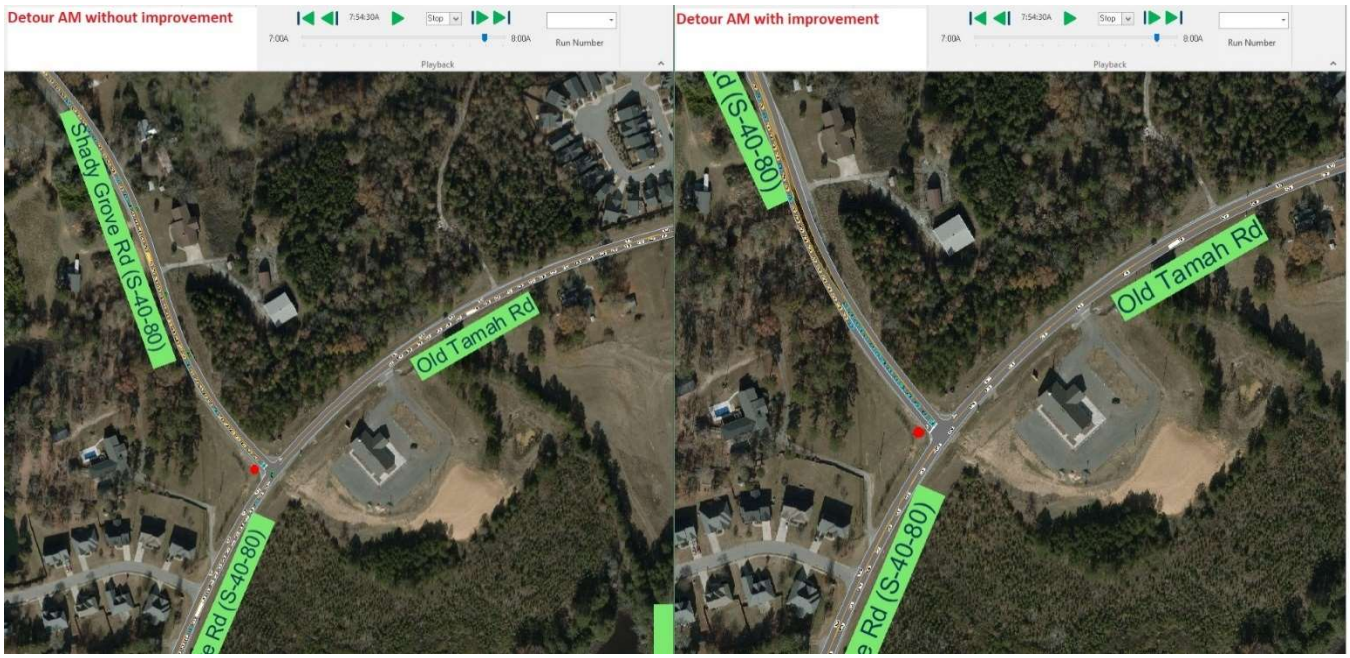


Figure 3: Old Tamah / Shady Grove Road Operations with and w/o Turn Bay Improvements

3. Broad River Road at Shady Grove Road

The Koon Road detour reroutes a significant volume of traffic onto Shady Grove. At the Broad River/Shady Grove Road intersection, the intersection operates at 26.1 / C in the AM peak hour, indicating acceptable intersection operations during detour operations. However, SimTraffic results show significant queuing on southbound Shady Grove in the AM peak period due to an increase in southbound left turns at this intersection. With the addition of a southbound protected/permitted left turn phase, intersection delays slightly increase to 32.3 / C and 23.3 / C in the AM and PM peak hours respectively, but southbound queues are significantly reduced, as illustrated in Figure 4 below.

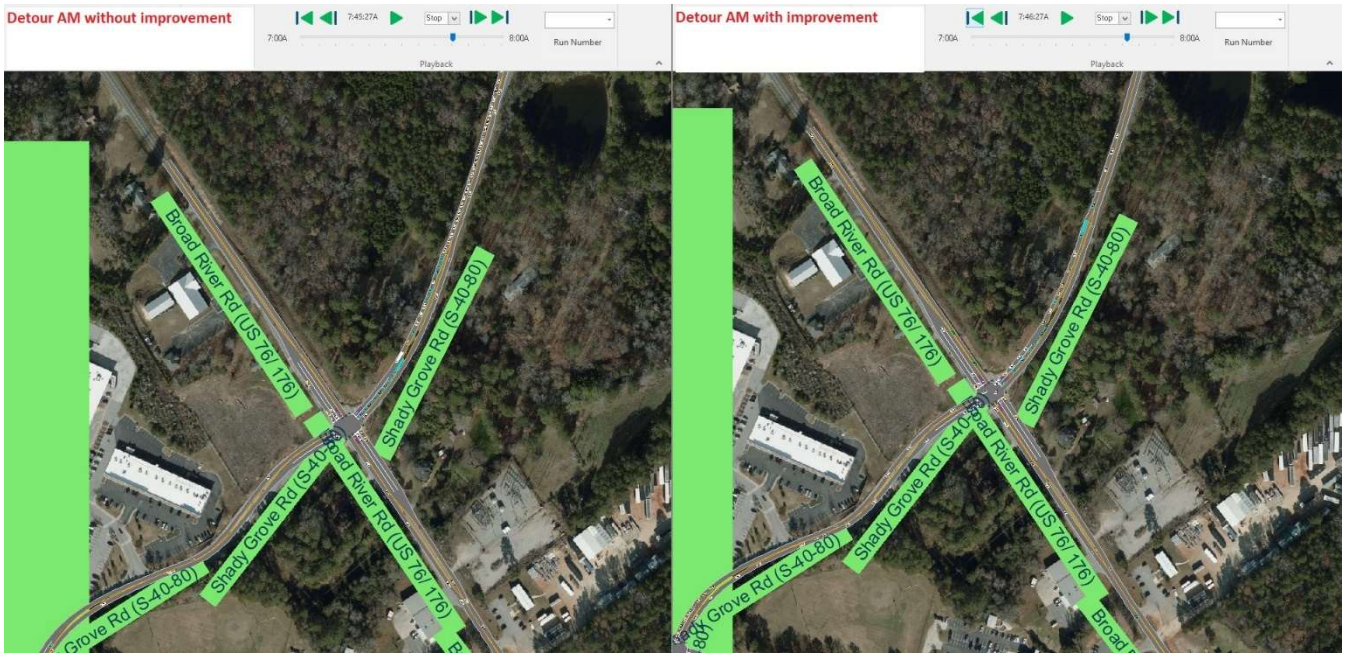


Figure 4: Broad River/Shady Grove Rd Operations with and w/o LT Signal Phase Improvements

4. US-176 (Broad River Road) at Martin Road

At this minor street (Martin Road) stop-controlled intersection, the peak hour intersection operations decreased from LOS A in both peak periods to LOS F / LOS E in the AM / PM peak hours respectively during the Peak Street bridge detour. However, SimTraffic observations, illustrated in Figure 5, showed the LOS reduction is overstated, as the maximum vehicle queues on Martin Road was shown to be less than 10 vehicles during the AM peak period. No improvement recommendations are recommended for this intersection.

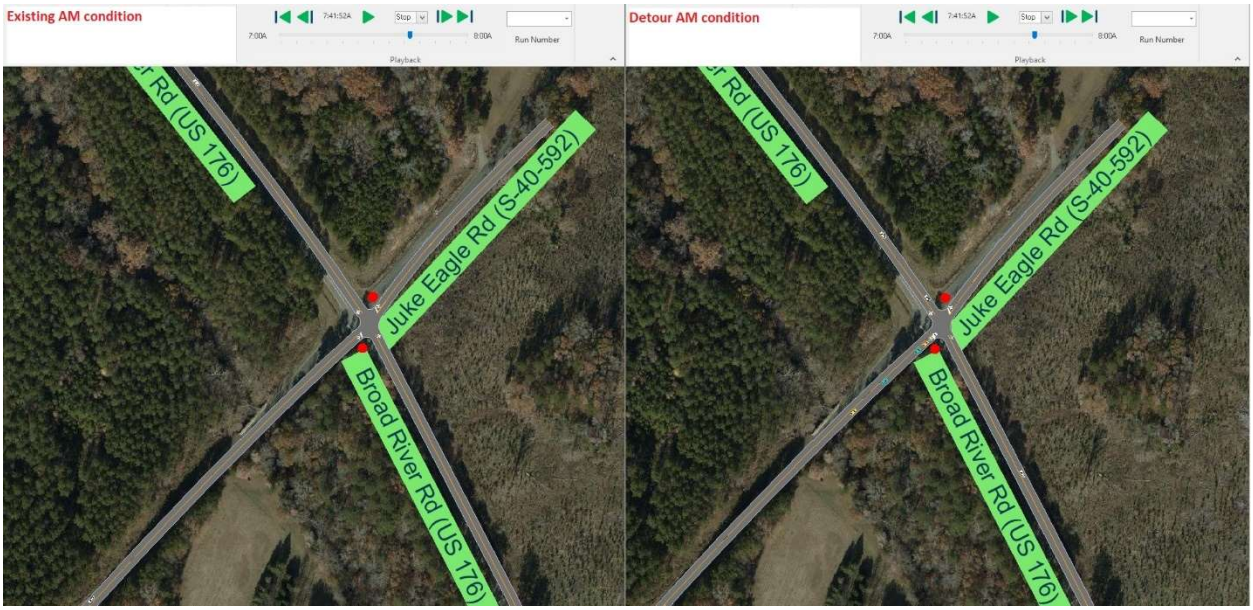


Figure 5: Maximum PM Peak Queue on NB Martin Road at US-176 During Detour Conditions

5. US-76 (Chapin Rd) at St Peters Church Rd

Operational analysis showed that during the Holy Trinity Church detour, the LOS decreases from LOS C to LOS D during the PM peak. However, observations in SimTraffic, illustrated in Figure 6, showed the maximum vehicle queues on the stop-controlled approach (St. Peters Church) to be less than 10 vehicles during the PM peak period. No improvement recommendations are recommended for this intersection.

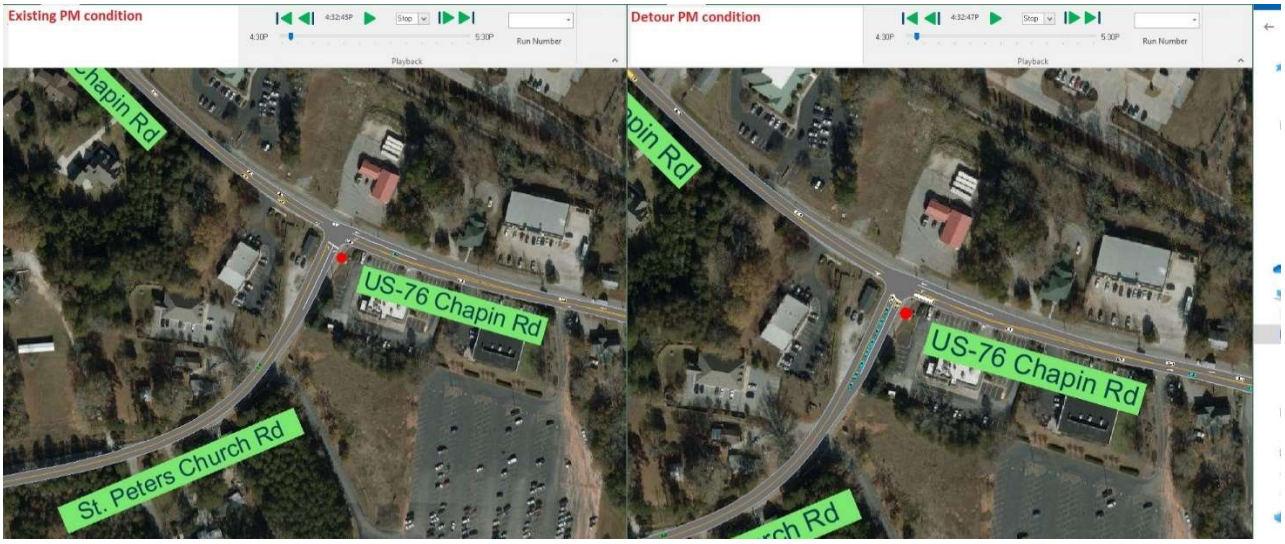


Figure 6: Maximum PM Peak Queue on NB St. Peters Church at US-76 During Detour Conditions

6. US-76 (Dutch Fork) at Mt. Vernon/Lowman Road

Despite acceptable delay and LOS at this intersection with the detour in place (42.6 / D and 20.0 / B in the AM / PM peak hours respectively), a review of SimTraffic operations showed that during the Old Hilton Road detour, southbound approach queues exceeded one-half mile in the AM peak hour. The addition of an eastbound left turn protected/permitted phase significantly reduces both eastbound and southbound queues, as illustrated in Figure 7. With this improvement, intersection delay improves from 42.6 / D to 26.3 / C in the AM peak hour and southbound approach queues are substantially reduced.

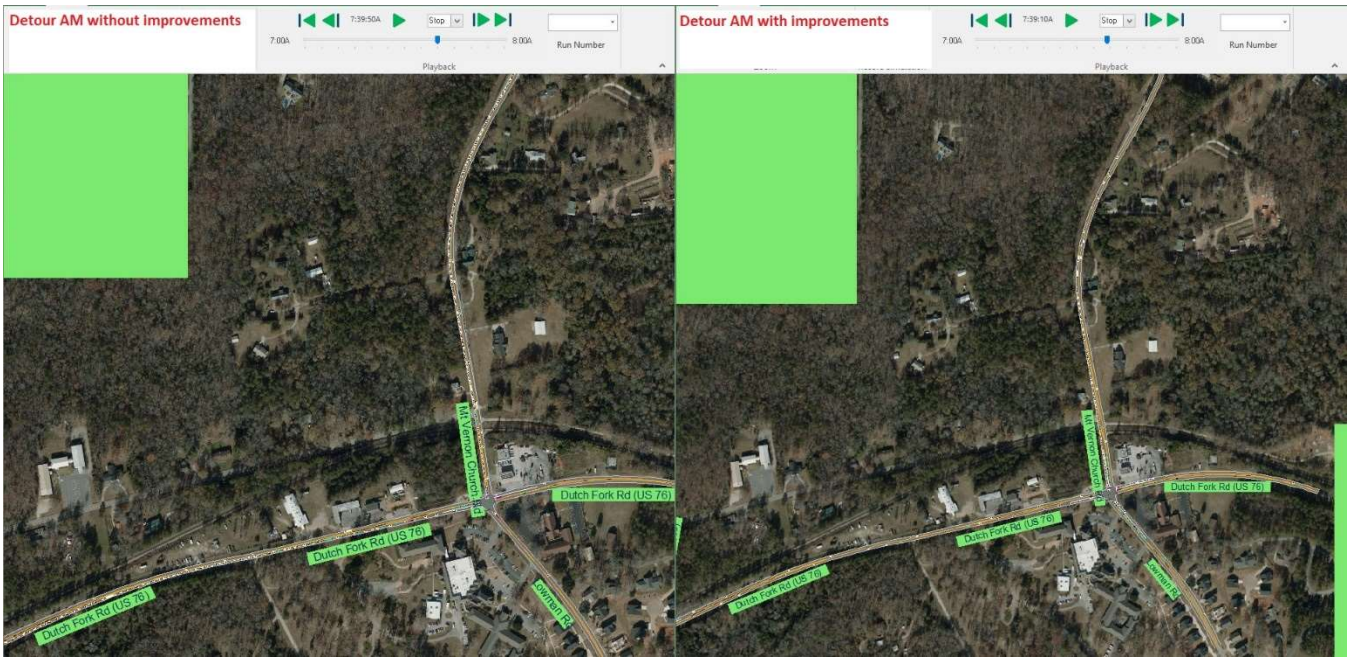


Figure 7: US-76 / Mt. Vernon / Lowman Intersection Operations with and Without Improvement

Other SimTraffic Observations

As part of the delay/LOS SimTraffic observations, several locations were identified that have poorly performing intersections with lengthy queues in the AM and/or PM existing conditions that are not worsened by the detour route traffic conditions. The following locations may be of interest to the Department for further investigation and consideration of future operational improvements:

- US-76 at Farming Creek Road (northbound queues on Farming Creek Road); however, these delays may be overstated as northbound left turn vehicles use the center left turn lane to complete two-stage left turns that is not able to be captured in the SimTraffic model.
- US-76/Dutch Fork Road at Three Dog Road (northbound queuing in the AM peak)
- US-76 at Columbia Avenue/Amicks Ferry (northbound Amick Ferry queuing)

Conclusions

Based on the proposed bridge closure route operational analyses, the following recommendations are made for the detour conditions:

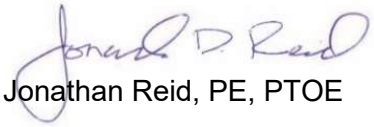
- During the Koon Road detour, it is recommended that eastbound right turn bay and right turn signal phase (overlapping the NB left turn) be added at the Old Tamah / Koon Road intersection.
- During the Koon Road detour, it is recommended that a left turn bay be added on southbound (stop-controlled) Shady Grove Road approach at the Shady Grove / Old Tamah intersection.

- During the Koon Road detour, it is recommended that a protected/permitted signal phase be added on southbound Shady Grove at the Shady Grove / Broad River Road intersection.
- During the Old Hilton Road detour, it is recommended that a protected/permitted signal phase be added on eastbound US-76 at the US-76 / Mt. Vernon / Lowman Road intersection.

All other intersections along the proposed detour routes are projected to have acceptable delays / LOS or otherwise not significantly impact existing traffic operations. Therefore, no other intersection geometric or control modifications are required during any of the planned bridge detours.

Sincerely,

Arcadis

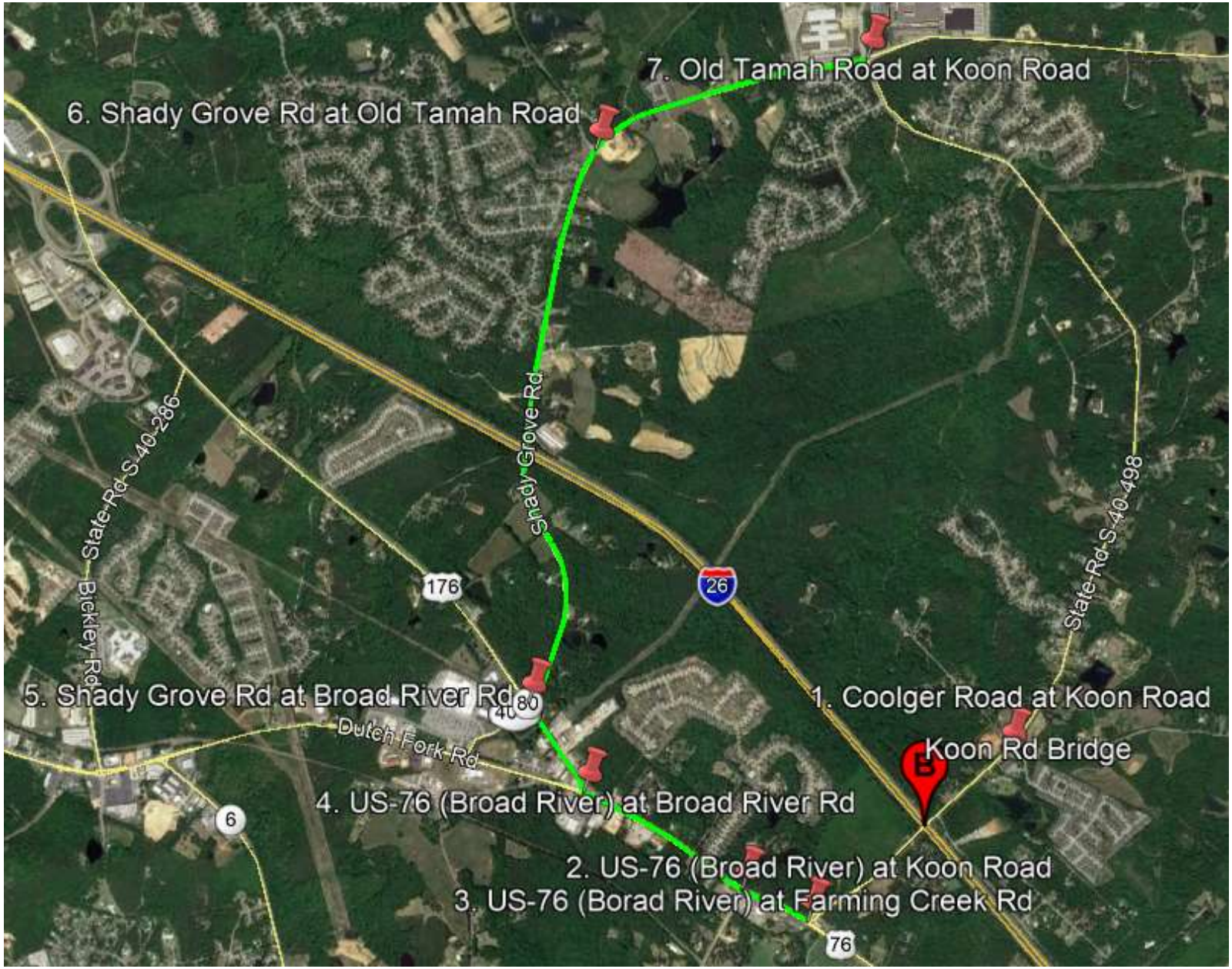


Jonathan Reid, PE, PTOE

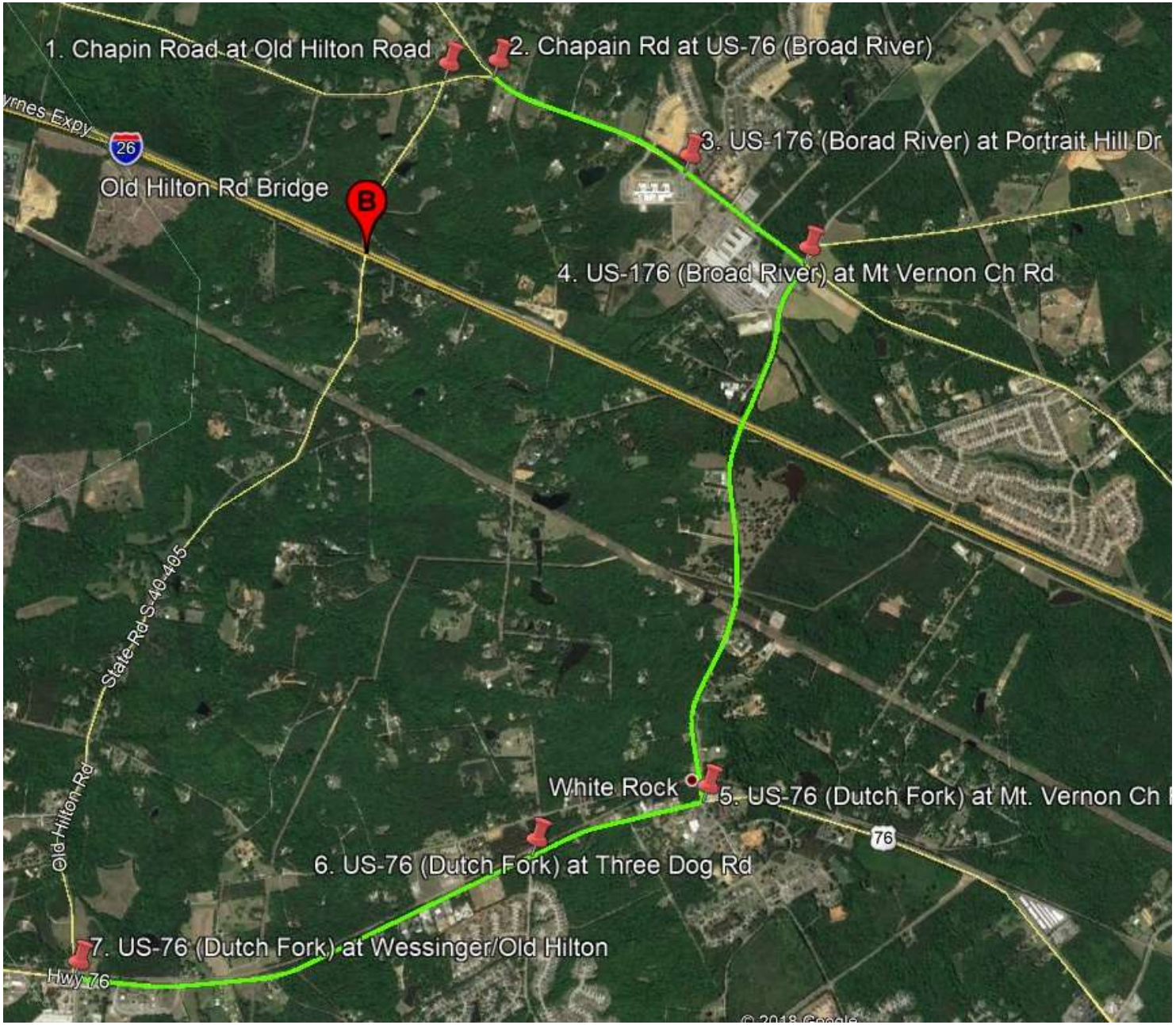
Appendix A

Approved Detour Routes

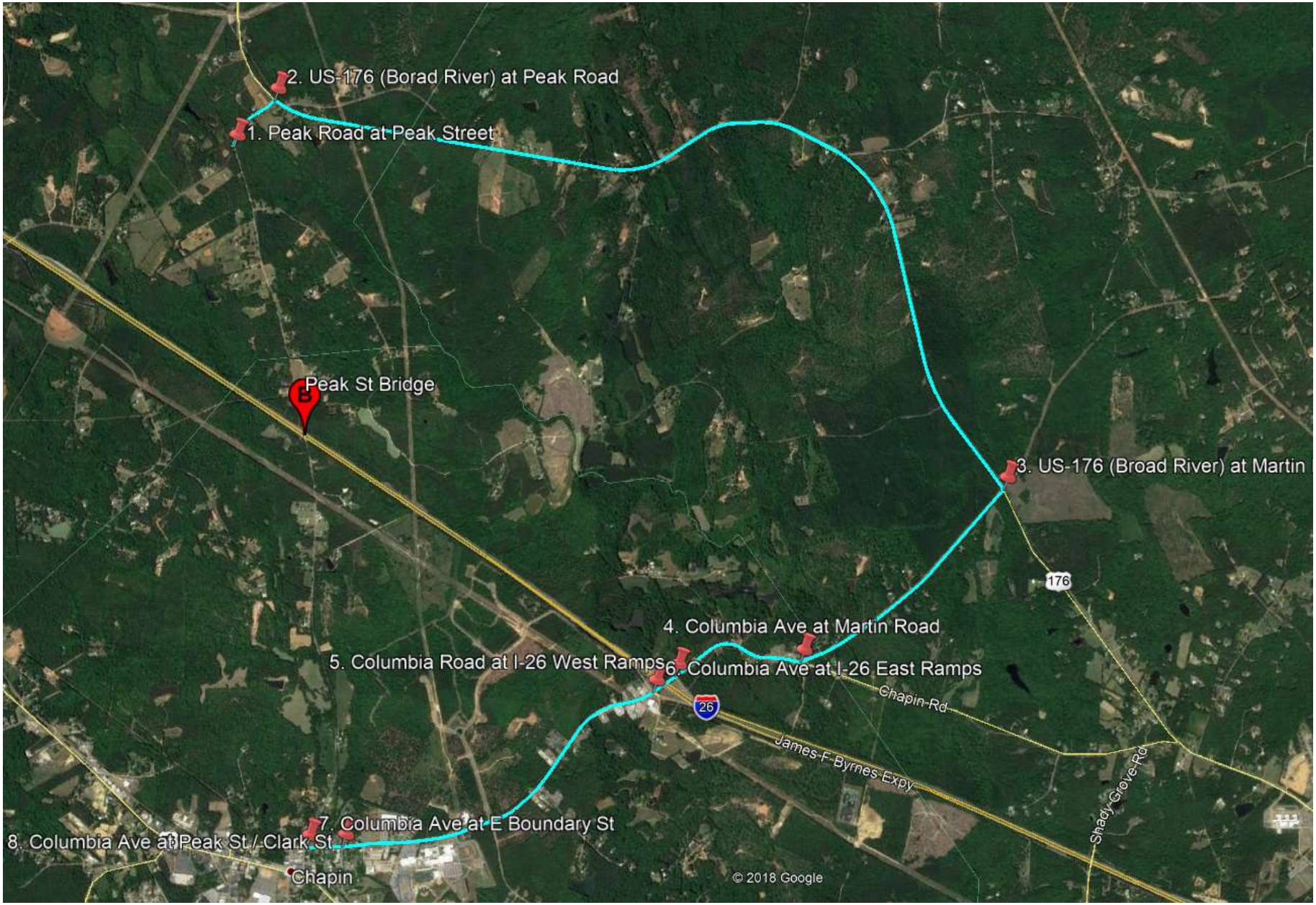
Koon Road Bridge Closure Detour Route



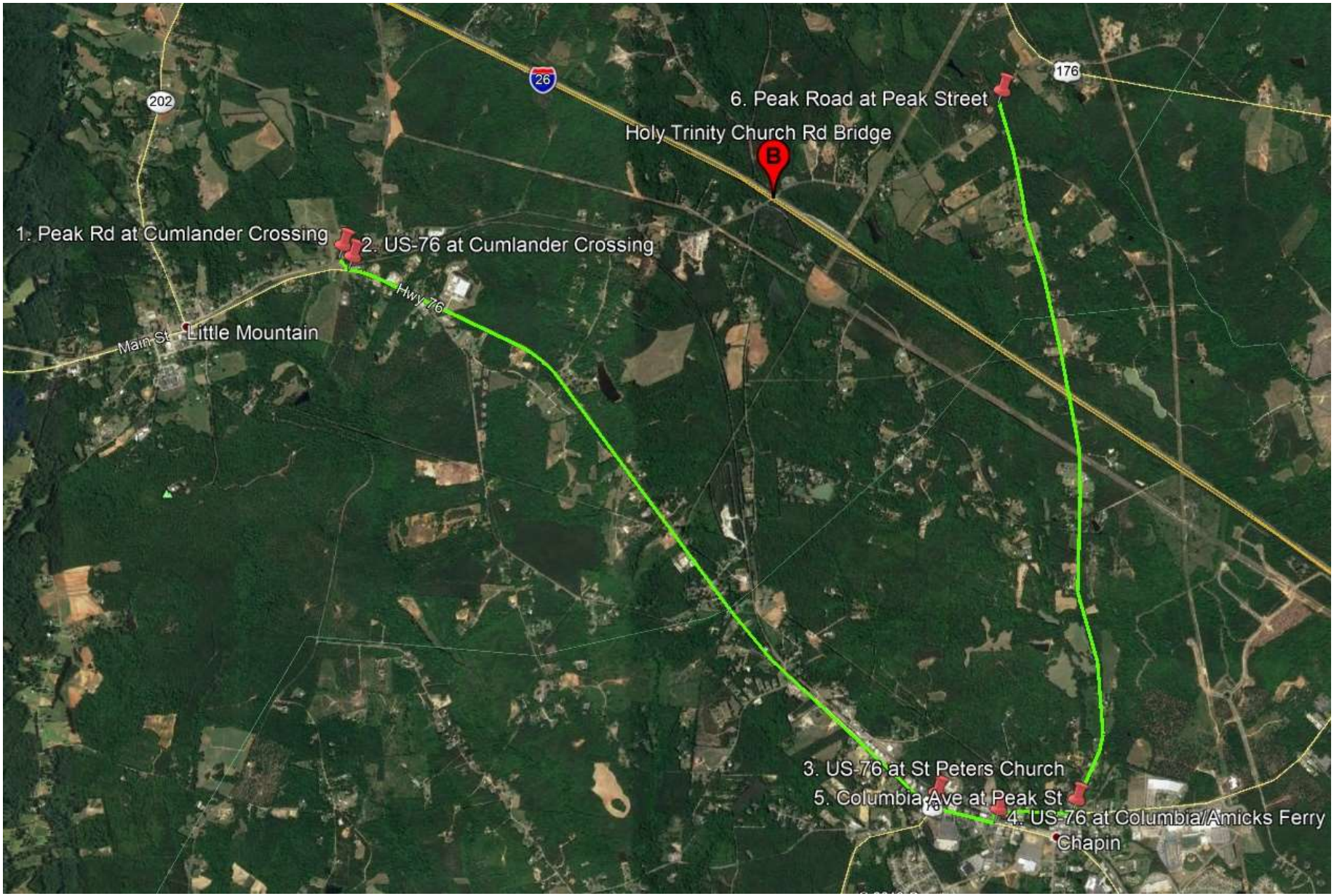
Old Hilton Road Bridge Closure Detour Route



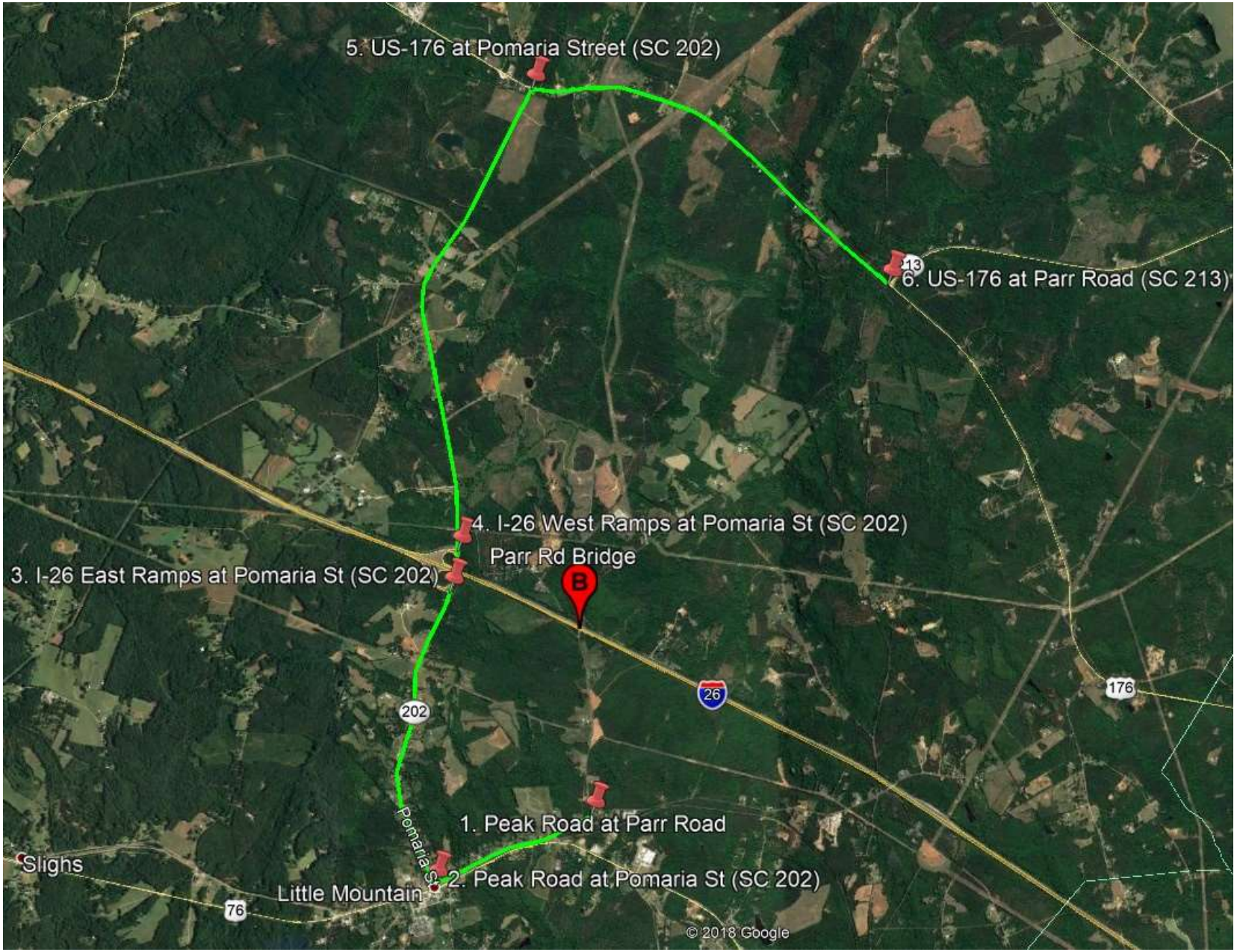
Peak Street Bridge Closure Detour Route



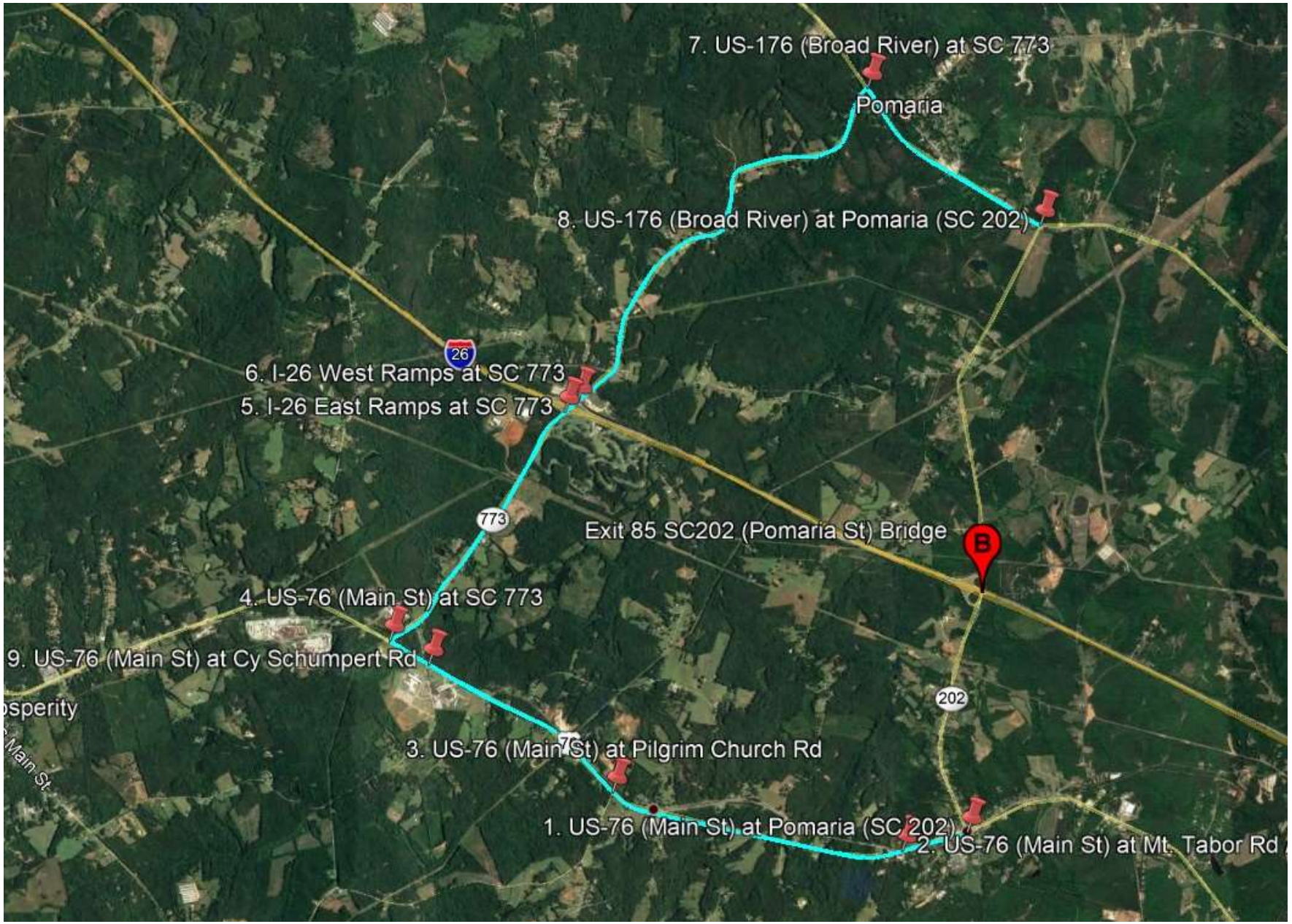
Holy Trinity Road Bridge Closure Detour Route



Parr Road Bridge Closure Detour Route



SC 202 (Pomaria Street) Bridge Closure Detour Route



Appendix B

Intersection Count Data Collected

(not included)

Appendix C

AADT to Turning Movement Count Calculations

(not included)

Appendix D

Detour Route Volume Calculation Diagrams

(not included)

Appendix E

HCM Level of Service Reports

(not included)

ATTACHMENT B:

CULTURAL RESOURCES ADDENDUM AND CONCURRENCES

Office 803-328-2427
Fax 803-328-5791

May 26, 2020

Attention: Tracy Martin
SCDOT
P.O. Box 191
Columbia, SC 29202

Re. THPO # TCNS # Project Description
2020-66-13 Second Addendum: Cultural Resources Survey of S-48 Improvements, Lexington Co.

Dear Ms. Martin,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

If you have questions please contact Caitlin Rogers at 803-328-2427 ext. 226, or e-mail Caitlin.Rogers@catawba.com.

Sincerely,

Caitlin Rogers for

Wenonah G. Haire
Tribal Historic Preservation Officer

GWYƆ DƁP
CHEROKEE NATION®
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918-453-5000 • www.cherokee.org

Office of the Chief

Chuck Hoskin Jr.
Principal Chief

Bryan Warner
Deputy Principal Chief

May 18, 2020

Tracy Martin
North Carolina Department of Transportation
P.O. Box 191
Columbia, SC 29201-3959

Re: Second Addendum to S-48 (Columbia Avenue) Improvements, Lexington County

Dear Tracy Martin:

The Cherokee Nation (Nation) is in receipt of your correspondence about and related report for **Second Addendum to S-48 (Columbia Avenue) Improvements, Lexington County**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the North Carolina Department of Transportation (NCDOT) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that NCDOT conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

LEXI
29673
16EJ0010

SCDOT
South Carolina
Department of Transportation

April 20, 2020

Ms. Elizabeth Johnson
Director, Historical Services, D-SHPO
State Historic Preservation Office
SC Department of Archives & History
8301 Parklane Road
Columbia, SC 29223

RE: Second Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, Lexington County, South Carolina.

Dear Ms. Johnson:

Please find attached a copy of the above-referenced report that describes cultural resources investigations conducted in an expanded area for additional improvements to S-48 (Columbia Avenue). This project is located in **Lexington County**, South Carolina.

The section addressed in this addendum is located to the east of the original project area. This expanded the survey area to approximately .70 miles along I-26 to the north of the intersection with Columbia Avenue and .60 miles along Columbia Avenue to the west of the intersection. This includes approximately 42 acres to the north of Columbia Avenue between I-26 and Dan Comalander Drive and about 12 acres to the west of I-26 and north of Columbia Avenue. The architectural survey boundary was a 300-foot buffer surrounding the project area.

The cultural resources survey did not identify any new archeological sites. A total of three new architectural resources were recorded and evaluated within the architectural survey boundary (Resource Numbers 1004, 1005, and 1006). Resource 1004 is a Colonial Revival Linear Ranch House constructed in 1968; Resource 1005 is a Linear Ranch House built in 1965; and Resource 1006 is a residential garage constructed about 1965. All three resources were found to lack historical associations that would qualify them for listing on the National Register of Historic Places under Criteria A and B and none have significant qualities that warrant significance under Criterion C. All of these aboveground resources have been assessed as **not eligible** for inclusion in the National Register of Historic Places.

Based on the results of the background research and field investigations, the Department has determined that **no historic properties will be affected** by the proposed undertaking.

Per the terms of the Section 106 Programmatic Agreement executed on October 6, 2017, the Department is providing this information on behalf of the Federal Highway Administration. It is requested that you review the enclosed material, and, if appropriate, indicate your concurrence in the Department's findings. Please respond within 30 days if you have any objections or if you have need of additional information.

Sincerely,

Tracy Martin
Archaeologist

TAM:tam

I ([redacted]) concur in the above determination.

Signed: _____ Date: 4/20/2020

ec: Shane Belcher, FHWA
Russell Townsend, Eastern Band of Cherokee Indians
Stephen J. Yerka, Eastern Band of Cherokee Indians
Elizabeth Toombs, Cherokee Nation
LeeAnne Wendt, Muscogee (Creek) Nation
Karen Pritchett, United Keetoowah
Charlotte Wolfe, United Keetoowah

cc: Wenonah G. Haire, Catawba Nation
Keith Derting, SCIAA

File: ENV/TAM

Second Addendum:

Cultural Resources Survey of S-48 (Columbia Avenue) Improvements

Lexington County, South Carolina

New South Associates, Inc.

Second Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements

Lexington County, South Carolina

Report submitted to:

Infrastructure, Consulting, and Engineering • 1021 Briargate Circle • Columbia, SC 29210

Report prepared by:

New South Associates • 1819 Hampton Street • Columbia, South Carolina 29201

Natalie Adams Pope – Principal Investigator

Katie Dykens Quinn – Historian and Co-Author
Kelly Higgins – Archaeologist and Co-Author

April 10, 2020 • Final Report
New South Associates Technical Report 3037

ABSTRACT

This second addendum report addresses an additional area not surveyed and discussed in New South Technical Reports #2535 and 2617, *Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, Lexington County, South Carolina* and *Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements* (Dykens and Sipe 2017; Pope et al. 2017). The section addressed in this second addendum report is located on the east end of the original project area, expanding the survey area to approximately .70-miles along I-26 to the north of the intersection with Columbia Avenue and .60-miles along Columbia Avenue to the west of the intersection. This includes approximately 42 acres to the north of Columbia Avenue between I-26 and Dan Comalander Drive, and approximately 12 acres to the west of I-26 and north of Columbia Avenue.

New South Associates, Inc. completed a cultural resources survey of the additional section of the project corridor in order to identify significant archaeological and historic architectural resources in its Area of Potential Effects (APE). This report describes the goals, methods, results, and recommendations for the additional surveyed area.

Background research indicated no archaeological resources were previously recorded inside the project APE. Twenty-one historic architectural resources were previously surveyed within the APE. Eighteen remain extant. None were recommended eligible for the National Register of Historic Places (NRHP).

This archaeological survey identified no sites. The historic architectural survey recorded and evaluated three additional resources. The resources lack qualities of significance that would qualify them for NRHP listing under Criterion A, B, or C. Therefore, New South does not recommend any further consideration regarding these three resources.

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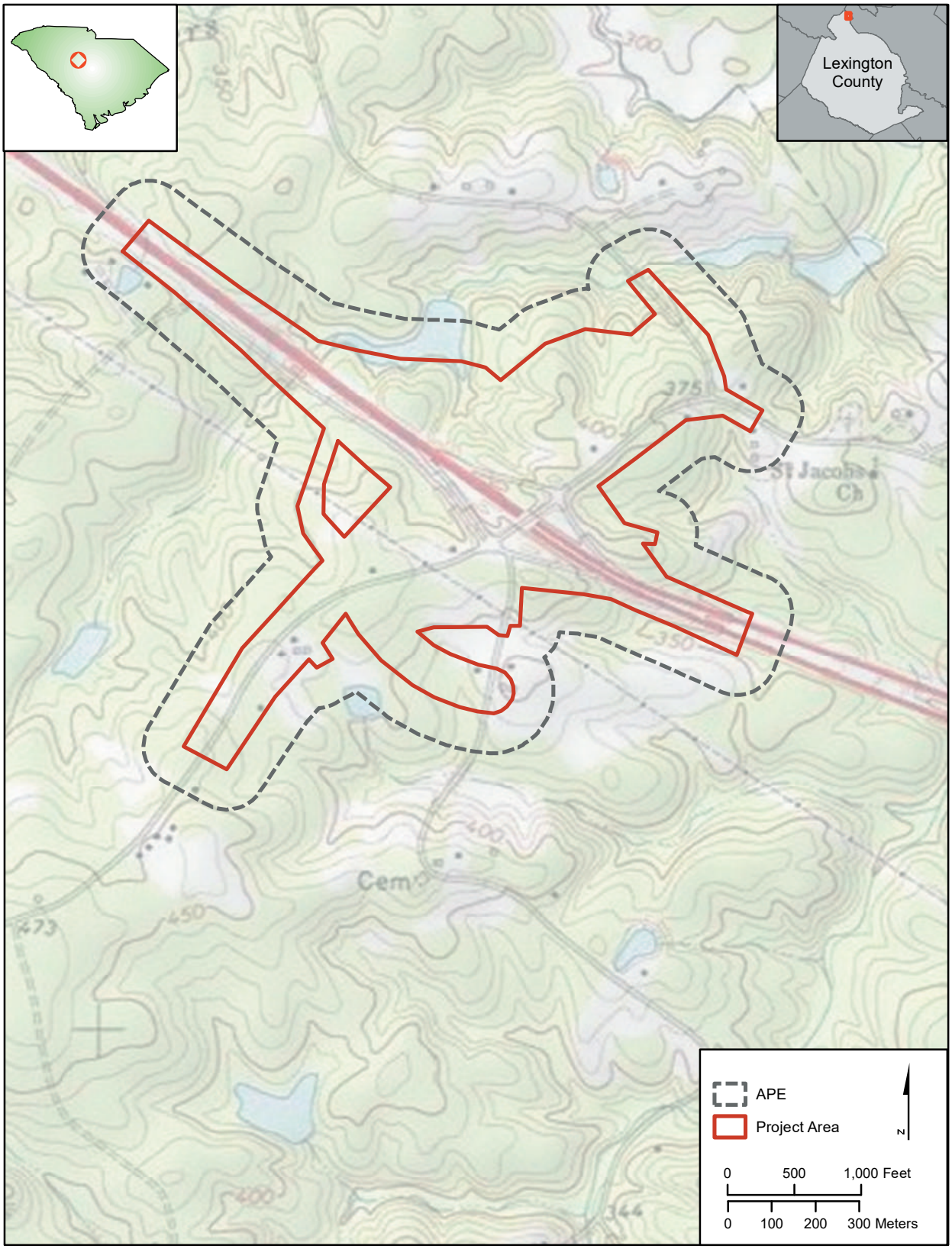
I. INTRODUCTION

This second addendum report addresses an additional area not surveyed and discussed in New South Technical Reports #2535 and 2617, *Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, Lexington County, South Carolina* and *Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements* (Dykens and Sipe 2017; Pope et al. 2017). The section addressed in this second addendum report is located on the east end of the original project area and includes an expanded area along I-26 in both directions as well as north of Columbia Avenue near Dan Comalander Drive (Figure 1). The Area of Potential Effects (APE) consists of the project area and its viewshed, which is defined by a 300-foot buffer. For the archaeological survey, the entire project area was examined. For the historic architectural resources survey, the entire APE was examined.

The goal of this Phase I survey was to identify significant cultural resources in the project's APE and to assess project effects. Specific tasks included background research, fieldwork, and reporting. Background research entailed reviews of previously recorded archaeological sites and historic resources, along with development of prehistoric and historic contexts for the project area. These contexts, which are available in the original report, provided information necessary for survey planning as well as interpreting and evaluating cultural resources identified during the fieldwork. The fieldwork comprised archaeological and historic architectural resources surveys of the APE.

Natalie Adams Pope served as Principal Investigator, while Kelly Higgins served as the Project Archaeologist and Katie Dykens Quinn served as the Architectural Historian. This second addendum describes the objectives and results of this survey, and is organized into four chapters, including this introduction. Previous research can be found in Chapter II, while results of the survey are provided in Chapter III. A summary and recommendations are presented in Chapter IV.

Figure 1.
Map of Project Area



Source: USGS Chapin, South Carolina Quadrangle

II. PREVIOUS RESEARCH

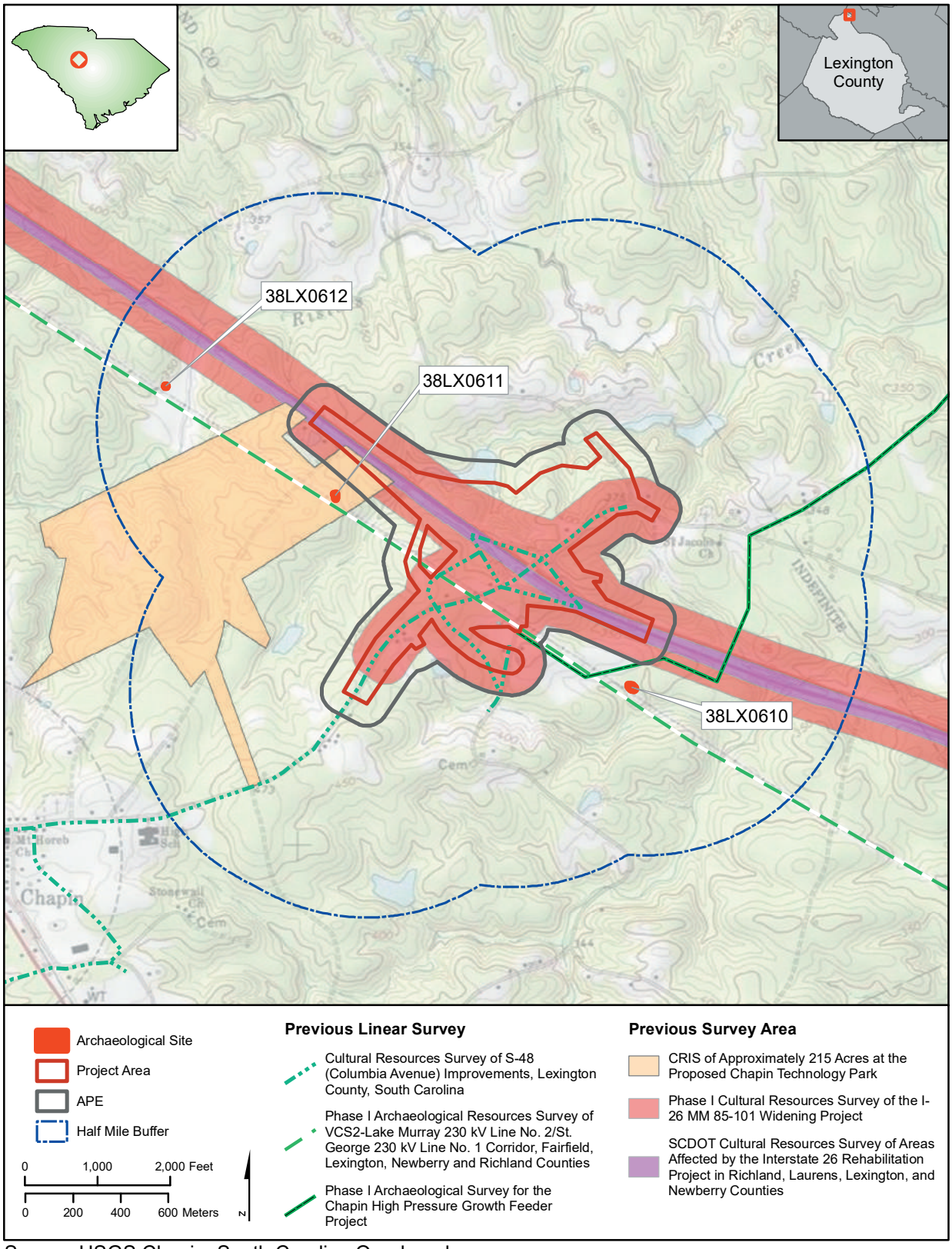
PREVIOUSLY SURVEYED RESOURCES

Background research sought to identify all previously recorded cultural resources located within or near the APE (including the project area and 300-foot viewshed). New South reviewed ArchSite, the digital site files and GIS database maintained by the South Carolina Institute of Archaeology and Anthropology (SCIAA) and the South Carolina Department of Archives and History (SCDAH), to identify previously recorded cultural resources within 0.5 miles of the APE. Available historical maps were also geo-referenced and reviewed to determine the location of potential archaeological and historic resources. These archival sources also provided information on how the project area's built environment changed over time.

A number of studies have been conducted within 0.5 miles of the project area (Figure 2). In recent years, portions of the project area have been examined twice already, in 2017 during the *Cultural Resources Survey of S-48 (Columbia Avenue) Improvements* and in 2018 during the *Phase I Cultural Resources Survey of the I-26 MM 85-101 Widening Project* (Pope et al. 2017; 2018). Also of note is the first addendum to the S-48 report, Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, which examined an area roughly 1.5 miles southwest of the current project area but which is associated with this report (Dykens and Sipe 2017). One Phase I archaeological survey conducted by Brockington and Associates in 2011 for a transmission line crosses the project area to the east of I-26 (Pappas and Bailey 2011). A Cultural Resources Identification Survey was conducted by S&ME to the northwest of the project area in 2012. This survey identified two archaeological sites, one of which is in the half-mile search radius (Green and Jones 2012). Finally, in 2016, AECOM conducted a Phase I survey to the south and east of the project area (Arnhold 2016).

Three previously recorded archaeological sites are located within the 0.5-mile search radius, though not in the project area itself (Figure 2). These three sites, 38LX610, 38LX611, and 38LX612, were identified in 2011 by Brockington and Associates as part of a Phase I survey (Pappas and Bailey 2011). Sites 38LX610 and 38LX611 are small prehistoric lithic scatters located along the existing power line corridor, while site 38LX612 is a historic artifact and prehistoric lithic scatter identified during a surface inspection. None of these sites were recommended eligible for inclusion in the National Register of Historic Places (NRHP).

Figure 2.
Previously Recorded Cultural Resources within 0.5 Mile of the APE



Source: USGS Chapin, South Carolina Quadrangle

Table 1. Previously Recorded Architectural Resources within the APE

Resource Number	Name/Address	Resource Use	Construction Date	NRHP Recommendation	Significant Changes
0888	645 Columbia Avenue	Residential (Commercial)	Circa 1915	Not Eligible	Vacant; appears to be in process of tear-down
0888.01	645 Columbia Avenue – Log Barn	Agricultural	Circa 1915	Not Eligible	No Longer Extant
0889	1201 Crooked Creek Road	Residential	Circa 1920	Not Eligible	None
0889.01	1201 Crooked Creek Road – Beauty Parlor	Commercial	Circa 1950	Not Eligible	None
0889.02	1201 Crooked Creek Road – Single Crib Barn	Agricultural	Circa 1940	Not Eligible	None
0889.03	1201 Crooked Creek Road – 1.5 Story Barn	Agricultural	Circa 1920	Not Eligible	None
0889.04	1201 Crooked Creek Road – Agricultural Structure	Agricultural	Circa 1920	Not Eligible	Roof has partially collapsed
0889.05	1201 Crooked Creek Road – One-Story Barn #1	Agricultural	Circa 1920	Not Eligible	None
0889.06	1201 Crooked Creek Road – One-Story Barn #2	Agricultural	Circa 1920	Not Eligible	None
0906	1232 Crooked Creek Road	Residential	1966	Not Eligible	None
0906.01	1232 Crooked Creek Road – Tobacco Barn	Agricultural	Circa 1900	Not Eligible	None
0906.02	1232 Crooked Creek Road – Equipment Shed	Residential	Circa 1950	Not Eligible	None
0974	810 Columbia Avenue – Old House	Residential (Vacant)	Circa 1900	Not Eligible	Porch has partially collapsed
0974.01	810 Columbia Avenue – Shed	Agricultural	Circa 1901	Not Eligible	None
0974.02	810 Columbia Avenue – Outbuilding	Agricultural	Circa 1940	Not Eligible	None
0974.03	810 Columbia Avenue – Barn	Agricultural	Circa 1901	Not Eligible	None
0975	803 Columbia Avenue	Residential	1962	Not Eligible	None
0976	1232 Crooked Creek	Residential	1966	Not Eligible	Duplicate – 0906
0976.01	1232 Crooked Creek – Garage	Residential	1966	Not Eligible	Duplicate – 0906.02
0977	471 Brentwood Court	Residential	1965	Not Eligible	Vacant and in process of tear-down or remodel
0978	Bridge Carrying S-48 over I-26	Structure	1959	Not Eligible	None

Twenty-one previously recorded architectural resources were located within 0.5 miles of the project area, all within the APE and are shown in Figure 2 and Table 1. One is no longer extant, while two of the resources, 0976 and 0976.01, were found to be duplicates of resources 0906 and 0906.02, making a total of 18 resources. None of these resources were recommended as eligible for the NRHP.

All of the resources were surveyed less than five years ago as a result of one of two surveys, the original *Cultural Resources Survey of S-48 Improvements* or *Phase I Cultural Resources Survey of the I-26 MM 85-101 Widening Project* (Pope et al. 2017; 2018). Each previously recorded resource was revisited during the field survey and any significant physical changes since its previous recording are described in Table 1. The current study concurs with the original NRHP eligibility recommendations for all 19 extant resources.

III. SURVEY RESULTS

ARCHAEOLOGICAL SURVEY RESULTS

The archaeological survey was conducted from September 19–24, 2019. Three hundred and seven (307) shovel test locations were placed in the project area, which were located along transects placed at 30-meter intervals (Figure 3). Shovel tests were either excavated or documented (in cases of development or disturbance) at 30-meter intervals. There were two general soil profiles observed. The first soil profile consisted of approximately 15 centimeters (cm) of strong brown (7.5YR 4/6) sandy clay loam (Ap horizon) overlying 10+ cm, or 15-25+ centimeters below the surface (cmbs), of strong brown (7.5YR 5/8) sandy clay subsoil (Bt horizon), while the second consisted of approximately 10 cm of yellowish red (5YR 5/6) silty loam (Ap horizon) followed by 10+ cm (10-20+ cmbs) of reddish yellow (5YR 6/8) clay subsoil (Bt horizon). Vegetation in the project area consisted of mixed pines and hardwoods, as well as dense undergrowth in the northeast portion of the project area. Additionally, commercial and residential development was present along Columbia Avenue (Figure 4). Topography in the project area ranged from 350 feet above mean sea level (amsl) in the northeastern and southeastern portions of the project area to 400 ft amsl in the central portion of the survey tract. As a result of the archaeological survey, no sites or isolated finds were identified.

HISTORIC ARCHITECTURAL SURVEY RESULTS

On August 29, 2019, the architectural historian surveyed the additional APE to identify previously unrecorded historic architectural resources (Figure 5). The added project area contains a mix of building types, both historic and non-historic. Development on S-48 north of I-26 is relatively sparse and consists primarily of single-family homes. Development on S-48 to the south of I-26 is denser and contains a mix of modern commercial, historic and modern residential properties.

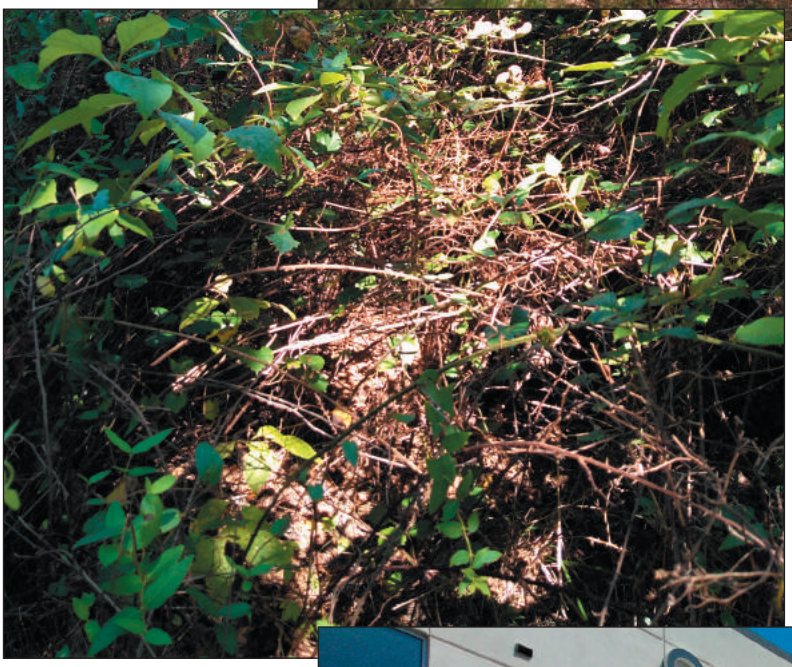
As a result of the survey, three individually surveyed architectural historic resources were recorded and evaluated. Twenty-one previously recorded resources were also identified within the APE. All resources are shown in Figure 5 and discussed in detail below.

Figure 3.
Survey Coverage Map

Source: Bing Aerial Hybrid (2019)

Figure 4.
Survey Conditions

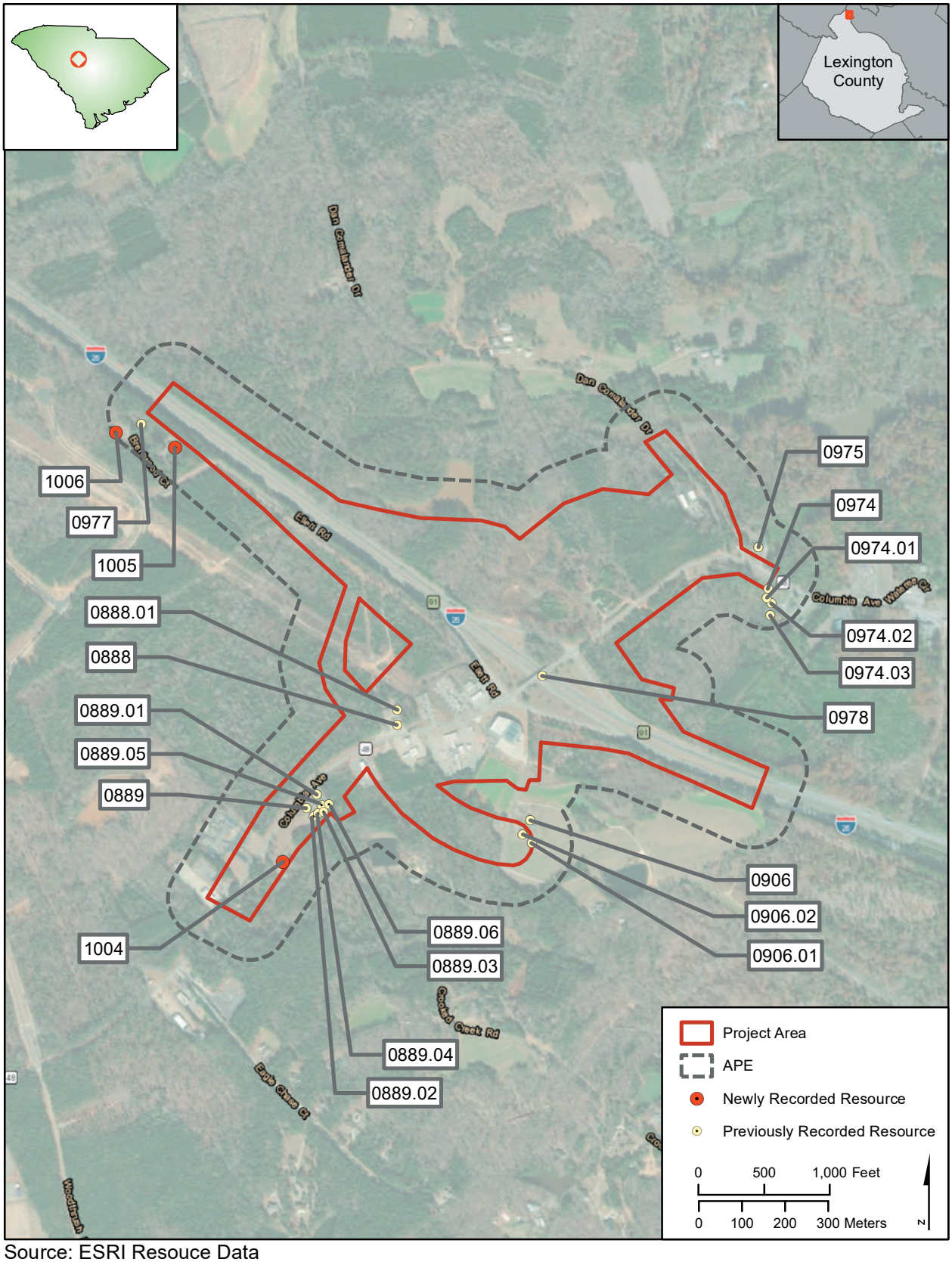
A. Vegetation in the Project Area, Facing East



B. Dense vegetation in the Northeastern Portion of the Project Area, Facing Southeast

C. Commercial Development Along Columbia Ave, Facing Southeast

Figure 5.
Previously and Newly Recorded Architectural Resources within the APE



Source: ESRI Resouce Data

NEWLY SURVEYED RESOURCES

The survey identified three previously unrecorded individual historic resources. The location of these resources is shown in Figure 5 and they are listed in Table 2, which lists the address, date of construction and NRHP recommendation. A discussion of each individually surveyed historic resource follows the table. None of the newly surveyed resources recorded as part of this study are recommended eligible for the NRHP.

Table 2. Newly Surveyed Architectural Resources Surveyed Within the APE

Name/Address	Resource Use	Date of Construction	NRHP Eligibility Recommendation
556 Columbia Avenue	Residential	1968	Not Eligible
469 Brentwood Court	Residential	1965	Not Eligible
471 Brentwood Court – Garage	Residential	Circa 1965	Not Eligible

Resource 1004: 556 Columbia Avenue

Resource 1004 is a 1968 Colonial Revival Linear Ranch House located approximately 0.2 miles north of the intersection of Columbia Avenue and Eagle Chase Court. It faces west towards Columbia Avenue. It is one story tall and roughly rectangular in plan with a laterally gabled composition shingle roof and brick veneer cladding (Figure 6). Windows throughout are modern vinyl one-over-one double-hung sashes with louvered shutters. A large, front-gabled porch with columnar supports and wood siding in the gable end is located in the center of the front elevation. It shelters the wood panel front door and a window to either side. Two windows are located to the north and south of the porch, and the building is slightly stepped back on either side, forming two very shallow wings. A brick slab interior chimney rises from the roofline and the foundation is concealed.

Resource 1004 is located on a two-acre lot that is landscaped with a grass lawn to the front and wooded buffer to the rear. Several outbuildings are located to the rear of the property; however, it is surrounded by a locked chain link fence and the rear of the property could not be accessed. Although Resource 1004 is a Colonial Revival Linear Ranch House, it is not a distinctive or noteworthy example of this house type which is common in South Carolina. Its integrity is further impacted by the replacement of its original windows. It was not found to embody the distinctive characteristics of a period or method of construction and does not possess significance for its engineering or materials. It is not known to be associated with events or persons significant in the past. Therefore, the resource is recommended as not individually eligible for the NRHP under Criterion A, B, or C.

Figure 6.
Resource 1004: 556 Columbia Avenue

A. West Elevation

B. Southwest Oblique

C. Northwest Oblique

Resource 1005: 469 Brentwood Court

Resource 1005 is a 1965 Linear Ranch House located approximately 200 feet northwest of the intersection of Brentwood Court and Ellett Road. It faces south towards Brentwood Court. It is one story tall and roughly rectangular in shape with a laterally gabled composition shingle roof and brick veneer cladding (Figure 7). Windows throughout are horizontal two-over-two aluminum frame double-hung sashes. The wood panel door is located in the rough center of the building. The section of the building to the east of the door is obscured by trees and bushes. To the west of the door there is an exterior slab brick chimney, a single window, and an engaged two-car garage. Aerial photos indicate a front-gabled section to the rear and a shed-roofed porch or addition.

Resource 1005 is sited on a 1.2-acre parcel and has a generous setback of roughly 220 feet. The lot is landscaped with a grass lawn and numerous trees and overgrown shrubs. Although Resource 1005 is a Linear Ranch House, it is not a distinctive or noteworthy example of this house type which is common in South Carolina. It was not found to embody the distinctive characteristics of a style, period, or method of construction, and does not possess significance for its engineering or materials. It is not known to be associated with events or persons significant in the past. Therefore, the resource is recommended as not individually eligible for the NRHP under Criterion A, B, or C.

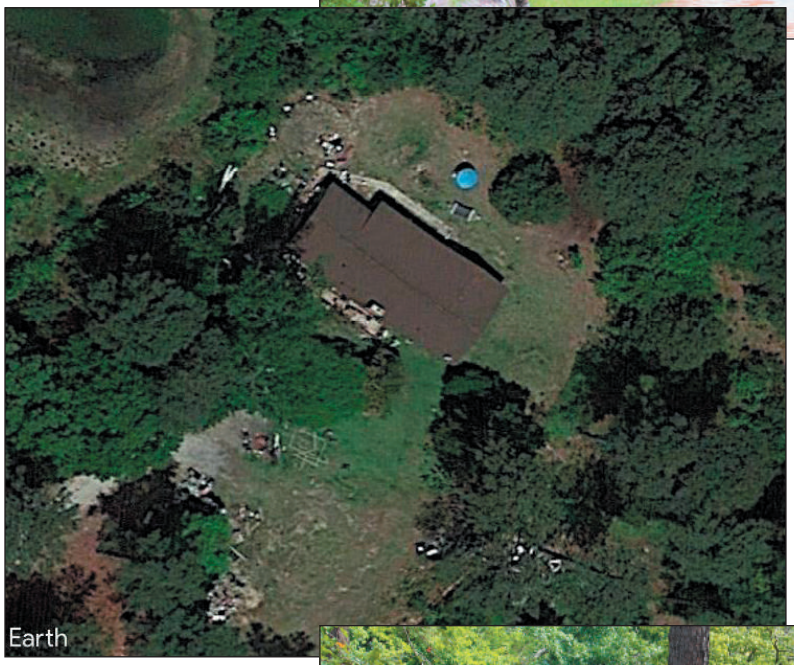
Resource 1006: 471 Brentwood Court – Garage

Resource 1006 is a circa 1965 one-story shed located to the northeast of the terminus of Brentwood Court. It faces west. It is one story tall and rectangular in plan with a laterally gabled composition roof and wood frame six-over-six double-hung sash windows throughout (Figure 8). It is of concrete block construction with a one-flue concrete brick chimney at the center of the roofline. The building is accessed by an original metal and glass window garage door on the south elevation and a modern rolling garage door on the west elevation. The door on the west elevation is flanked by a window to either side. There is vinyl siding in the gable ends.

Resource 1006 is located on a roughly 4-acre lot that it shares with Resource 0977, although Resource 0977 is located on the other side of Brentwood Court. The southwestern side of the lot is landscaped with a grass lawn and a wooded buffer on the north and west sides. Resource 1006 was not found to embody the distinctive characteristics of a type, period, or method of construction, and does not represent the work of a master or possess high artistic value. It is not known to be associated with events or persons significant in the past. Therefore, the resource is recommended as not individually eligible for the NRHP under Criterion A, B, or C.

Figure 7.
Resource 1005: 469 Brentwood Court

A. Southwest Oblique



B. Aerial View
Source: Google Earth 2018

C. South Elevation

Figure 8.
Resource 1006: 471 Brentwood Court – Garage

A. Southeast Oblique

B. Southwest Oblique

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IV. RESULTS AND RECOMMENDATIONS

As a result of the archaeological survey, no new archaeological sites were identified within the additional project area. The additional historic architectural survey identified and evaluated three resources that reflected twentieth-century domestic functions. All three resources lack historical associations that would qualify for NRHP listing under Criteria A and B, and none have qualities of significance under Criterion C.

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REFERENCES CITED

Arnhold, Nicholas

2016 *Phase I Archaeological Survey for the Chapin High Pressure Growth Feeder Project*. AECOM, Columbia, South Carolina.

Dykens, Katie and Ryan Sipe

2017 *Addendum: Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, Lexington County, South Carolina*. New South Associates, Columbia, South Carolina.

Green, William and Heather Jones

2012 *Cultural Resource Identification Survey of Approximately 215 Acres at the Proposed Chapin Technology Park*. S&ME, Inc., Columbia, South Carolina.

Pappas, Andrew and Ralph Bailey

2011 *Phase I Archaeological Resources Survey of VCS2-Lake Murray 230 kV Line No. 2/St. George 230 kV Line No. 1 Corridor, Fairfield, Lexington, Newberry, and Richland Counties, South Carolina*. Brockington and Associates, Inc., Mt. Pleasant, South Carolina.

Pope, Natalie Adams, Brad Botwick, Terri D. Gillett, and Katie Dykens Quinn

2017 *Cultural Resources Survey of S-48 (Columbia Avenue) Improvements, Lexington County, South Carolina*. New South Associates, Stone Mountain, Georgia.

Pope, Natalie Adams, Katie Dykens, and James Stewart

2018 *Phase I Cultural Resources Survey of the I-26 MM 85-101 Widening Project*. New South Associates, Inc., Stone Mountain, Georgia.

ATTACHMENT C:

FLOODPLAIN COORDINATION

NEWBERRY COUNTY PLANNING & ZONING DEPT.
FEMA Floodplain Management
1512 Martin Street, P. O. Box 1014
Newberry, SC 29108
Telephone – (803) 321-2166
Facsimile – (803) 321-2682

October 10th, 2019

Ronnie Smoak, PE
Infrastructure Consulting and Engineering
1021 Briargate Circle
Columbia, SC 29210

This letter is in reply to your letter dated September 30th, 2019 stating that there will be no impact on the flood zone A by the construction of new and modifications to existing culverts relating to the road widening construction of I-26 from mile marker 85-101.

From the information given in this letter, I, as FEMA Floodplain Administrator for Newberry County, concur that a 'no-impact' certification and other relevant FEMA correspondence will not be required for this road widening project.

Sincerely,

Peters, CFM

Anne Peters, CFM
FEMA Floodplain Administrator

County of Lexington

Community Development
Floodplain Management

November 26, 2019

RE: I-26 Widening MM 85-101 Project

Ronnie Smoak, PE
Infrastructure Consulting and Engineering
1021 Briargate Circle
Columbia, SC 29210

Mr Smoak,

The County Hydrologist and I have reviewed the submitted data in support of this project. We concur that a no-impact certification or other FEMA correspondence will not be required for this widening project.

Sincerely,

Christopher J. Stone, CFM
Lexington County Floodplain Manager
212 Southlake Drive Suite 401
Lexington, SC 29072
Phone 803-785-8121
Fax 803-785-5186

RICHLAND COUNTY
COMMUNITY PLANNING & DEVELOPMENT
2020 Hampton Street
Columbia, SC 29204

April 7, 2020

Ronnie Smoak, PE
Infrastructure Consulting and Engineering
1021 Briargate Circle
Columbia SC 29210

Re: Interstate 26 Widening MM 85 – 101 (Segment 1)
Design-Build Project
Project ID 029208
Community Number: 450170

Dear Mr. Smoak:

The County Engineer and I have reviewed the submitted No Impact Certification for the Interstate 26 Widening MM 85 – 101 (Segment 1) project. The information provided indicates that the project will meet the minimum provisions of section 26-106 of the Richland County Land Development Code.

Richland County approves the project based on the submitted no-impact certification.

Please be advised that the project will still need to comply with all local, state and federal permitting requirements with regards to Floodplain and Wetland permitting if applicable.

If you have additional questions or need assistance please do not hesitate to contact me at 803-576-2158 or by email at brown.heather@richlandcountysc.gov.

Sincerely,

Heather Brown

Heather Brown, CFM
Floodplain Manager
Richland County
2020 Hampton St
PO Box 192
Columbia SC 29204
(803) 576-2158

ATTACHMENT D:

NATURAL RESOURCE TECHNICAL MEMORANDUM UPDATE

INFRASTRUCTURE
CONSULTING & ENGINEERING

To: Will McGoldrick, SCDOT ESO
From: Barrett Stone, ICE
Date: May 15, 2020
Re: I-26 Widening MM 85 to 101 (P029208) – NRTM Update

A Natural Resource Technical Memorandum (NRTM) was completed in January 2018 in conjunction with the Environmental Assessment (EA). This document serves to outline the natural resources and environment surrounding the project corridor. The I-26 Widening from mile marker 85-101 is currently being delivered through a design build contract. The development of the final design has resulted in minor modifications of the previously identified preferred alternatives. As a result, the original NEPA project study area (PSA) has been expanded, resulting in the need for further evaluation. The purpose of this report is to provide an addendum to the original NRTM in regard to protected species and other natural resources within the expanded PSA.

Project Description:

The proposed project includes improvements and upgrades to I-26 to accommodate existing and projected traffic volumes. SCDOT proposes widening I-26 and reconstructing three interchanges from mile marker (MM) 85 near Little Mountain to MM 101 near Irmo in Newberry, Lexington, and Richland counties. Improvements would take place from 1.6 miles west of the SC 202 (Exit 85) interchange to the US 176 (Exit 101) interchange. The improvements would widen the mainline of I-26 from Exit 85 (MM 85) to Exit 101 (MM 101). I-26 would be widened to a total of six lanes, three in each direction from Exit 85 to Exit 97 and to eight lanes, four in each direction from Exit 97 to Exit 101. The widening would be constructed towards the existing median, minimizing impacts and areas of new disturbance. Interchange improvements would be provided at Exits 85, 91, and 97. A total of seven overpasses that cross I-26 would be replaced including S-36-167 (Parr Road), S-36-39 (Holy Trinity Church Road), S-32-49 (Peak Street), S-40-58 (Old Hilton Road), S-40-234 (Mt. Vernon Church Road), S-40-80 (Shady Grove Road), and S-40-58 (Koon Road). The truck weigh station near MM 94 would be improved as a weigh-in-motion station.

Changes to PSA:

The previous PSA, evaluated in May and June of 2017, was developed in conjunction with the Environmental Assessment (EA) regarding proposed improvements documented above. As the project progressed through the final design phase and design build delivery, various design modifications have been implemented resulting in proposed work extending beyond

the original PSA. The new PSA has been evaluated to determine the potential presence of any waters of the U.S. (WOUS), as well as the potential presence of any protected species listed under the Endangered Species Act (ESA). The previous findings and new revisions are summarized below along with attached figures (Attachment A) providing further illustrations.

The previous PSA encompassed approximately 1073-acres along the I-26 corridor, with an approximate 75-foot buffer from the centerline of existing right-of-way. The final design of the project has resulted in the expansion of the PSA to bring the total evaluated area to approximately 1,213-acres. Specifically, this new PSA includes changes associated with variable scope items, finalized roadway geometry, Exit 91 change from a diverging diamond to a partial cloverleaf, accommodation and minimization of conflicts with SCDOT's Carolina Crossroads (CCR) project, as well as the incorporation of final drainage design. The expanded PSA accurately captures all proposed improvements associated with the I-26 widening project.

Waters of the US (WOUS):

The South Carolina Department of Transportation (SCDOT) received a Preliminary Jurisdictional Determination (PJD) (SAC-2018-00748) for the original PSA (1,073-acres) from the USACE on August 8, 2018. This PJD superseded other existing PJDs within the PSA, including SAC-2014-01110 and SAC-2016-00168.

The SCDOT identified the need to revise the SAC-2018-00748-PJD to the additional PSA; more accurately map existing features; and to revise previously identified aquatic features. In summary, the PJD was revised to 1,210 acres to fully encompass the extents of the disturbed area required for the project construction. This revised 1,210-acre PSA included seven newly identified wetlands, four linear non-wetland waters, and one open water non-wetland water. These features total 24,806.73 linear feet (LF) of non-wetland waters, 1.24 acre of non-wetland water ponds and 2.45 acres of wetlands. The mapping of previously identified aquatic features has been updated based on project topographic survey and other supplemental survey to more accurately reflect field conditions and project design. In addition, 26 previously identified aquatic features have been re-evaluated and determined non-aquatic features based largely on hydrologic conditions, origin, and function.

Site visits were conducted during project development in June, July and August 2019 to further evaluate and document the potential WOUS. A field visit was conducted on September 17, 2019 with the United States Army Corps of Engineers (USACE) to field verify the documented aquatic features. The field evaluation confirmed 72 non-wetland waters, 4 non-wetland water ponds, and 15 wetlands.

Numerous aquatic features identified in PJD – SAC-2018-00748 were updated based on project topographic survey and additional field mapping. Specifically, these updates provide more accurate depictions of these features and will directly correlate with project design. These updates are captured in the attached WOUS Revisions table (Attachment B).

USACE issued a revised PJD associated with SAC-2018-00748 that supersedes all previous approvals. The approval letter dated February 18, 2020 can be found in Attachment C.

Final design associated with the project has progressed since issuance of the revised 2020 PJD, with the identification of isolated work areas that extend beyond the PSA documented in the PJD approval. These areas total approximately 3-acres and have been subsequently identified and documented as delineation only areas in conjunction with the 404 permit. The three isolated areas are further described below.

- *Additional PSA Area 1:* Additional PSA Area 1 is 1.78 acres and extends from the updated PSA north along Western Lane. Specifically, this area was included within the PSA of the ongoing SCDOT CCR project (SAC #2015-01080) with a PJD issued in June 2018. Upon further project coordination and evaluation, it was determined that work along the westbound I-26 would need to be implemented with the I-26 project to avoid reconstruction during the CCR project. As such, the additional area includes Tributary 2, Freshwater Wetland 56, and Freshwater Wetland 57. This area depicted on the CCR permit sheets (6,7 and 8 of 78) was included in the November 26, 2019 public notice.

- *Additional PSA Area 2:* Additional PSA Area 2 is 1.38 acres and is located south of the mainline I-26 along Columbia Avenue and extends from the updated PSA southeast behind the Bojangles. The need for expansion of the PSA in this area was identified due to the need for an access road to Bojangles to meet traffic requirements. A desktop review of available mapping (NWI, topo, and soils) and field reconnaissance in April 2020 found that the PSA consists only of uplands. The PSA consisted of a mixed upland pine stand, as well as a disturbed buffer directly adjacent to the Bojangles parking lot. An upland data point was collected within the additional PSA area as well as pictures to document the existing conditions of the area.

- *Additional PSA Area 3:* Additional PSA Area 3 is 0.01 acre and extends from the updated PSA south along NWW 59. The need for expansion of the PSA in this area was identified due to the need for an additional ditch to more effectively redirect the flows of NWW 59 into the inlet of the proposed pipe extension. NWW 59 was extended from 69.89 LF to 82.12 LF in this location.

Threatened and Endangered Species:

The EA documented the threatened and endangered species for the original PSA boundary. The USFWS species list from the EA identified nine federally protected species known to occur or that have a high possibility of occurring in Lexington, Newberry, and/or Richland County:

- Bald eagle (*Haliaeetus leucocephalus*) – Bald and Golden Eagle Protection Act

- Red-cockaded woodpecker (*Picoides borealis*) – Federal/State Endangered
- Wood stork (*Mycteria americana*) – Federal Threatened
- Atlantic Sturgeon (*Acispenser oxyrinchus*) – Federal Endangered
- Shortnose sturgeon (*Acipenser brevirostrum*) – Federal Endangered
- Canby's dropwort (*Oxypolis canbyi*) – Federal Endangered
- Michaux's sumac (*Rhus michauxii*) – Federal Endangered
- Rough-leaved loosestrife (*Lysimachia asperulaefolia*) – Federal Endangered
- Smooth coneflower (*Echinacea laevigata*) – Endangered

According to the EA/FONSI the project was determined to have "no effect" on species identified as state and/or federally threatened or endangered.

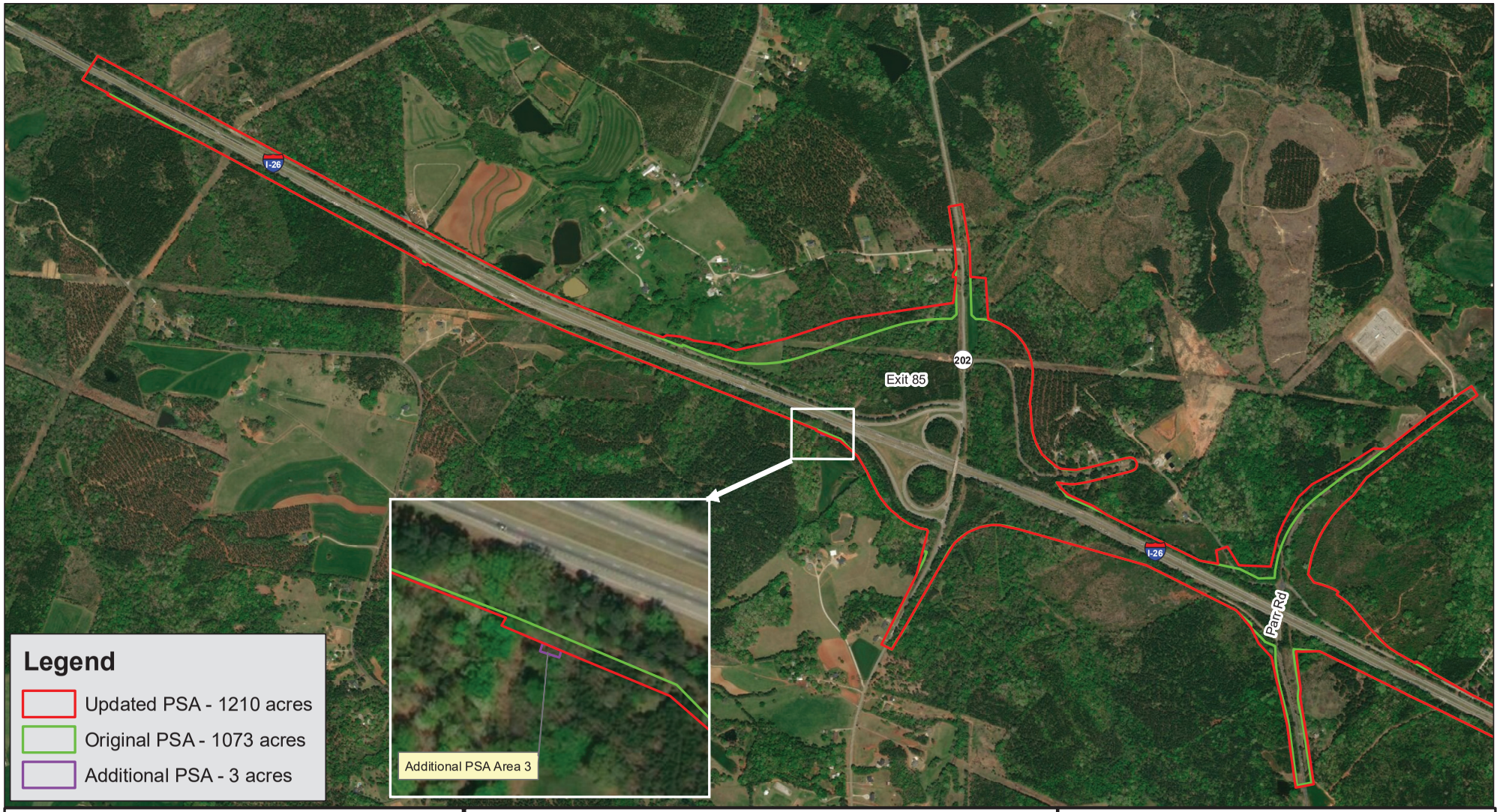
An updated counties species list was acquired from USFWS that was updated April 27, 2020. The updated list shows that Michaux's sumac and Atlantic sturgeon have been delisted for the applicable counties. In addition, an IPAC report was generated from USFWS on March 10, 2020 for use in evaluating the additional PSA area. The IPAC species list identified five species as potentially occurring within the PSA: red-cockaded woodpecker, wood stork, Canby's dropwort, rough-leaved loosestrife, and smooth coneflower. The updated counties species lists and IPAC report can be found in Attachment D.

The data collected from online resources and databases, in addition to the field site visits, did not identify species that may be found within or directly adjacent to the revised PSA. Suitable habitat for protected species was not identified within the PSA. It is recommended that the proposed project, including the revised PSA be determined to have "no effect" on species identified as state and/or federally threatened or endangered, similar to the original determination in the EA/FONSI.

Summary

In summary, the additional PSA area was assessed for any changes in findings regarding natural resources. The additional area led to a modification to the PJD which has been approved by USACE, with further expanded area being evaluated in conjunction with the 404 permit, and the updated threatened and endangered species information led to a reduction in number of species from nine to five with the recommendation that the previous "no effect" determination for the listed species remain applicable for the project.

Attachment A: Figures



Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.1: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

N
W E
S

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.2: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

N
W E
S

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.3: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

N
W E
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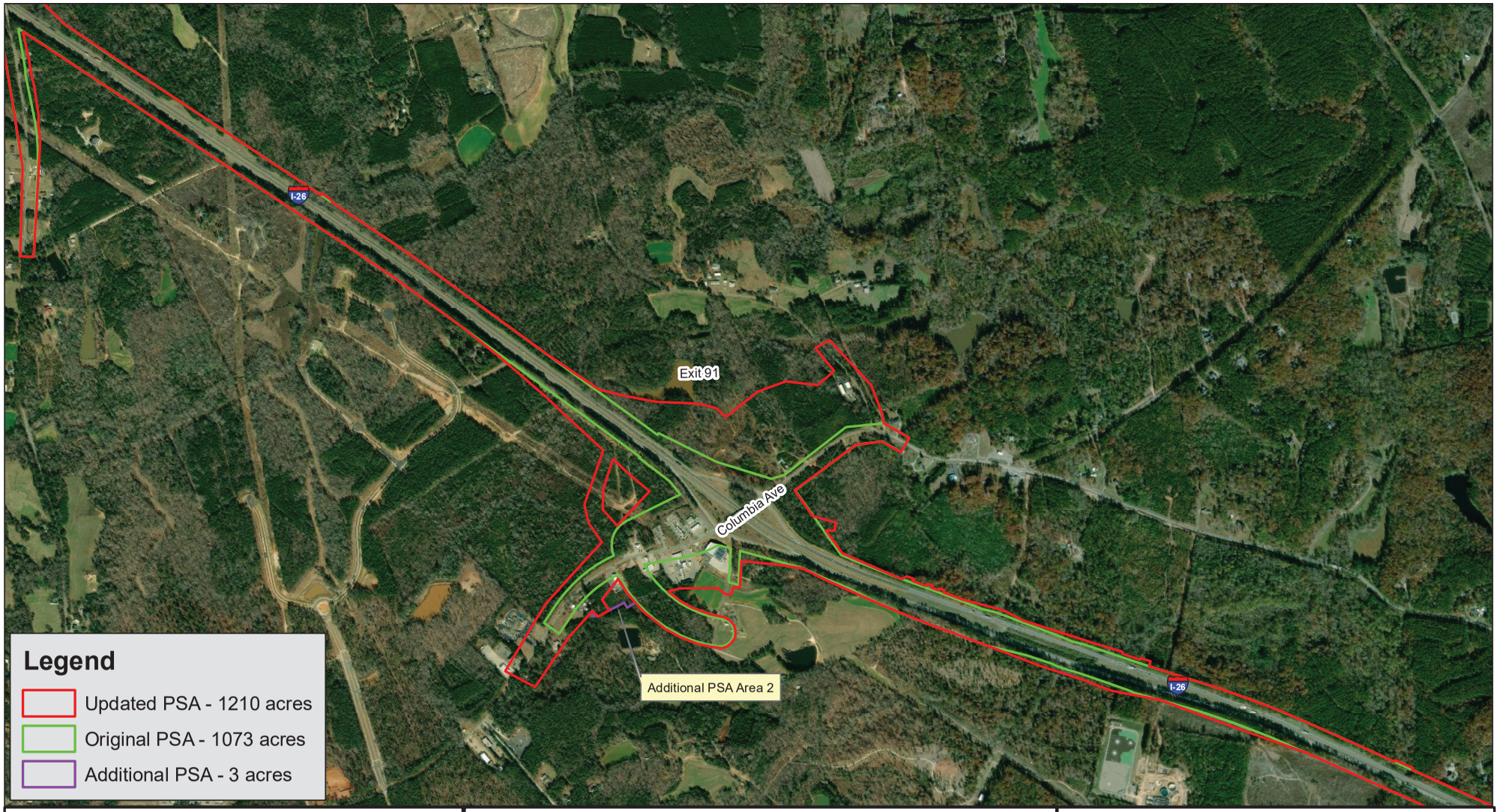

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.4: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

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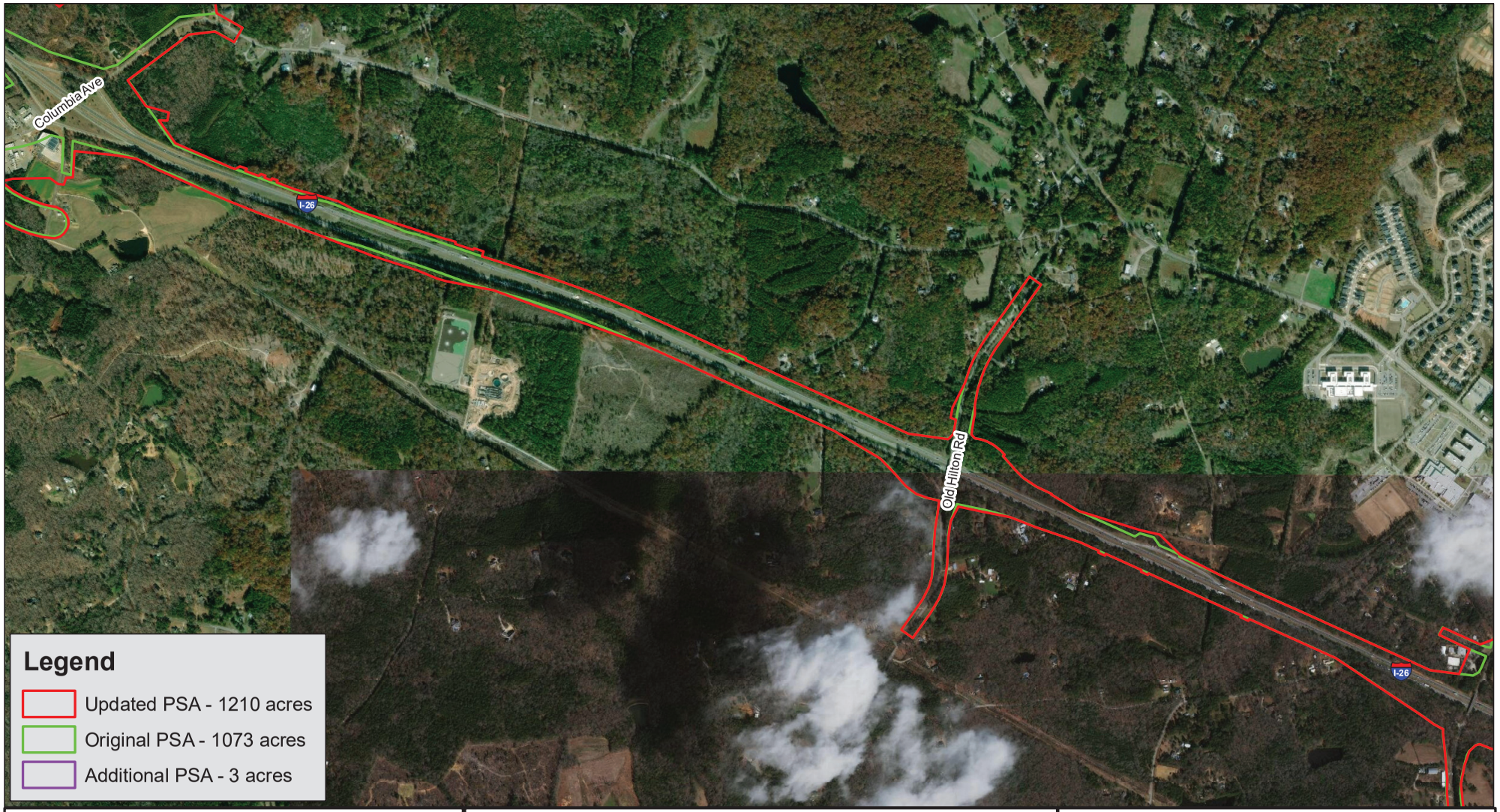

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.5: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington and Richland Counties, SC

0 1,000 Feet

N
W E
S

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.6: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

N
W E
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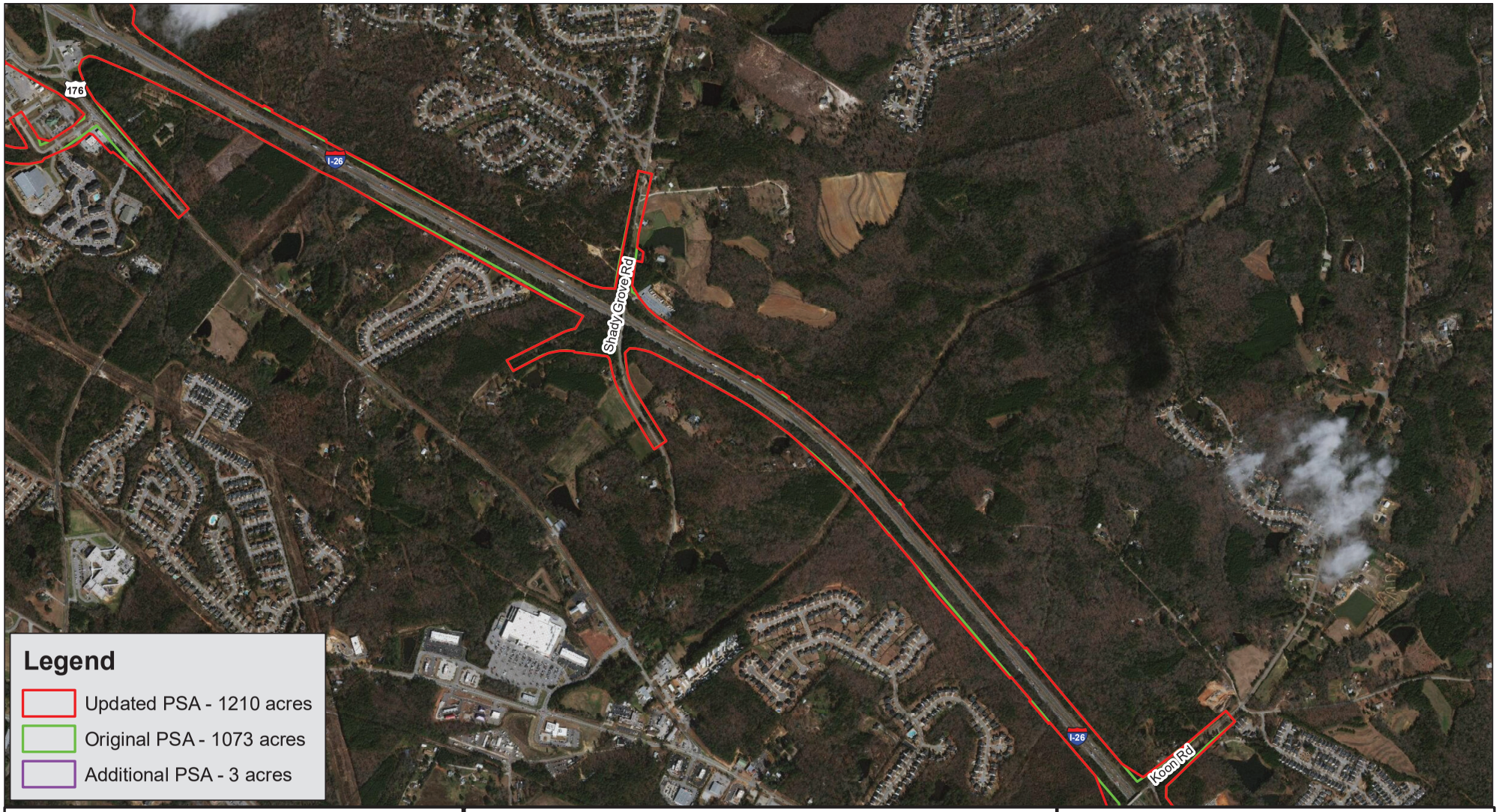

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.7: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

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Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.8: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

N
W E
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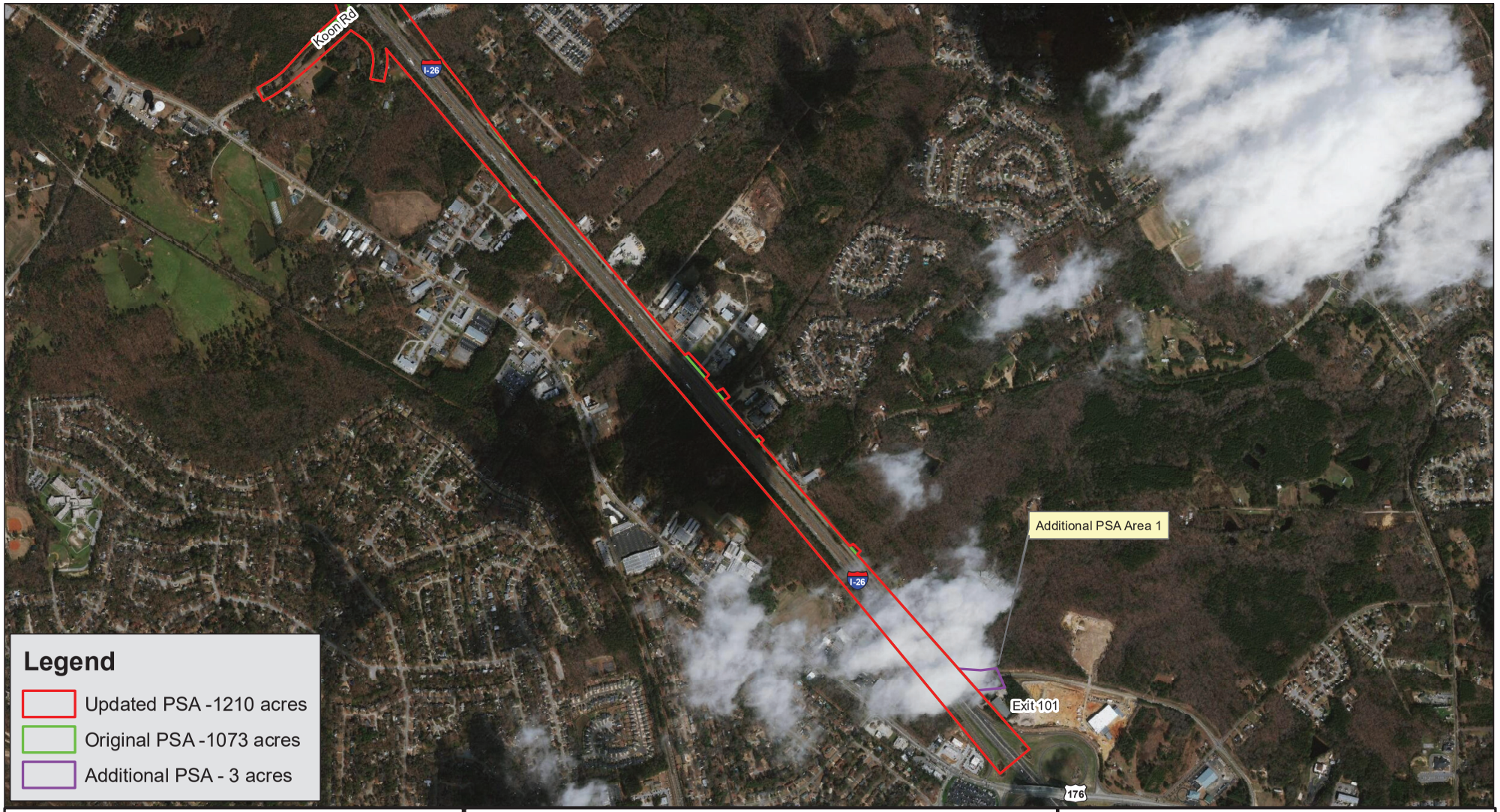

Date: 5.12.2020

INFRASTRUCTURE CONSULTING & ENGINEERING

Figure 1.9: NRTM Revision

I-26 Widening MM 85-101
Newberry, Lexington, and Richland Counties, SC

0 1,000 Feet

N
W E
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Attachment B: PJD Revisions Table

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Previously estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)		Pevious PJD coverage	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable) Revised Aug 2019		Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)	Change in previously estimated amount of aquatic resource to new estimated amount of aquatic resource (acreage and linear feet if applicable)
Non-wetland waters 1A	34.110834	-81.186329	200.38	LF	SAC-2018-00748 AUG 02 2018	222.30	LF	Non-wetland Water	Section 404	21.92
Non-wetland waters 1B	34.112197	-81.189096	42.3087	LF	SAC-2018-00748 AUG 02 2018	36.47	LF	Non-wetland Water	Section 404	-5.84
Non-wetland waters 1C	34.112276	-81.189254	120.5872	LF	SAC-2018-00748 AUG 02 2018	46.24	LF	Non-wetland Water	Section 404	-74.35
Non-wetland waters 1D	34.106366	-81.183077	43.6764	LF	SAC-2018-00748 AUG 02 2018	35.50	LF	Non-wetland Water	Section 404	-8.17
Non-wetland waters 2	34.11714	-81.192914	74.029	LF	SAC-2018-00748 AUG 02 2018	47.46	LF	Non-wetland Water	Section 404	-26.57
Non-wetland waters 4	34.149497	-81.2398907	46.1545	LF	SAC-2018-00748 AUG 02 2018	524.91	LF	Non-wetland Water	Section 404	478.76
Non-wetland waters 6	34.141903	-81.238558	66.2305	LF	SAC-2018-00748 AUG 02 2018	39.75	LF	Non-wetland Water	Section 404	-26.48
Non-wetland waters 7A	34.125921	-81.202096	169.69	LF	SAC-2018-00748 AUG 02 2018	161.93	LF	Non-wetland Water	Section 404	-7.76
Non-wetland waters 7B	34.125145	-81.202446	113.2471	LF	SAC-2018-00748 AUG 02 2018	24.81	LF	Non-wetland Water	Section 404	-88.43
Non-wetland waters 8A	34.131084	-81.207426	166.73	LF	SAC-2018-00748 AUG 02 2018	135.04	LF	Non-wetland Water	Section 404	-31.69
Non-wetland waters 8B	34.130977	-81.207271	83.9399	LF	SAC-2018-00748 AUG 02 2018	67.69	LF	Non-wetland Water	Section 404	-16.25
Non-wetland waters 8C	34.130475	-81.207914	139.5987	LF	SAC-2018-00748 AUG 02 2018	72.93	LF	Non-wetland Water	Section 404	-66.67
Non-wetland waters 9	34.134321	-81.211493	219.55	LF	SAC-2018-00748 AUG 02 2018	225.11	LF	Non-wetland Water	Section 404	5.56
Non-wetland waters 10	34.134805	-81.212378	105.81	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-105.81
Non-wetland waters 11	34.138604	-81.220784	600.53	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-600.53
Non-wetland waters 12	34.141885	-81.228193	380.89	LF	SAC-2018-00748 AUG 02 2018	379.09	LF	Non-wetland Water	Section 404	-1.80
Non-wetland waters 13	34.142706	-81.230024	224.01	LF	SAC-2018-00748 AUG 02 2018	248.17	LF	Non-wetland Water	Section 404	24.16
Non-wetland waters 15	34.152706	-81.255487	216.57	LF	SAC-2018-00748 AUG 02 2018	188.03	LF	Non-wetland Water	Section 404	-28.54
Non-wetland waters 18	34.162244	-81.296459	150.71	LF	SAC-2018-00748 AUG 02 2018	168.61	LF	Non-wetland Water	Section 404	17.90
Non-wetland waters 19A	34.168681	-81.296459	425.5841	LF	SAC-2018-00748 AUG 02 2018	983.65	LF	Non-wetland Water	Section 404	558.07
Non-wetland waters 19B	34.168866	-81.296499	100.7297	LF	SAC-2018-00748 AUG 02 2018	42.65	LF	Non-wetland Water	Section 404	-58.08
Non-wetland waters 19C	34.168428	-81.295787	165.897	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-165.90
Non-wetland waters 20	34.169806	-81.299272	320.47	LF	SAC-2018-00748 AUG 02 2018	362.64	LF	Non-wetland Water	Section 404	42.17
Non-wetland waters 24	34.170424	-81.300882	603.8219	LF	SAC-2018-00748 AUG 02 2018	628.70	LF	Non-wetland Water	Section 404	24.88
Non-wetland waters 25A	34.172058	-81.305806	77.5016	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-77.50
Non-wetland waters 25B	34.171948	-81.308319	28.9979	LF	SAC-2018-00748 AUG 02 2018	74.19	LF	Non-wetland Water	Section 404	45.19
Non-wetland waters 26	34.173185	-81.309908	264.54	LF	SAC-2018-00748 AUG 02 2018	564.92	LF	Non-wetland Water	Section 404	300.38
Non-wetland waters 27	34.174324	-81.313541	1157.422	LF	SAC-2018-00748 AUG 02 2018	1019.07	LF	Non-wetland Water	Section 404	-138.35
Non-wetland waters 28	34.186381	-81.337543	96.3934	LF	SAC-2018-00748 AUG 02 2018	229.96	LF	Non-wetland Water	Section 404	133.56
Non-wetland waters 29	34.187304	-81.339186	432.8848	LF	SAC-2018-00748 AUG 02 2018	819.77	LF	Non-wetland Water	Section 404	386.88
Non-wetland waters 30A	34.189818	-81.343753	36.9237	LF	SAC-2018-00748 AUG 02 2018	326.39	LF	Non-wetland Water	Section 404	289.47
Non-wetland waters 30B	34.189046	-81.343761	156.0062	LF	SAC-2018-00748 AUG 02 2018	175.00	LF	Non-wetland Water	Section 404	19.00
Non-wetland waters 31	34.19523	-81.353547	831.617	LF	SAC-2018-00748 AUG 02 2018	405.43	LF	Non-wetland Water	Section 404	-426.19
Non-wetland waters 32	34.196927	-81.356752	291.6689	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-291.67
Non-wetland waters 33A	34.200204	-81.36266	587.6989	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-587.70
Non-wetland waters 33B	34.199056	-81.360594	752.7767	LF	SAC-2018-00748 AUG 02 2018	763.43	LF	Non-wetland Water	Section 404	10.66
Non-wetland waters 33C	34.198287	-81.36052	58.8861	LF	SAC-2018-00748 AUG 02 2018	62.58	LF	Non-wetland Water	Section 404	3.69
Non-wetland waters 33D	34.198181	-81.360497	59.5288	LF	SAC-2018-00748 AUG 02 2018	50.11	LF	Non-wetland Water	Section 404	-9.42
Non-wetland waters 35	34.206453	-81.374711	479.335	LF	SAC-2018-00748 AUG 02 2018	225.86	LF	Non-wetland Water	Section 404	-253.47
Non-wetland waters 36A	34.207705	-81.377707	383.44	LF	SAC-2018-00748 AUG 02 2018	414.01	LF	Non-wetland Water	Section 404	30.57
Non-wetland waters 36B	34.207532	-81.377273	367.5944	LF	SAC-2018-00748 AUG 02 2018	143.06	LF	Non-wetland Water	Section 404	-224.54
Non-wetland waters 36C	34.20803	-81.379984	132.4025	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-132.40
Non-wetland waters 36D	34.207884	-81.379827	90.8191	LF	SAC-2018-00748 AUG 02 2018	162.52	LF	Non-wetland Water	Section 404	71.70
Non-wetland waters 37	34.209984	-81.383	110.92	LF	SAC-2018-00748 AUG 02 2018	72.94	LF	Non-wetland Water	Section 404	-37.98
Non-wetland waters 38A	34.212238	-81.388689	27.12	LF	SAC-2018-00748 AUG 02 2018	139.22	LF	Non-wetland Water	Section 404	112.10
Non-wetland waters 38B	34.211837	-81.389611	438.6744	LF	SAC-2018-00748 AUG 02 2018	392.92	LF	Non-wetland Water	Section 404	-45.76
Non-wetland waters 38C	34.211507	-81.389071	60.8738	LF	SAC-2018-00748 AUG 02 2018	12.79	LF	Non-wetland Water	Section 404	-48.08
Non-wetland waters 38D	34.211537	-81.388925	114.0294	LF	SAC-2018-00748 AUG 02 2018	115.97	LF	Non-wetland Water	Section 404	1.94
Non-wetland waters 39A	34.212337	-81.388967	79.3628	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-79.36

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Previously estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)		Pevious PJD coverage	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable) Revised Aug 2019		Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)	Change in previously estimated amount of aquatic resource to new estimated amount of aquatic resource (acreage and linear feet if applicable)
Non-wetland waters 40A	34.224184	-81.409541	2291.55	LF	SAC-2018-00748 AUG 02 2018	2613.58	LF	Non-wetland Water	Section 404	322.03
Non-wetland waters 40B	34.221169	-81.408927	133.8686	LF	SAC-2018-00748 AUG 02 2018	135.66	LF	Non-wetland Water	Section 404	1.79
Non-wetland waters 40C	34.220609	-81.408544	232.0763	LF	SAC-2018-00748 AUG 02 2018	244.94	LF	Non-wetland Water	Section 404	12.86
Non-wetland waters 40D	34.21925	-81.40851	59.9361	LF	SAC-2018-00748 AUG 02 2018	0	LF	Non-wetland Water	Section 404	-59.94
Non-wetland waters 40E	34.218672	-81.408309	267.7515	LF	SAC-2018-00748 AUG 02 2018	0	LF	Non-wetland Water	Section 404	-267.75
Non-wetland waters 43	34.222495	-81.414865	259.83	LF	SAC-2018-00748 AUG 02 2018	290.97	LF	Non-wetland Water	Section 404	31.14
Non-wetland waters 44	34.223033	-81.413705	249.9278	LF	SAC-2018-00748 AUG 02 2018	258.03	LF	Non-wetland Water	Section 404	8.10
Non-wetland waters 45A	34.223477	-81.414117	2287.5326	LF	SAC-2018-00748 AUG 02 2018	2848.86	LF	Non-wetland Water	Section 404	561.33
Non-wetland waters 45B	34.224191	-81.413337	265.2399	LF	SAC-2018-00748 AUG 02 2018	252.76	LF	Non-wetland Water	Section 404	-12.48
Non-wetland waters 46	34.223195	-81.418078	144.9112	LF	SAC-2018-00748 AUG 02 2018	103.58	LF	Non-wetland Water	Section 404	-41.33
Non-wetland waters 47	34.223732	-81.420274	946.9449	LF	SAC-2018-00748 AUG 02 2018	554.52	LF	Non-wetland Water	Section 404	-392.43
Non-wetland waters 48	34.231245	-81.438614	78.51	LF	SAC-2018-00748 AUG 02 2018	93.02	LF	Non-wetland Water	Section 404	14.51
Non-wetland waters 49	34.231205	-81.440527	113.09	LF	SAC-2018-00748 AUG 02 2018	133.65	LF	Non-wetland Water	Section 404	20.56
Non-wetland waters 51A	34.230666	-81.439229	54.2145	LF	SAC-2018-00748 AUG 02 2018	842.73	LF	Non-wetland Water	Section 404	788.52
Non-wetland waters 51B	34.230713	-81.439146	61.703	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-61.70
Non-wetland waters 51C	34.229976	-81.437652	168.6555	LF	SAC-2018-00748 AUG 02 2018	0	LF	Non-wetland Water	Section 404	-168.66
Non-wetland waters 54A	34.223085	-81.420266	3032.02	LF	SAC-2018-00748 AUG 02 2018	1931.66	LF	Non-wetland Water	Section 404	-1100.36
Non-wetland waters 54B	34.22247	-81.418196	72.3604	LF	SAC-2018-00748 AUG 02 2018	73.00	LF	Non-wetland Water	Section 404	0.64
Non-wetland waters 54C	34.222299	-81.417505	422.292	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-422.29
Non-wetland waters 59	34.221487	-81.41513	0.0019	LF	SAC-2018-00748 AUG 02 2018	69.89	LF	Non-wetland Water	Section 404	69.89
Non-wetland waters 60	34.218582	-81.411321	595.396	LF	SAC-2018-00748 AUG 02 2018	232.34	LF	Non-wetland Water	Section 404	-363.06
Non-wetland waters 103	34.126158	-81.203471	115.77	LF	SAC-2018-00748 AUG 02 2018	182.07	LF	Non-wetland Water	Section 404	66.30
Non-wetland waters 104	34.168653	-81.291292	123.74	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-123.74
Non-wetland waters 107	34.174892	-81.318139	436.2189	LF	SAC-2018-00748 AUG 02 2018	401.61	LF	Non-wetland Water	Section 404	-34.61
Non-wetland waters 105	34.213791	-81.394398	129.73895	LF	SAC-2018-00748 AUG 02 2019	0.00	LF	Non-wetland Water	Section 404	-129.74
Non-wetland waters 108	34.103077	-81.178291	87.78	LF	SAC-2018-00748 AUG 02 2018	117.03	LF	Non-wetland Water	Section 404	29.25
Non-wetland waters 109	34.224593	-81.424935	65.87	LF	SAC-2018-00748 AUG 02 2018	70.01	LF	Non-wetland Water	Section 404	4.14
Non-wetland waters 110	34.168164	-81.290997	107.325	LF	SAC-2018-00748 AUG 02 2018	170.97	LF	Non-wetland Water	Section 404	63.65
Non-wetland waters D	34.14583	-81.23515	241.4175	LF	SAC-2018-00748 AUG 02 2018	0.00	LF	Non-wetland Water	Section 404	-241.42
Non-wetland waters 17/NWW H	34.157695	-81.268643	930.0606	LF	SAC-2018-00748 AUG 02 2018	452.21	LF	Non-wetland Water	Section 404	-477.85
Non-wetland waters HB/NWW IB	34.148852	-81.243557	373.066031	LF	SAC-2018-00748 AUG 02 2018	84.80	LF	Non-wetland Water	Section 404	-288.27
Non-wetland waters HA/NWW IA	34.148277	-81.243841	152.368584	LF	SAC-2018-00748 AUG 02 2018	191.79	LF	Non-wetland Water	Section 404	39.42
Non-wetland waters J	34.180253	-81.328249	80.325	LF	SAC-2018-00748 AUG 02 2018	313.27	LF	Non-wetland Water	Section 404	232.95
Non-wetland waters 4T	34.173806	-81.32425	324	LF	SAC-2015-01451-DS JAN 20 2017	274.14	LF	Non-wetland Water	Section 404	-49.87
Non-wetland waters 6T	34.179173	-81.324678	145	LF	SAC-2015-01451-DS JAN 20 2017	536.42	LF	Non-wetland Water	Section 404	391.42
Wetland 1	34.173464	-81.324265	0.472	Acre	SAC-2015-01451-DS JAN 20 2017	0.16	Acre	Wetland	Section 404	-0.31
Wetland 2	34.178973	-81.324707	0.023	Acre	SAC-2015-01451-DS JAN 20 2017	0	Acre	Wetland	Section 404	-0.02
Wetland 3	34.177774	-81.324943	0.043	Acre	SAC-2015-01451-DS JAN 20 2017	0	Acre	Wetland	Section 404	-0.04
Wetland A	34.119468	-81.195281	0.0186	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.02
Wetland B	34.121156	-81.196849	0.1082	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.11
Wetland C	34.014599	-81.244278	0.0146	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.01
Wetland D	34.145767	-81.235359	0.2156	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.22
Wetland E	34.140223	-81.253795	0.0633	Acre	SAC-2018-00748 AUG 02 2018	0.03	Acre	Wetland	Section 404	-0.03
Wetland F	34.152798	-81.253795	0.0249	Acre	SAC-2018-00748 AUG 02 2018	0.01	Acre	Wetland	Section 404	-0.01
Wetland G	34.207884	-81.377932	0.0344	Acre	SAC-2018-00748 AUG 02 2018	0.02	Acre	Wetland	Section 404	-0.01
Wetland H	34.157981	-81.267682	0.0874	Acre	SAC-2018-00748 AUG 02 2018	0.11	Acre	Wetland	Section 404	0.02
Wetland I	34.14831	-81.243893	0.0118	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.01
Wetland J	34.180694	-81.327747	0.0306	Acre	SAC-2018-00748 AUG 02 2018	0.1	Acre	Wetland	Section 404	0.07
Wetland K	34.224365	-81.424345	0.061	Acre	SAC-2018-00748 AUG 02 2018	0.06	Acre	Wetland	Section 404	0.00

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Previously estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)		Pevious PJD coverage	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable) Revised Aug 2019		Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)	Change in previously estimated amount of aquatic resource to new estimated amount of aquatic resource (acreage and linear feet if applicable)
Wetland L	34.180694	-81.327747	0.1159	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.12
Wetland M	34.167748	-81.291172	0.1111	Acre	SAC-2018-00748 AUG 02 2018	0.32	Acre	Wetland	Section 404	0.21
Wetland O	34.224365	-81.424345	0.067	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.07
Wetland P	34.16948	-81.290957	0.05	Acre	SAC-2018-00748 AUG 02 2018	0	Acre	Wetland	Section 404	-0.05
Non-wetland WaterPond A	34.10465	-81.181329	0.138	Acre	SAC-2018-00748 AUG 02 2018	0.11	Acre	Non-wetland Water	Section 404	-0.03
Non-wetland Water Pond B	34.170007	-81.290194	0.141	Acre	SAC-2018-00748 AUG 02 2018	0.12	Acre	Non-wetland Water	Section 404	-0.02
Non-wetland Water Pond C	34.158044	-81.270726	0.257	Acre	SAC-2018-00748 AUG 02 2018	0.23	Acre	Non-wetland Water	Section 404	-0.03
Non-wetland Water Pond CA	34.180332	-81.324271	N/A	N/A	N/A	0.78	Acre	Non-wetland Water	Section 404	N/A
Non-wetland Water CA	34.182112	-81.320001	N/A	N/A	N/A	114.68	LF	Non-wetland Water	Section 404	N/A
Non-wetland Water CB	34.106258	-81.181586	N/A	N/A	N/A	86.06	LF	Non-wetland Water	Section 404	N/A
Non-wetland Water CC	34.175341	-81.316847	N/A	N/A	N/A	278.87	LF	Non-wetland Water	Section 404	N/A
Non-wetland Water CD	34.111408	-81.1869	N/A	N/A	N/A	41.82	LF	Non-wetland Water	Section 404	N/A
Wetland CA	34.219	-81.4102	N/A	N/A	N/A	0.39	Acre	Wetland	Section 404	N/A
Wetland CB	34.2239	-81.4146	N/A	N/A	N/A	0.99	Acre	Wetland	Section 404	N/A
Wetland CC	34.2068	-81.3771	N/A	N/A	N/A	0.16	Acre	Wetland	Section 404	N/A
Wetland CD	34.3201	-81.1822	N/A	N/A	N/A	0.04	Acre	Wetland	Section 404	N/A
Wetland CE	34.2239	-81.4146	N/A	N/A	N/A	0.02	Acre	Wetland	Section 404	N/A
Wetland CF	34.1794	-81.3242	N/A	N/A	N/A	0.02	Acre	Wetland	Section 404	N/A
Wetland CG	34.173	-81.3084	N/A	N/A	N/A	0.02	Acre	Wetland	Section 404	N/A

	Totals				Change
Indicates Eliminated Feature	Non-wetland Water LF	26949.05487		Non-wetland Water LF	24806.734	-2142.32
Indicates New Feature	Non-wetland Water ac	0.536		Non-Wetland Water ac	1.24	0.704
	Wetland ac	1.5524		Wetland ac	2.45	0.8976

Attachment C: PJD Approval

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A HAGOOD AVENUE
CHARLESTON, SC 29412

18 February 2020

Regulatory Division

Mr. Sean Connolly
SC Department of Transportation
P.O. BOX 191
Columbia, South Carolina 29202
ConnollyMS@scdot.org

Dear Mr. Connolly:

This is in response to your request for a Preliminary Jurisdictional Determination (PJD) (SAC-2018-00748) received in our office on August 23, 2019, for a 1,210-acre site located on and along an approximately 16-mile long segment of Interstate 26 (I-26) from Mile Marker 85 to Mile Marker 101 (SCDOT ID# P029208) in Newberry, Lexington and Richland Counties, South Carolina (Latitude: 34.181373°, Longitude: -81.323797°). A PJD is used to indicate the approximate location(s) and boundaries of wetlands and/or other aquatic resources presumed to be waters of the United States on a site pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344) and/or navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899 (RHA) (33 U.S.C. § 403).

The site is shown on the attached depictions entitled Figures 5.1 to 5.53 entitled "Aquatic Features I-26 Widening MM85-101 Newberry, Lexington, and Richland Counties, SC" and dated September 20, 2019, and prepared by Infrastructure, Consulting and Engineering. Based upon on-site inspection, a review of aerial photography, topographic maps, National Wetlands Inventory maps, soil survey information, and Wetland Determination Data Forms, we conclude the boundaries shown on the referenced depictions are a reasonable approximation of the aquatic resources found within the site that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers. The site contains a total of approximately 3.69 acres and 24,806.76 linear feet of federally defined wetlands and other aquatic resources that are presumed to be waters of the United States subject to Corps' jurisdiction under Section 404 of the CWA. Of these aquatic resources, the site contains approximately 2.45 acres of federally defined wetlands, approximately 1.24 acres of open water (pond, lake, etc.), and 24,806.76 linear feet of other aquatic resources that are presumed to be waters of the United States subject to Corps' jurisdiction under Section 404 of the CWA.

You are cautioned the boundaries of the delineated wetlands and/or other aquatic resources presumed to be subject to regulatory jurisdiction of the Corps of Engineers shown on the attached depiction are approximate and subject to change. **Also, please be aware that due to revisions to the project area and/or delineated waters, this PJD supersedes the former PJDs, including the PJD the Corps provided SCDOT for the I-26 from Mile Marker 85 to Mile Marker 101 project dated August 2, 2018 and any previous PJDs that included segments of I-26 within this project boundary (Mile Marker 85 to Mile Marker 101).**

By providing this PJD, the Corps of Engineers is making no legally binding determination of any type regarding whether jurisdiction exists over the particular aquatic resource(s) in question. This PJD is not a definitive determination of the presence or absence of areas within the Corps of Engineers' jurisdiction, and, therefore, it does not have an expiration date. Also note this PJD is not an appealable action under the Corps of Engineers' administrative appeal procedures defined at 33 CFR 331 as it is not a final action. A PJD is "preliminary" in the sense that a recipient of a PJD can later request and obtain an Approved Jurisdictional Determination (AJD) for a definitive, official determination of the presence or absence of jurisdictional aquatic resources on a site, including the identification of the geographic limits of the jurisdictional aquatic resources. To receive a definitive determination of jurisdiction, you must submit an AJD request.

Be aware a permit from this office may be required for certain activities in the areas identified as wetlands and/or other aquatic resources that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers. These areas may further be subject to restrictions or requirements of other state or local government agencies. A PJD may be used as the basis of a permit decision however, when computing impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a PJD will treat all aquatic resources affected in any way by the permitted activity as jurisdictional. If you intend to request an AJD in the future, you are advised not to commence work in these wetlands and/or other aquatic resources presumed to be jurisdictional prior to receiving the AJD. Attached is a Preliminary Jurisdictional Determination Form describing the areas in question and clarifying the option to request an AJD.

If you submit a permit application as a result of this PJD, include a copy of this letter and the depictions as part of the application. Not submitting the letter and depiction will cause a delay while we confirm a PJD was performed for the proposed permit project area. Note that some or all of these areas may be regulated by other state or local government entities, and you should contact the South Carolina Department of Health and Environmental Control, Bureau of Water, or Department of Ocean and Coastal Resource Management, to determine the limits of their jurisdiction.

This PJD was conducted to identify approximate location(s) of aquatic resources presumed to be subject to regulatory jurisdiction of the Corps of Engineers on the particular site identified in this request. This PJD may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Attached is a copy of the Preliminary Jurisdictional Determination Form signed by our office. Please sign, retain a copy for your records, and return a signed copy to this office within 30 days of receipt of this letter.

In all future correspondence, please refer to file number SAC-2018-00748. A copy of this letter is being forwarded to State and/or Federal agencies for their information. If you

have any questions, please contact Stephen A. Brumagin, Project Manager, at (803) 253-3445, or by email at Stephen.A.Brumagin@usace.army.mil.

Sincerely,

Amanda L. Heath
Chief, Special Projects

Attachments:
Preliminary Jurisdictional Determination Form
Notification of Appeal Options
Figures 5.1 to 5.53 entitled “Aquatic Features I-26 Widening MM85-101 Newberry, Lexington, and Richland Counties, SC” dated 9/20/2019

Copies Furnished:

Mr. William McGoldrick
SCDOT
P O BOX 191
Columbia, South Carolina 29202
McGoldriWR@scdot.org

Mr. Cody Conner
Infrastructure, Consulting & Engineering
1021 Briargate Circle
Columbia, South Carolina 29210
cody.conner@ice-eng.com

SCDHEC - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201
WQCWetlands@dhec.sc.gov

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: January 31, 2020

B. NAME AND ADDRESS OF PERSON REQUESTING PJD:

Applicant:
Mr. William McGoldrick
SCDOT
P O BOX 191
Columbia, South Carolina 29202
McGoldriWR@scdot.org

Consultant:
Mr. Cody Conner
Infrastructure Consulting & Engineering
1021 Briargate Circle
Columbia, South Carolina 29210
cody.conner@ice-eng.com

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Charleston District, SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland Counties, South Carolina

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: The project is located on and along an approximately 16-mile long segment of Interstate 26 (I-26) from Mile Marker 85 to Mile Marker 101 (SCDOT ID# P029208) in Newberry, Lexington and Richland Counties, South Carolina

(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: South Carolina Counties: Newberry, Lexington & Richland Counties City: Chapin

Center coordinates of site (lat/long in degree decimal format):

Lat.: 34.181373 ° Long.: -81.323797 °

Universal Transverse Mercator: NAD 83

Name of nearest waterbody: Wateree Creek & Hollingshead Creek

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: January 31, 2020

☒ Field Determination. Date(s): September 17, 2019

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland Water CA, 2019	34.18211	-81.32	114.68 feet	Non-wetland water	Section 404
Non-wetland Water CB, 2019	34.10626	-81.18159	86.06 feet	Non-wetland water	Section 404
Non-wetland Water CC, 2019	34.17534	-81.31685	278.87 feet	Non-wetland water	Section 404
Non-wetland Water CD, 2019	34.11141	-81.1869	41.82 feet	Non-wetland water	Section 404
Non-wetland Water Pond A, 2019	34.10465	-81.18133	0.11 acre	Non-wetland water	Section 404
Non-wetland Water Pond B, 2019	34.17001	-81.29019	0.12 acre	Non-wetland water	Section 404
Non-wetland Water Pond C, 2019	34.15804	-81.27073	0.23 acre	Non-wetland water	Section 404
Non-wetland Water Pond CA, 2019	34.18033	-81.32427	0.78 acre	Non-wetland water	Section 404
Non-wetland waters 103, 2019	34.12616	-81.20347	182.07 feet	Non-wetland water	Section 404

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 107, 2019	34.17489	-81.31814	401.61 feet	Non-wetland water	Section 404
Non-wetland waters 108, 2019	34.10308	-81.17829	117.03 feet	Non-wetland water	Section 404
Non-wetland waters 109, 2019	34.22459	-81.42494	70.01 feet	Non-wetland water	Section 404
Non-wetland waters 110, 2019	34.16816	-81.291	170.97 feet	Non-wetland water	Section 404
Non-wetland waters 12, 2019	34.14189	-81.22819	379.09 feet	Non-wetland water	Section 404
Non-wetland waters 13, 2019	34.14271	-81.23002	248.17 feet	Non-wetland water	Section 404
Non-wetland waters 15, 2019	34.15271	-81.25549	188.03 feet	Non-wetland water	Section 404
Non-wetland waters 17/NWWH, 2019	34.1577	-81.26864	452.21 feet	Non-wetland water	Section 404
Non-wetland waters 18, 2019	34.16224	-81.29646	168.61 feet	Non-wetland water	Section 404

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 19A, 2019	34.16868	-81.29646	983.65 feet	Non-wetland water	Section 404
Non-wetland waters 19B, 2019	34.16887	-81.2965	42.65 feet	Non-wetland water	Section 404
Non-wetland waters 1A 2019	34.11083	-81.18633	222.3 feet	Non-wetland water	Section 404
Non-wetland waters 1B 2019	34.1122	-81.1891	36.47 feet	Non-wetland water	Section 404
Non-wetland waters 1C 2019	34.11228	-81.18925	46.24 feet	Non-wetland water	Section 404
Non-wetland waters 1D, 2019	34.10637	-81.18308	35.5 feet	Non-wetland water	Section 404
Non-wetland waters 2, 2019	34.11714	-81.19291	47.46 feet	Non-wetland water	Section 404
Non-wetland waters 20, 2019	34.16981	-81.29927	362.64 feet	Non-wetland water	Section 404
Non-wetland waters 24, 2019	34.17042	-81.30088	628.7 feet	Non-wetland water	Section 404
Non-wetland waters 25B, 2019	34.17195	-81.30832	74.19 feet	Non-wetland water	Section 404

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 26, 2019	34.17319	-81.30991	564.92 feet	Non-wetland water	Section 404
Non-wetland waters 27, 2019	34.17432	-81.31354	1019.07 feet	Non-wetland water	Section 404
Non-wetland waters 28, 2019	34.18638	-81.33754	229.96 feet	Non-wetland water	Section 404
Non-wetland waters 29, 2019	34.1873	-81.33919	819.77 feet	Non-wetland water	Section 404
Non-wetland waters 30A, 2019	34.18982	-81.34375	326.39 feet	Non-wetland water	Section 404
Non-wetland waters 30B, 2019	34.18905	-81.34376	175 feet	Non-wetland water	Section 404
Non-wetland waters 31, 2019	34.19523	-81.35355	405.43 feet	Non-wetland water	Section 404
Non-wetland waters 33B, 2019	34.19906	-81.36059	763.43 feet	Non-wetland water	Section 404
Non-wetland waters 33C, 2019	34.19829	-81.36052	62.58 feet	Non-wetland water	Section 404

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 33D, 2019	34.19818	-81.3605	50.11 feet	Non-wetland water	Section 404
Non-wetland waters 35, 2019	34.20645	-81.37471	225.86 feet	Non-wetland water	Section 404
Non-wetland waters 36A, 2019	34.20771	-81.37771	414.01 feet	Non-wetland water	Section 404
Non-wetland waters 36B, 2019	34.20753	-81.37727	143.06 feet	Non-wetland water	Section 404
Non-wetland waters 36D, 2019	34.20788	-81.37983	162.52 feet	Non-wetland water	Section 404
Non-wetland waters 37, 2019	34.20998	-81.383	72.94 feet	Non-wetland water	Section 404
Non-wetland waters 38A, 2019	34.21224	-81.38869	139.22 feet	Non-wetland water	Section 404
Non-wetland waters 38B, 2019	34.21184	-81.38961	392.92 feet	Non-wetland water	Section 404
Non-wetland waters 38C, 2019	34.21151	-81.38907	12.79 feet	Non-wetland water	Section 404

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 38D, 2019	34.21154	-81.38893	115.97 feet	Non-wetland water	Section 404
Non-wetland waters 4, 2019	34.1495	-81.23989	524.91 feet	Non-wetland water	Section 404
Non-wetland waters 40A, 2019	34.22418	-81.40954	2613.58 feet	Non-wetland water	Section 404
Non-wetland waters 40B, 2019	34.22117	-81.40893	135.66 feet	Non-wetland water	Section 404
Non-wetland waters 40C, 2019	34.22061	-81.40854	244.94 feet	Non-wetland water	Section 404
Non-wetland waters 43, 2019	34.2225	-81.41487	290.97 feet	Non-wetland water	Section 404
Non-wetland waters 44, 2019	34.22303	-81.41371	258.03 feet	Non-wetland water	Section 404
Non-wetland waters 45A, 2019	34.22348	-81.41412	2848.86 feet	Non-wetland water	Section 404
Non-wetland waters 45B, 2019	34.22419	-81.41334	252.76 feet	Non-wetland water	Section 404

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 46, 2019	34.2232	-81.41808	103.58 feet	Non-wetland water	Section 404
Non-wetland waters 47, 2019	34.22373	-81.42027	554.52 feet	Non-wetland water	Section 404
Non-wetland waters 48, 2019	34.23125	-81.43861	93.02 feet	Non-wetland water	Section 404
Non-wetland waters 49, 2019	34.23121	-81.44053	133.65 feet	Non-wetland water	Section 404
Non-wetland waters 4T, 2019	34.17381	-81.32425	274.14 feet	Non-wetland water	Section 404
Non-wetland waters 51A, 2019	34.23067	-81.43923	842.73 feet	Non-wetland water	Section 404
Non-wetland waters 54A, 2019	34.22309	-81.42027	1931.66 feet	Non-wetland water	Section 404
Non-wetland waters 54B, 2019	34.22247	-81.4182	73 feet	Non-wetland water	Section 404
Non-wetland waters 59, 2019	34.22149	-81.41513	69.89 feet	Non-wetland water	Section 404

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters 6, 2019	34.1419	-81.23856	39.75 feet	Non-wetland water	Section 404
Non-wetland waters 60, 2019	34.21858	-81.41132	232.34 feet	Non-wetland water	Section 404
Non-wetland waters 6T, 2019	34.17917	-81.32468	536.42 feet	Non-wetland water	Section 404
Non-wetland waters 7A, 2019	34.12592	-81.2021	161.93 feet	Non-wetland water	Section 404
Non-wetland waters 7B, 2019	34.12515	-81.20245	24.81 feet	Non-wetland water	Section 404
Non-wetland waters 8A, 2019	34.13108	-81.20743	135.04 feet	Non-wetland water	Section 404
Non-wetland waters 8B, 2019	34.13098	-81.20727	67.69 feet	Non-wetland water	Section 404
Non-wetland waters 8C, 2019	34.13048	-81.20791	72.93 feet	Non-wetland water	Section 404
Non-wetland waters 9, 2019	34.13432	-81.21149	225.11 feet	Non-wetland water	Section 404

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Non-wetland waters HA/NWWIA, 2019	34.14828	-81.24384	191.97 feet	Non-wetland water	Section 404
Non-wetland waters HB/NWWIB, 2019	34.14885	-81.24356	84.8 feet	Non-wetland water	Section 404
Non-wetland waters J, 2019	34.18025	-81.32825	313.27 feet	Non-wetland water	Section 404
Wetland 1, 2019	34.17346	-81.32427	0.16 acre	Wetland	Section 404
Wetland CA, 2019	34.219	-81.4102	0.39 acre	Wetland	Section 404
Wetland CB, 2019	34.2239	-81.4146	0.99 acre	Wetland	Section 404
Wetland CC, 2019	34.2068	-81.3771	0.16 acre	Wetland	Section 404
Wetland CD, 2019	34.3201	-81.1822	0.04 acre	Wetland	Section 404
Wetland CE, 2019	34.2239	-81.4146	0.02 acre	Wetland	Section 404
Wetland CF, 2019	34.1794	-81.3242	0.02 acre	Wetland	Section 404
Wetland CG, 2019	34.173	-81.3084	0.02 acre	Wetland	Section 404
Wetland E, 2019	34.14022	-81.2538	0.03 acre	Wetland	Section 404
Wetland F, 2019	34.1528	-81.2538	0.01 acre	Wetland	Section 404

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject
Wetland G, 2019	34.20788	-81.37793	0.02 acre	Wetland	Section 404
Wetland H, 2019	34.15798	-81.26768	0.11 acre	Wetland	Section 404
Wetland J, 2019	34.18069	-81.32775	0.1 acre	Wetland	Section 404
Wetland K, 2019	34.22437	-81.42435	0.06 acre	Wetland	Section 404
Wetland M, 2019	34.16775	-81.29117	0.32 acre	Wetland	Section 404

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit

(and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

☒ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
SCDOT Map: Figures 5.1 to 5.53 entitled "Aquatic Features I-26 Widening MM85-101 Newberry, Lexington, and Richland Counties, SC" dated 9/20/2019
☒ Data sheets prepared/submitted by or on behalf of the PJD requestor.
☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report. Rationale:

☐Data sheets prepared by the Corps:

☒ Corps navigable waters' study: Charleston District
Navigability Study 1977
☒ U.S. Geological Survey Hydrologic Atlas: HA 730-G 1990

☒ USGS NHD data. USGS 8 and 12 digit HUC maps. 0305010607 Crane Creek-Broad River

☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24,000, Irmo, Richtex & Chapin, SC quadrangles

☒ Natural Resources Conservation Service Soil Survey. Citation: USDA NRCS Esri data: Cataula, Chewacla, Georgeville, Herndon, Pacolet, Toccoa, Water & Winsboro series

☒ National wetlands inventory map(s). Cite name: USFWS NWI
data: R4SBC, PAB4Kx, PUBHh, PFO1C, PFO1Ah, PEM1Ch, R2UBH, PEM1A, PFO1A

☐ State/local wetland inventory map(s):
☐ FEMA/FIRM maps:

☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date): Google Earth Imagery 5/2/2018
☒ Other (Name & Date):Photos provided in PJD request

☐ Previous determination(s). File no. and date of response letter:
☒ Other information (please specify): September 17, 2019

SAC-2018-00748 SCDOT Interstate 26 (I-26) roadway widening from MM 85-101, Newberry, Lexington, Richland

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

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Signature and date of
Regulatory staff member
completing PJD

Signature and date of
person requesting PJD

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: SCDOT	File Number: SAC-2018-00748	Date: 18 Feb 2020
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
X	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the Division Engineer, South Atlantic Division, 60 Forsyth St, SW, Atlanta, GA 30308-8801. This form must be received by the Division Engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD **is not appealable**. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact the Corps biologist who signed the letter to which this notification is attached. The name and telephone number of this person is given at the end of the letter.	If you only have questions regarding the appeal process you may also contact: Jason W. Steele Administrative Appeals Review Officer USACE South Atlantic Division 60 Forsyth St, SW Atlanta, GA 30308-8801 (404) 562-5137

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

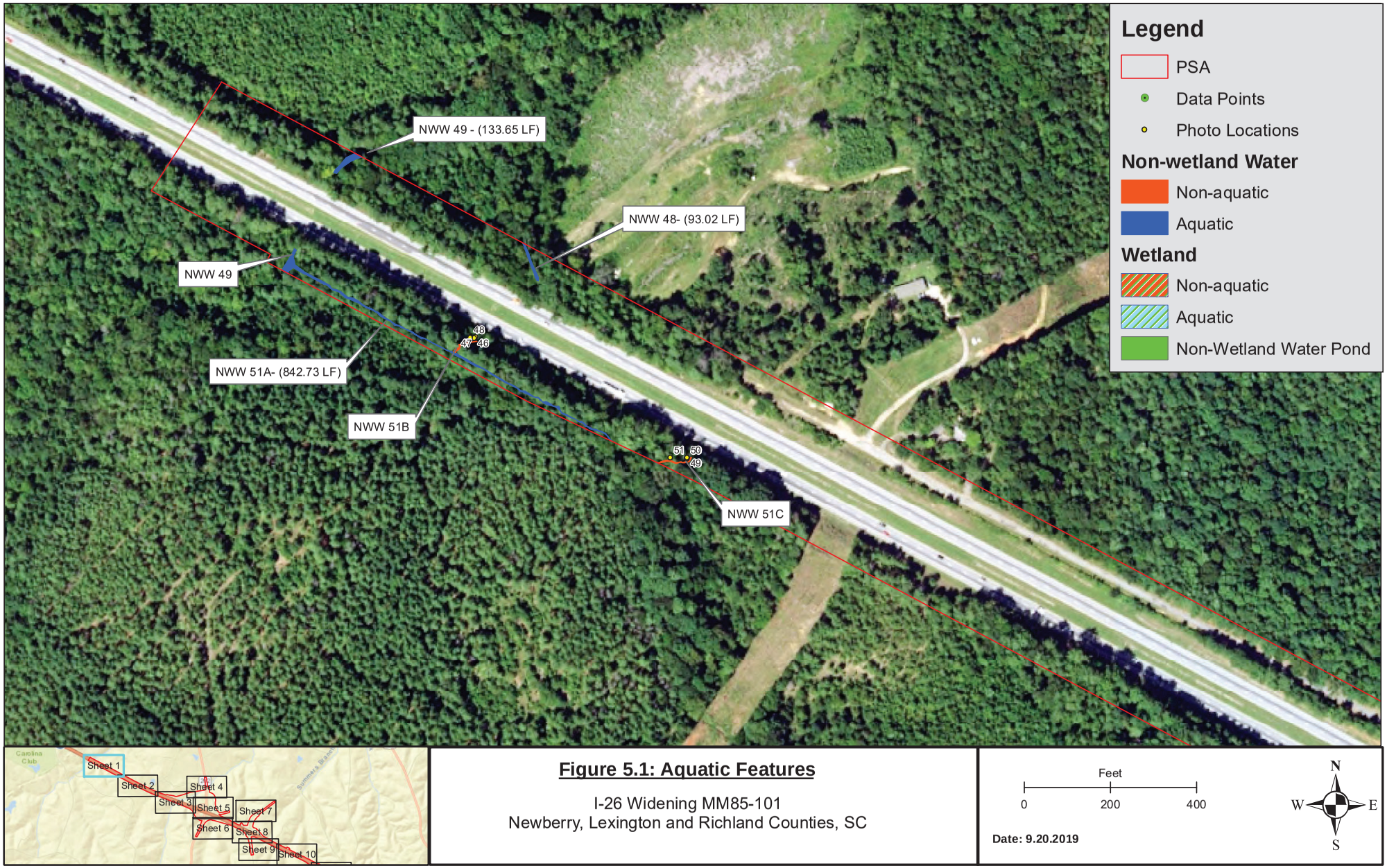

Figure 5.1: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.20.2019

Figure 5.2: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
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Date: 9.20.2019

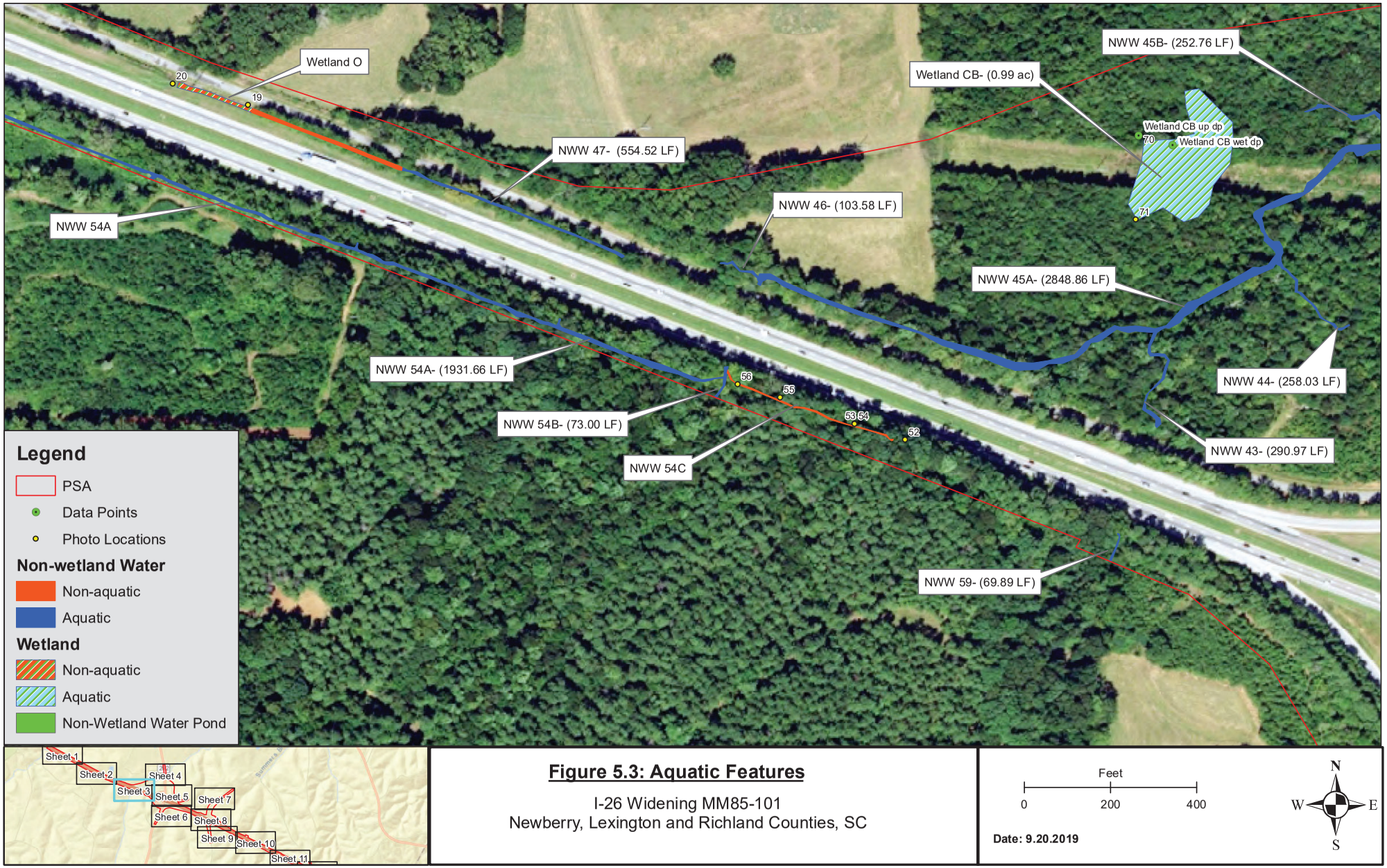

Figure 5.3: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.20.2019

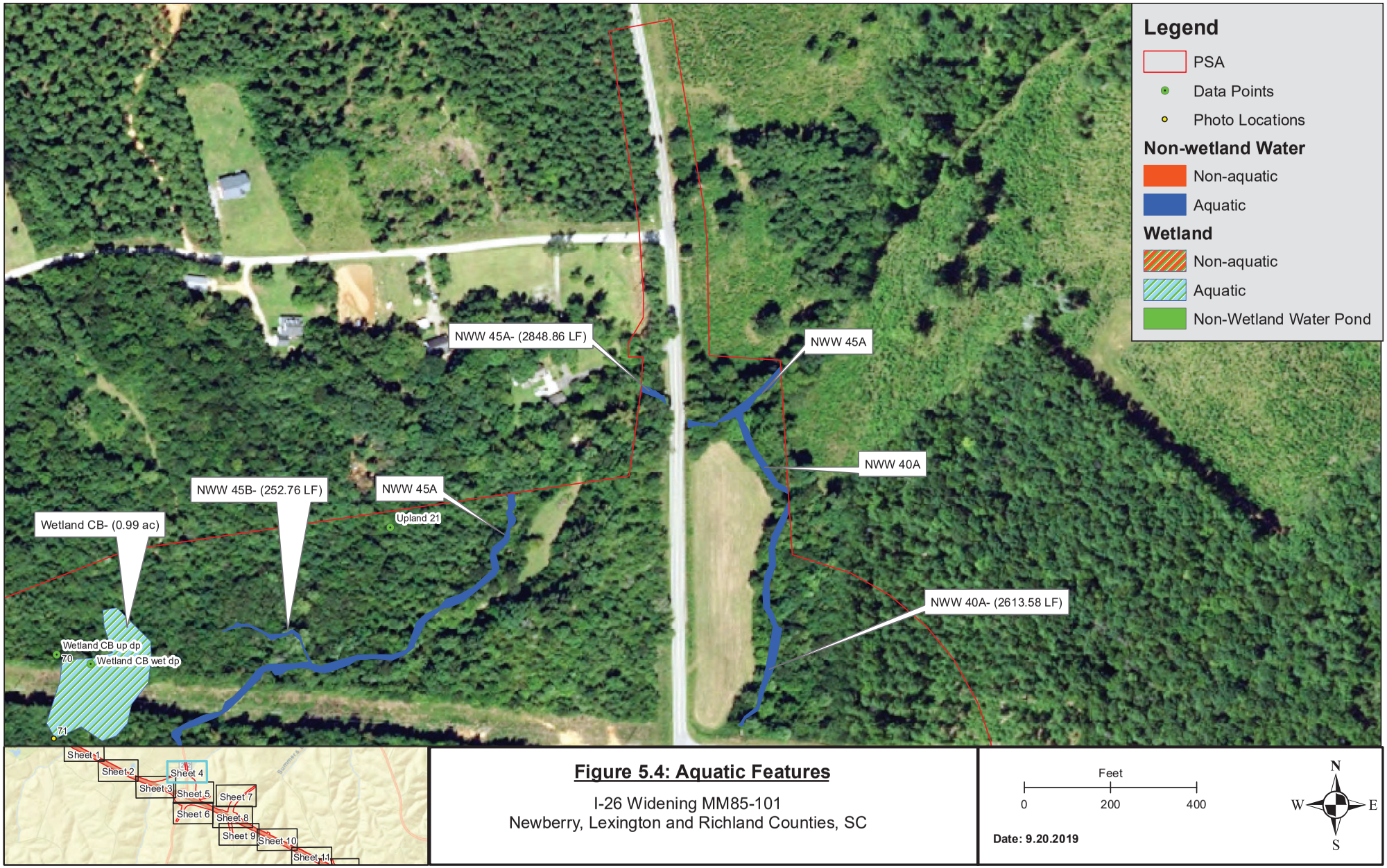

Figure 5.4: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.20.2019

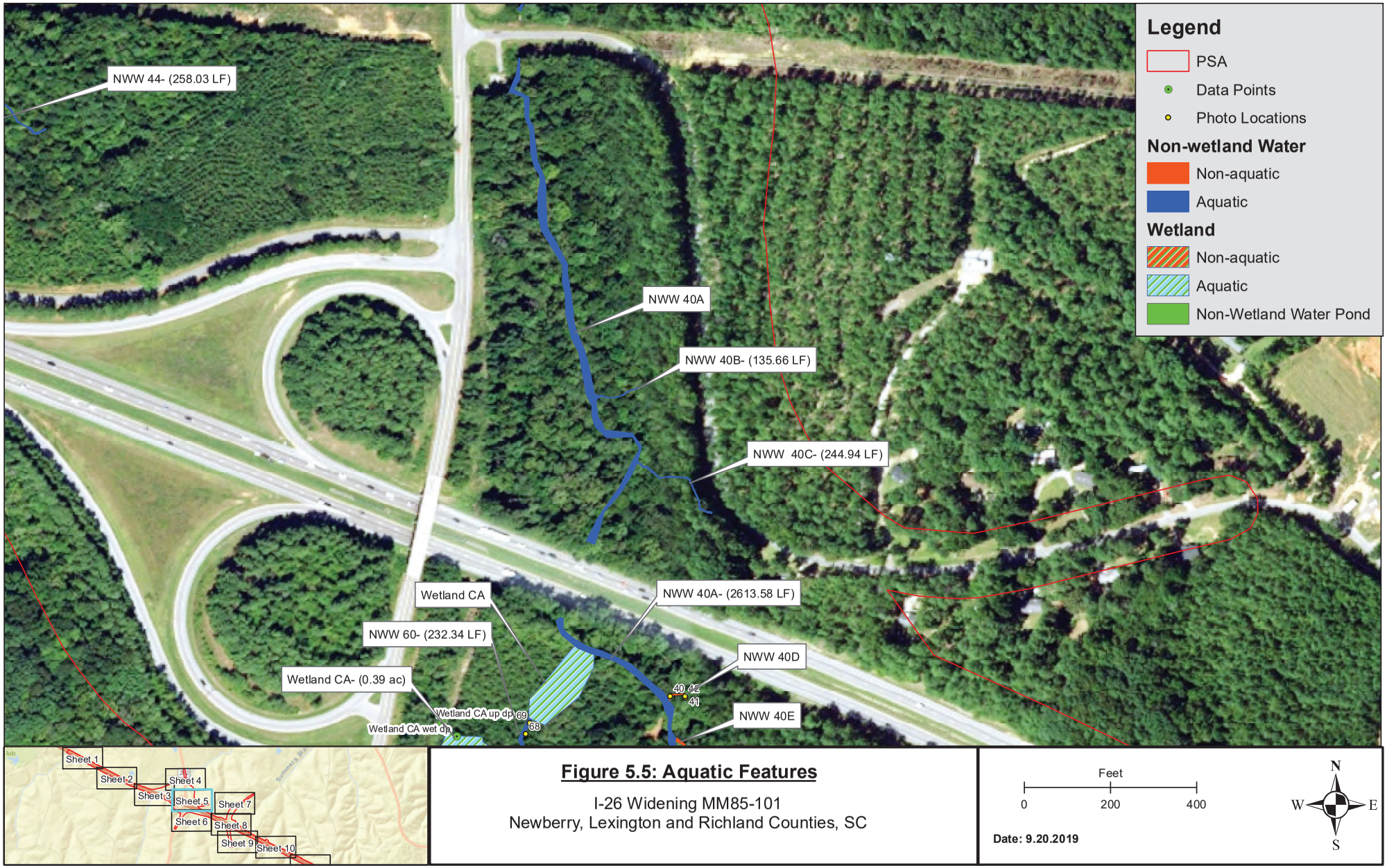

Figure 5.5: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.20.2019

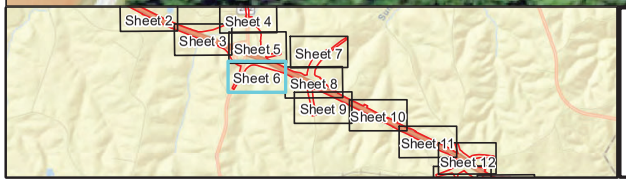

Figure 5.6: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
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Date: 9.20.2019

Figure 5.7: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Figure 5.8: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.20.2019

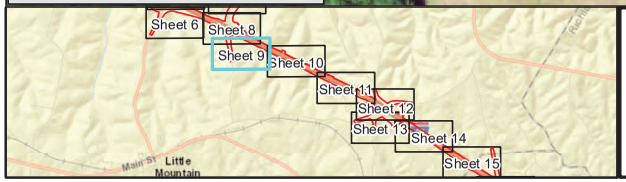

Figure 5.9: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.20.2019

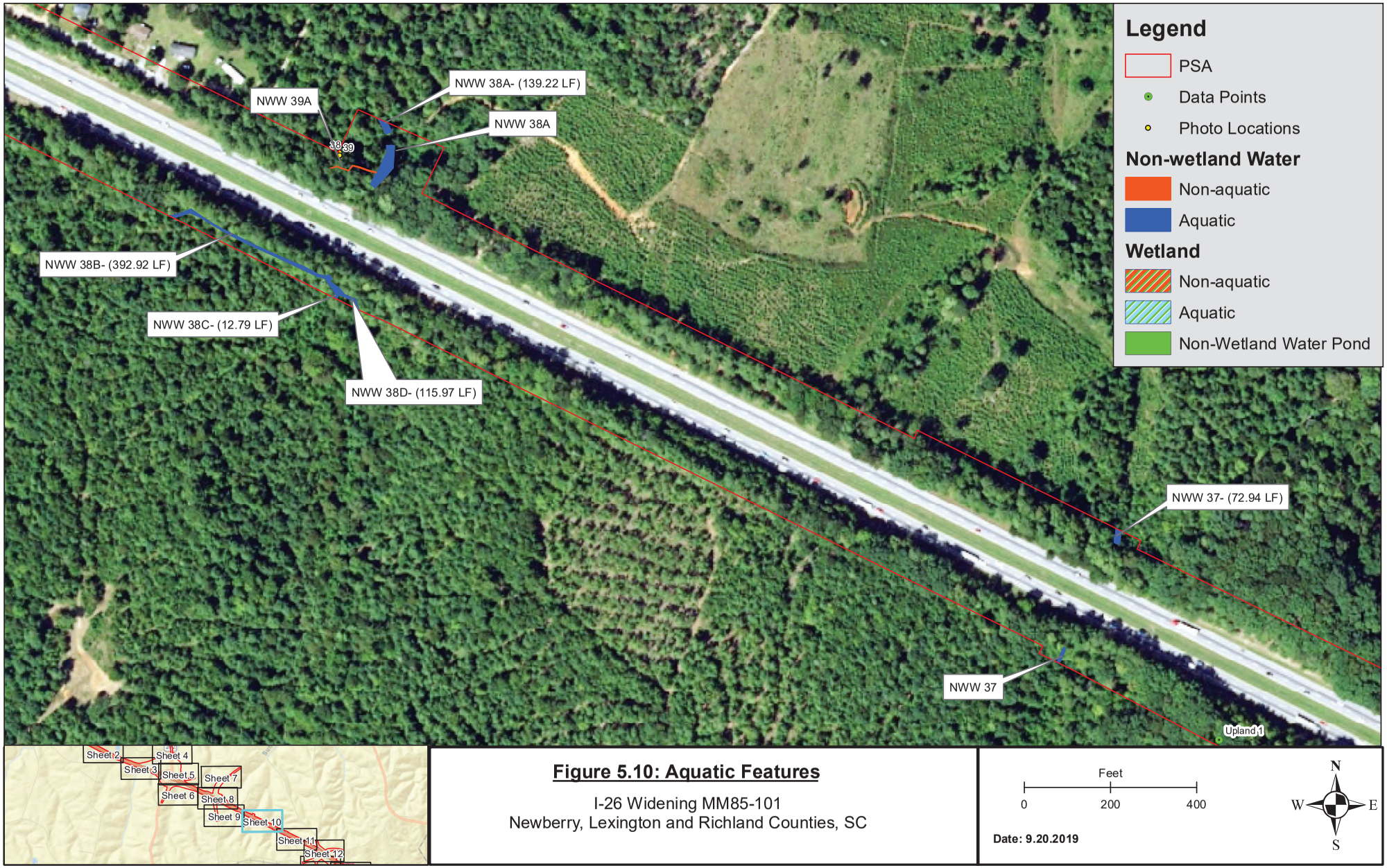

Figure 5.10: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.20.2019

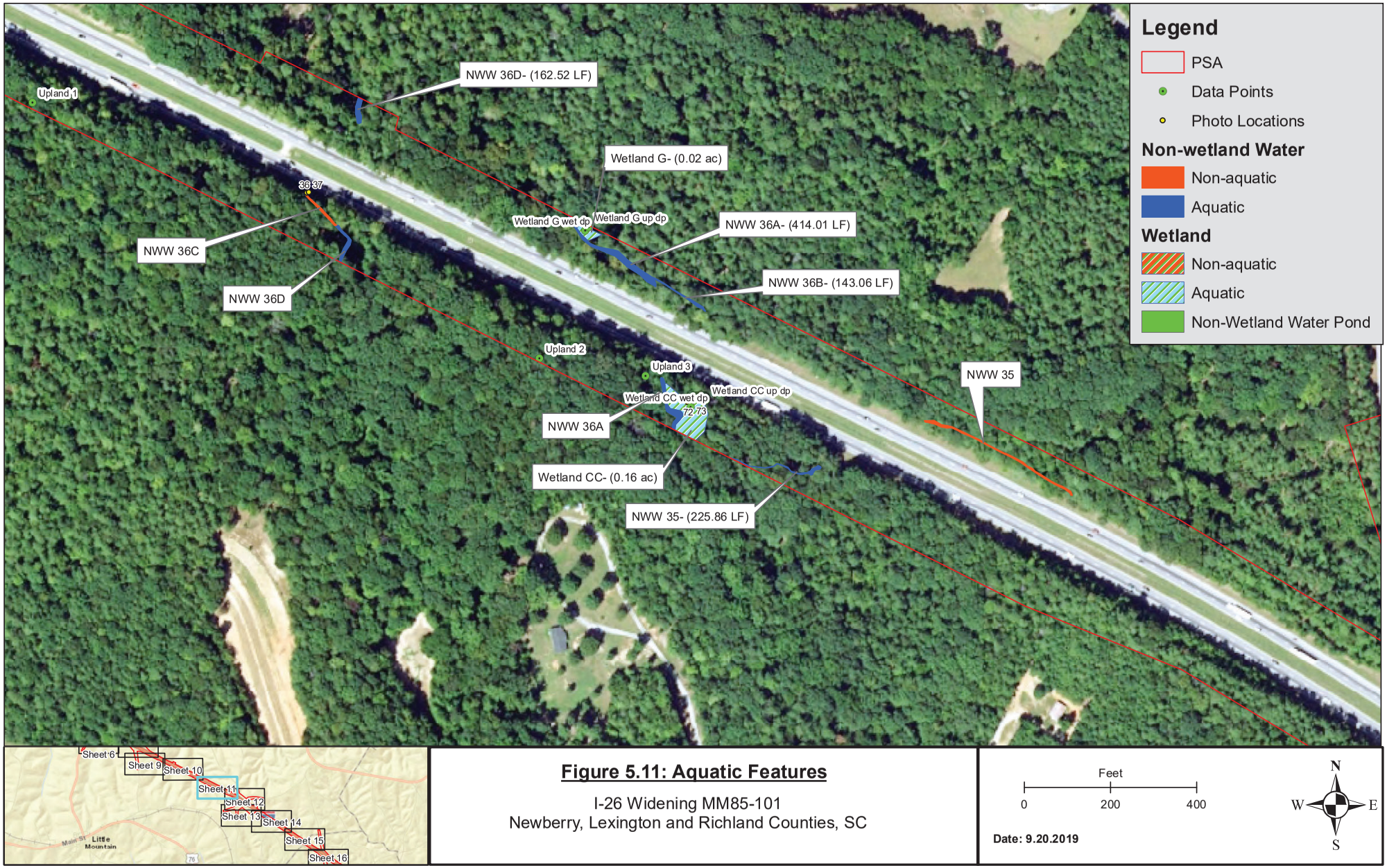

Figure 5.11: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Figure 5.12: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
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Date: 9.20.2019

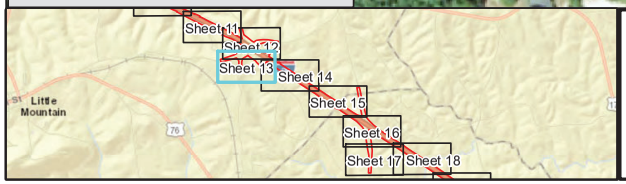

Figure 5.13: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.20.2019

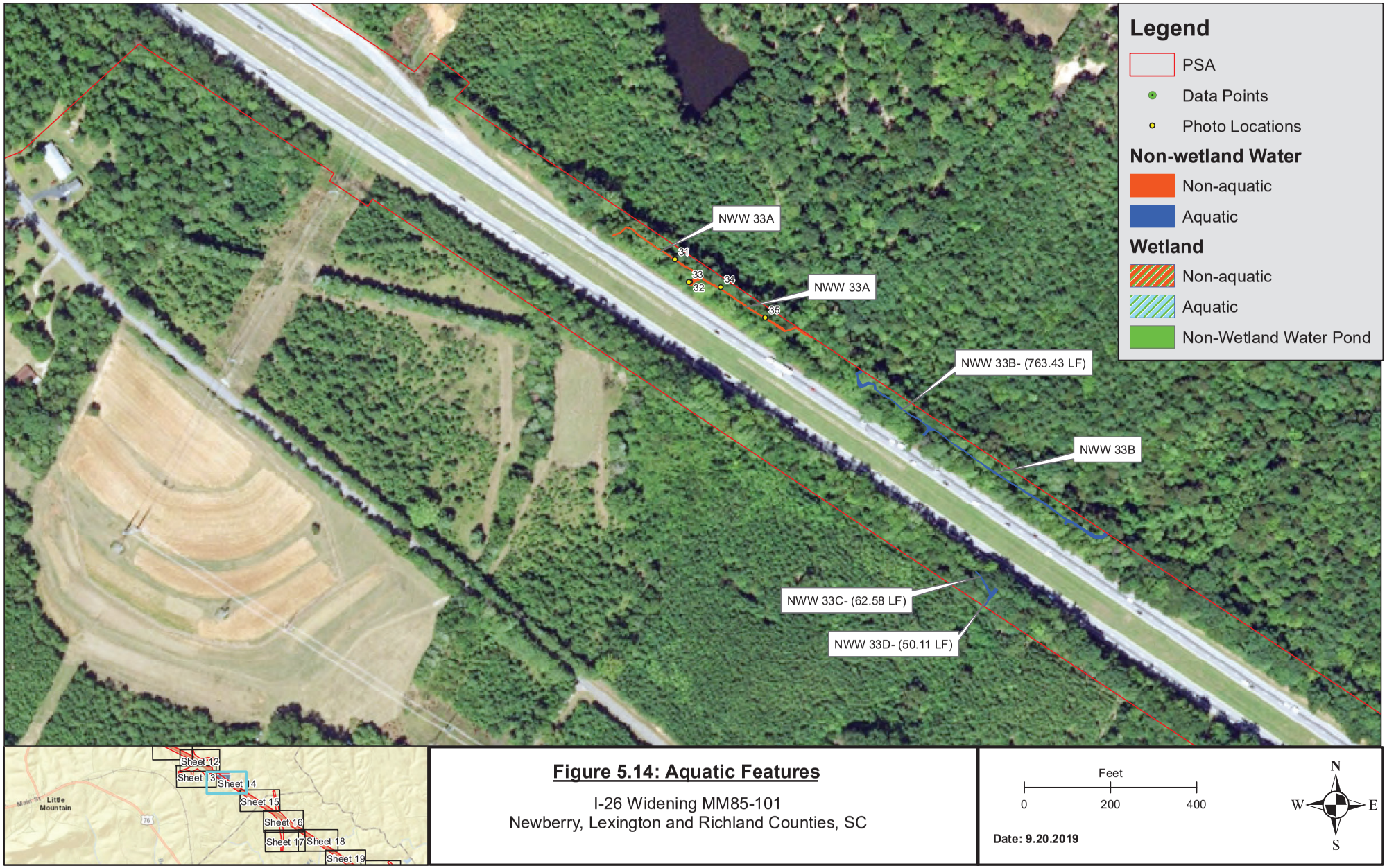

Figure 5.14: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

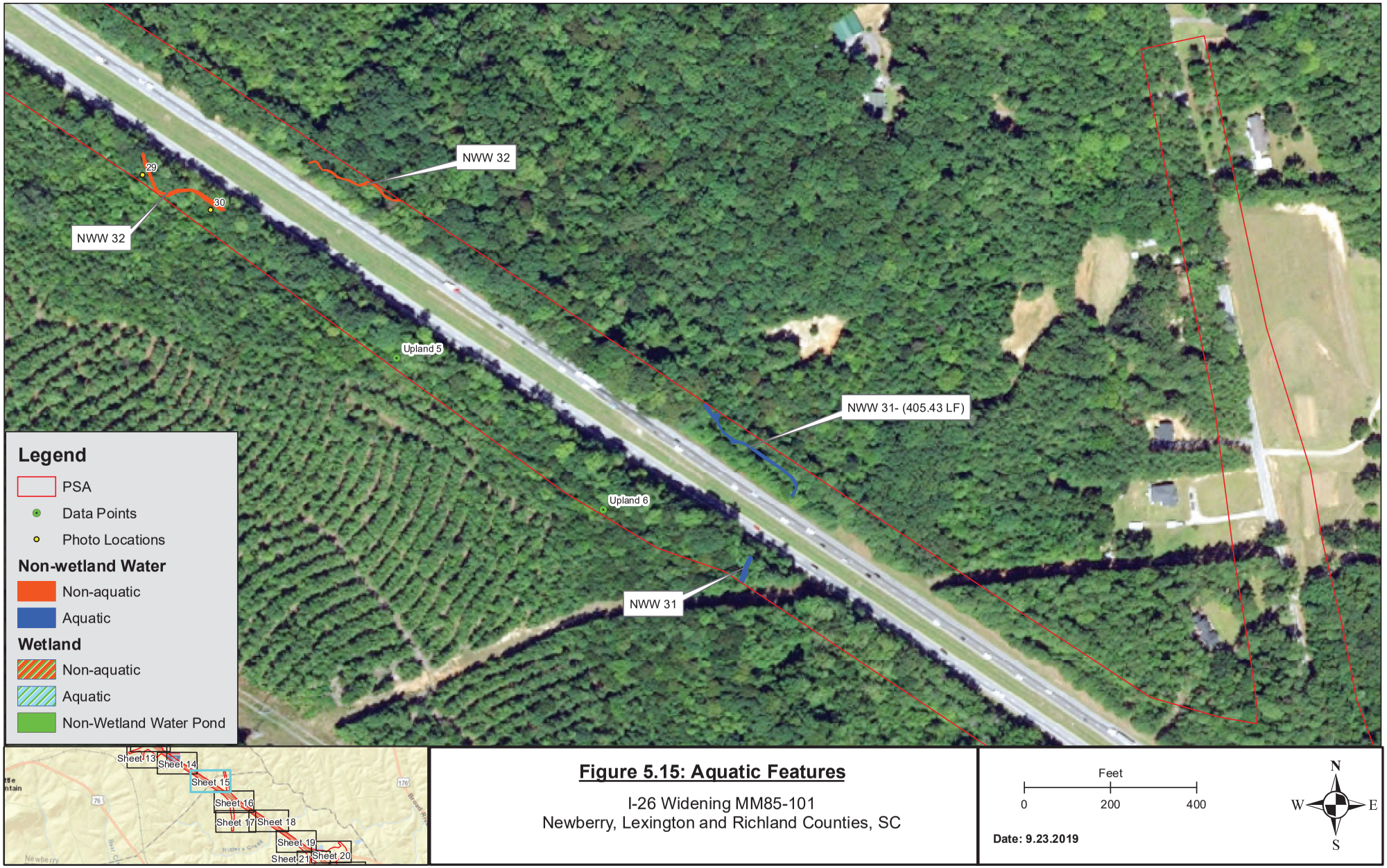

Figure 5.15: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

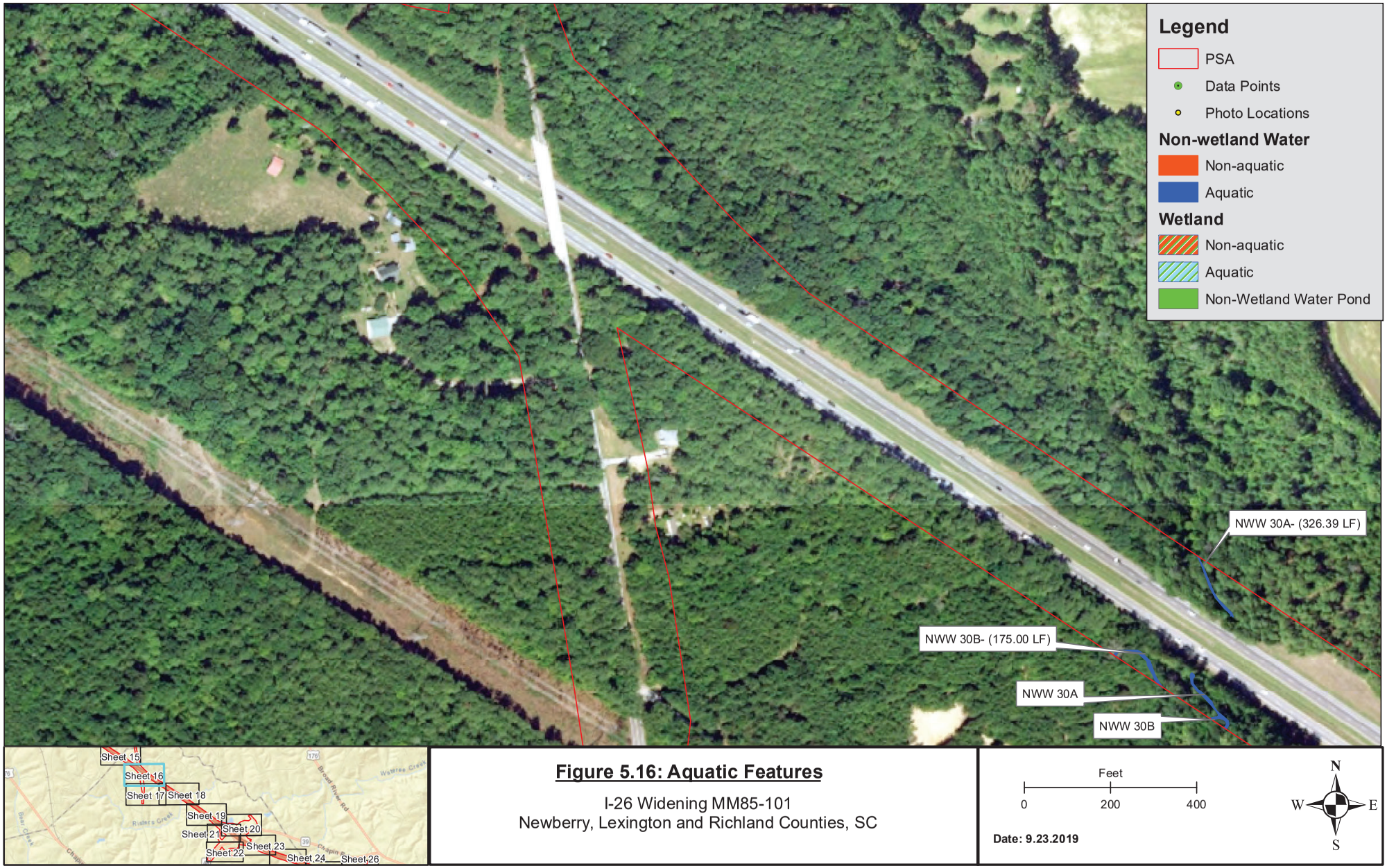

Figure 5.16: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

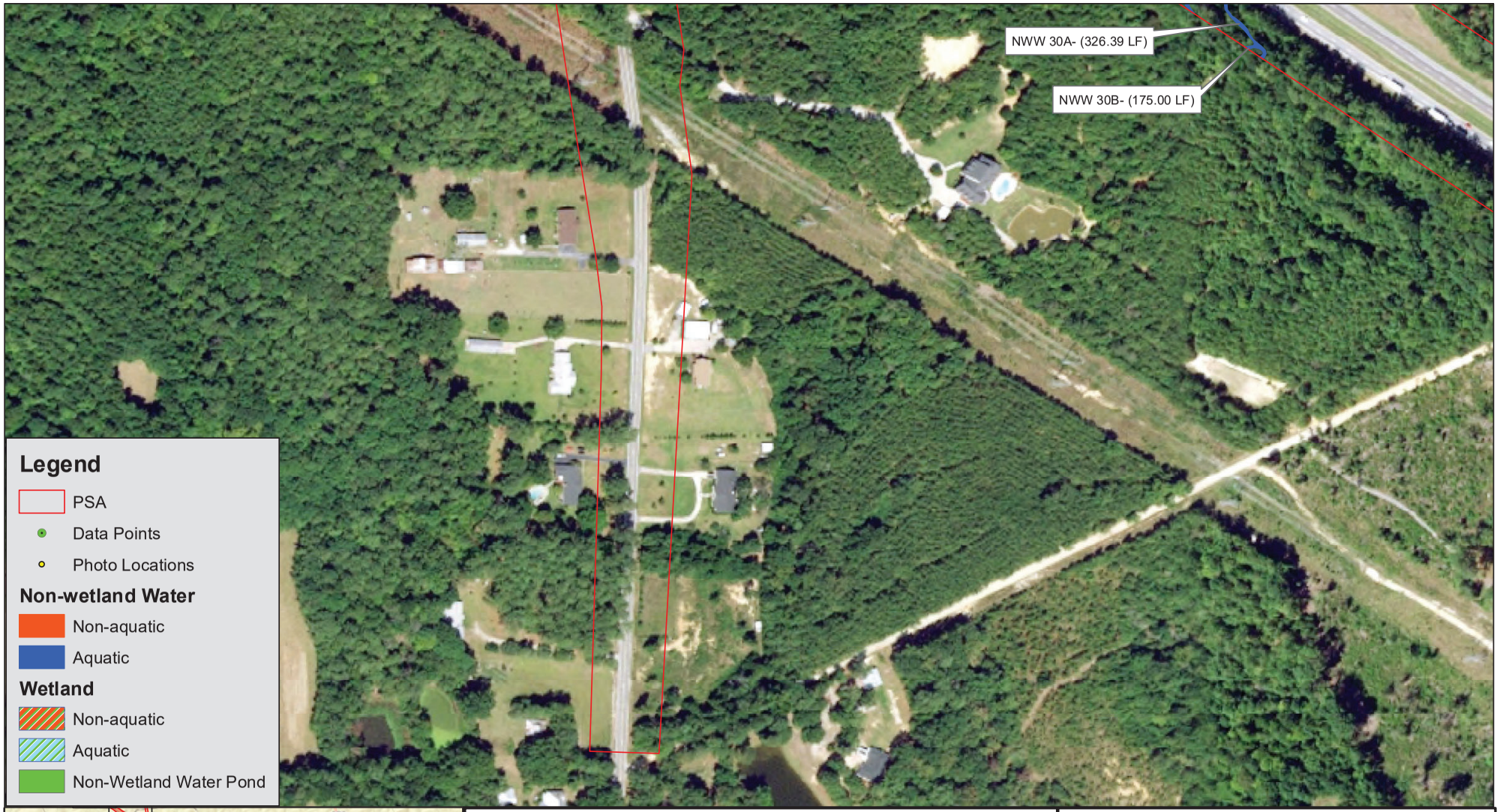

Figure 5.17: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

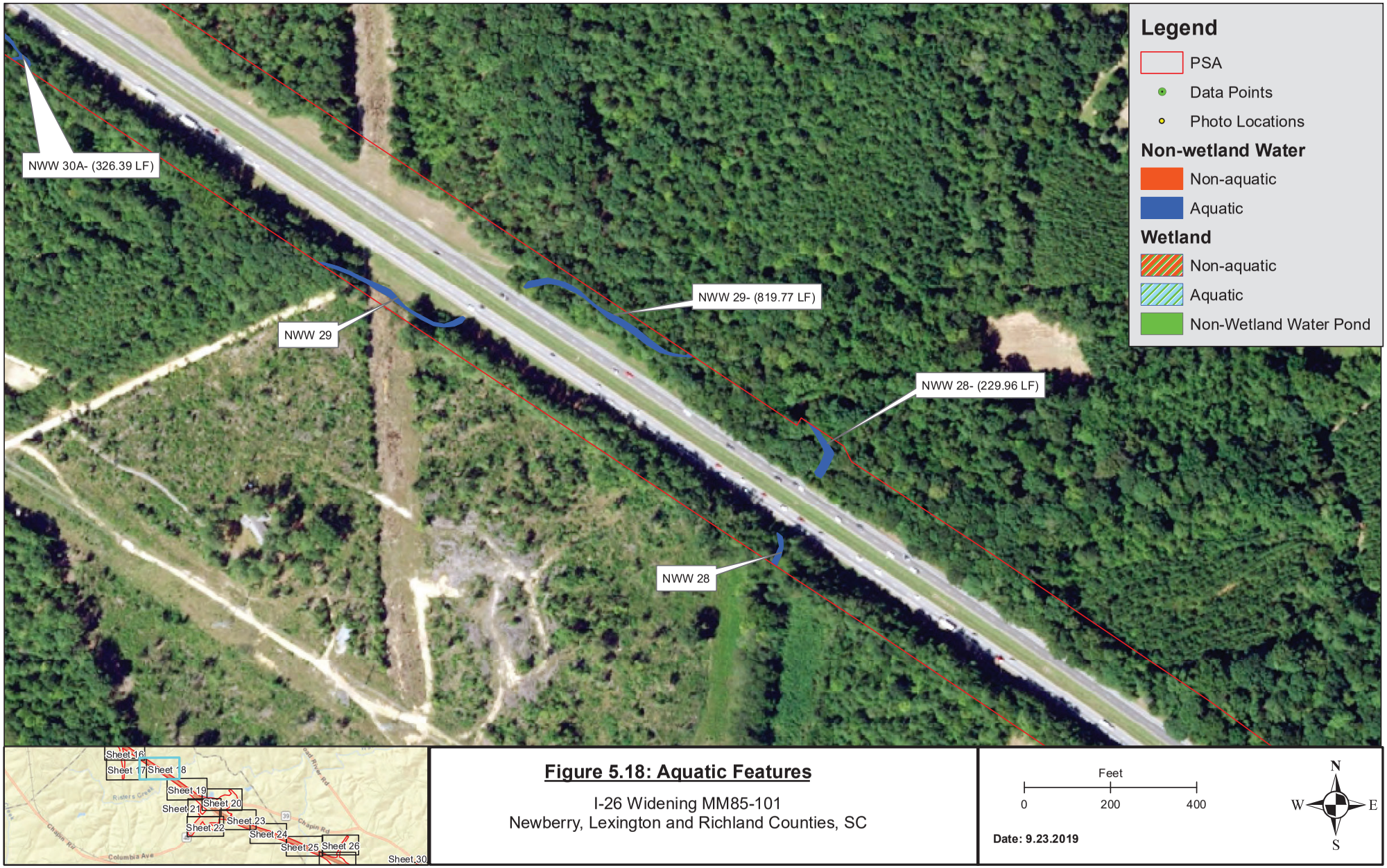

Figure 5.18: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.19: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.20: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.23.2019

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Figure 5.21: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.23.2019

Figure 5.22: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

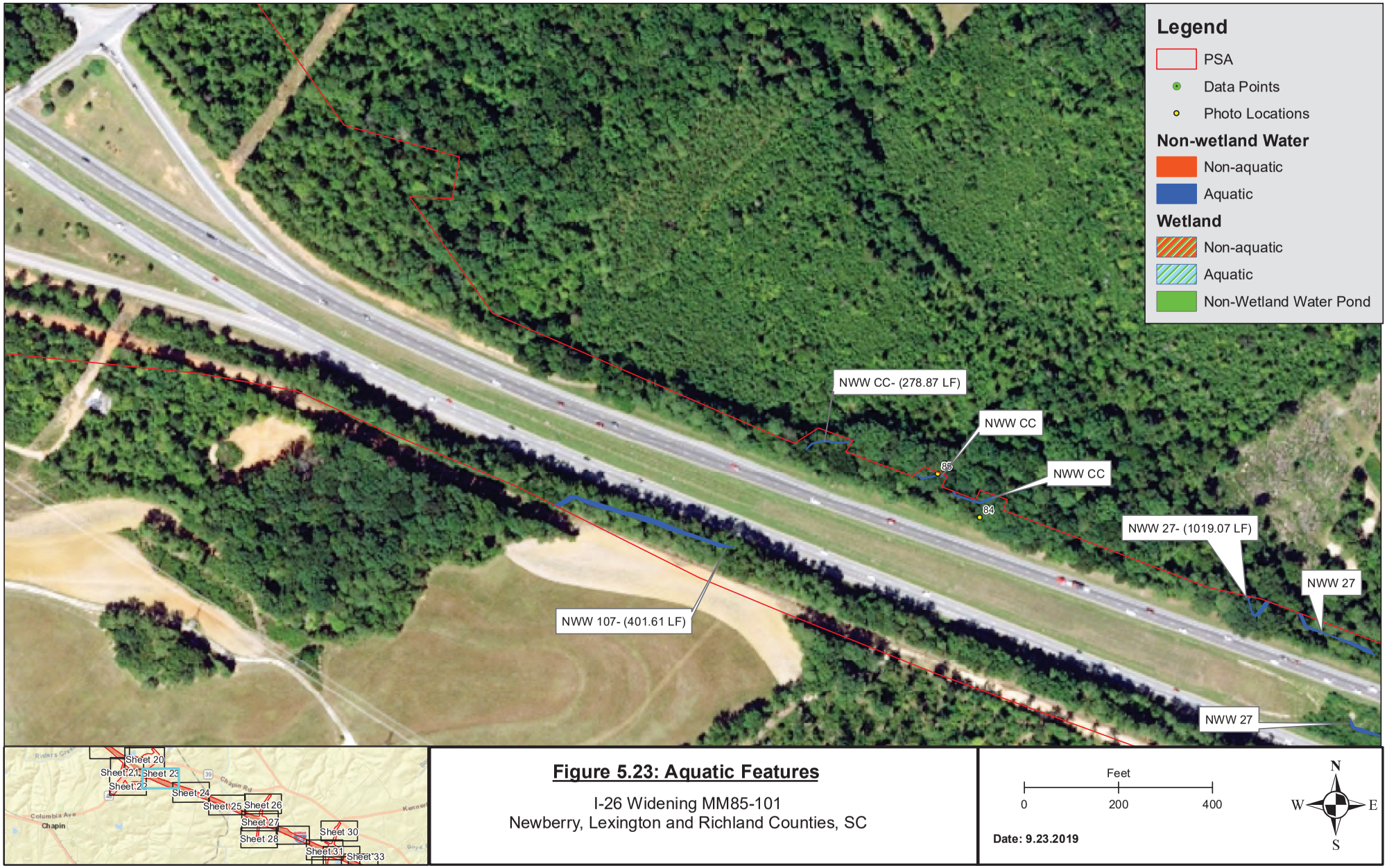

Figure 5.23: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.24: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

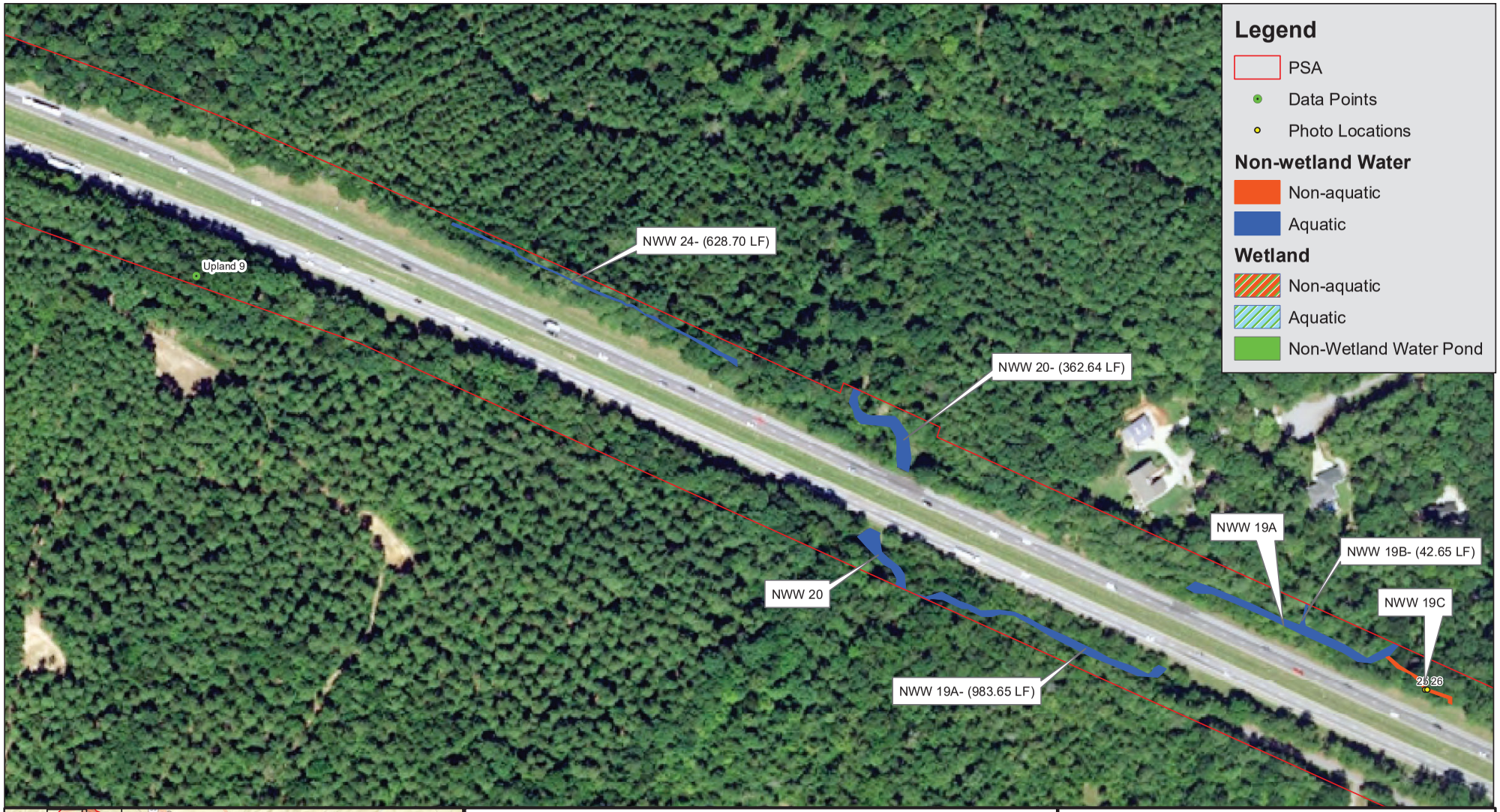

Figure 5.25: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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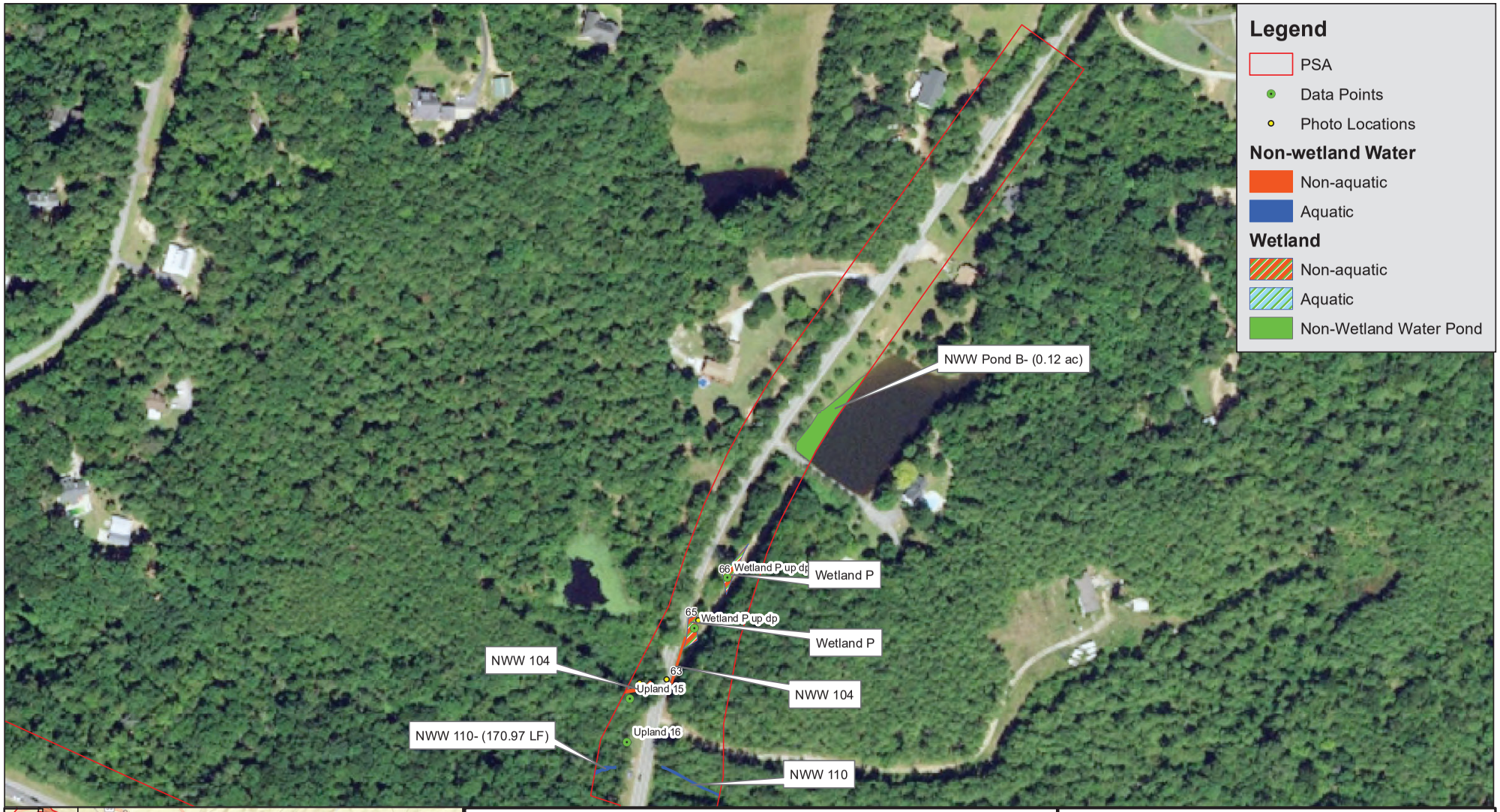
Date: 9.23.2019



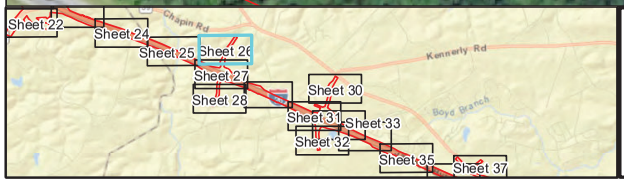


Figure 5.26: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
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Date: 9.23.2019

Figure 5.27: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

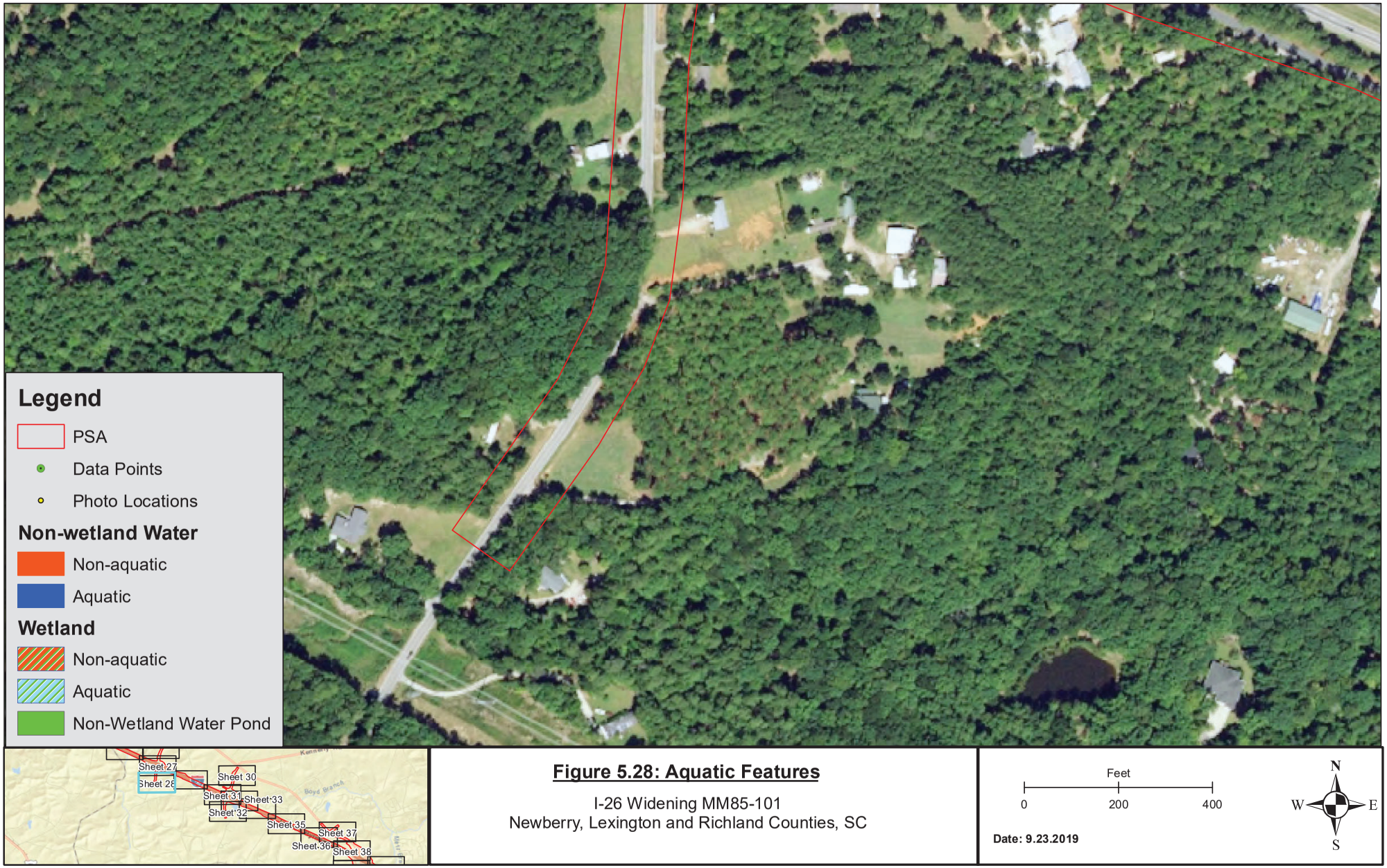

Figure 5.28: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

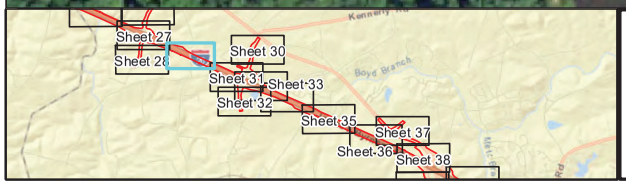

Figure 5.29: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.23.2019

Figure 5.30: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.31: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

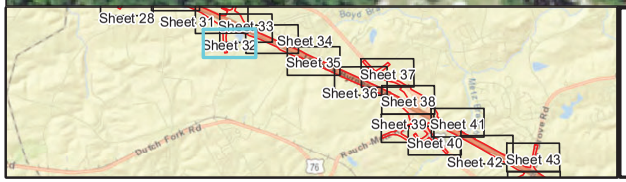

Figure 5.32: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
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Date: 9.23.2019

Figure 5.33: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

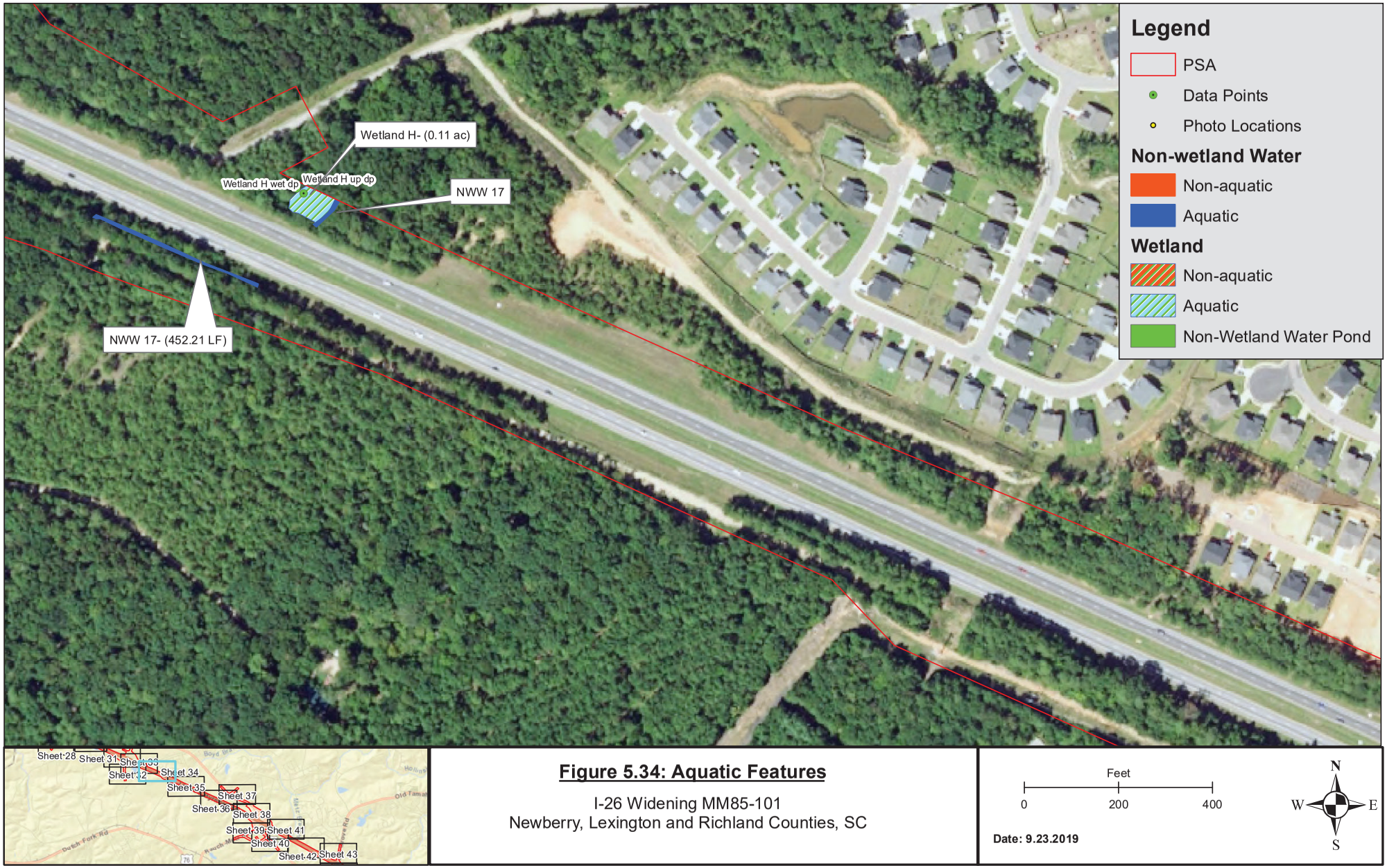

Figure 5.34: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.35: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.36: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

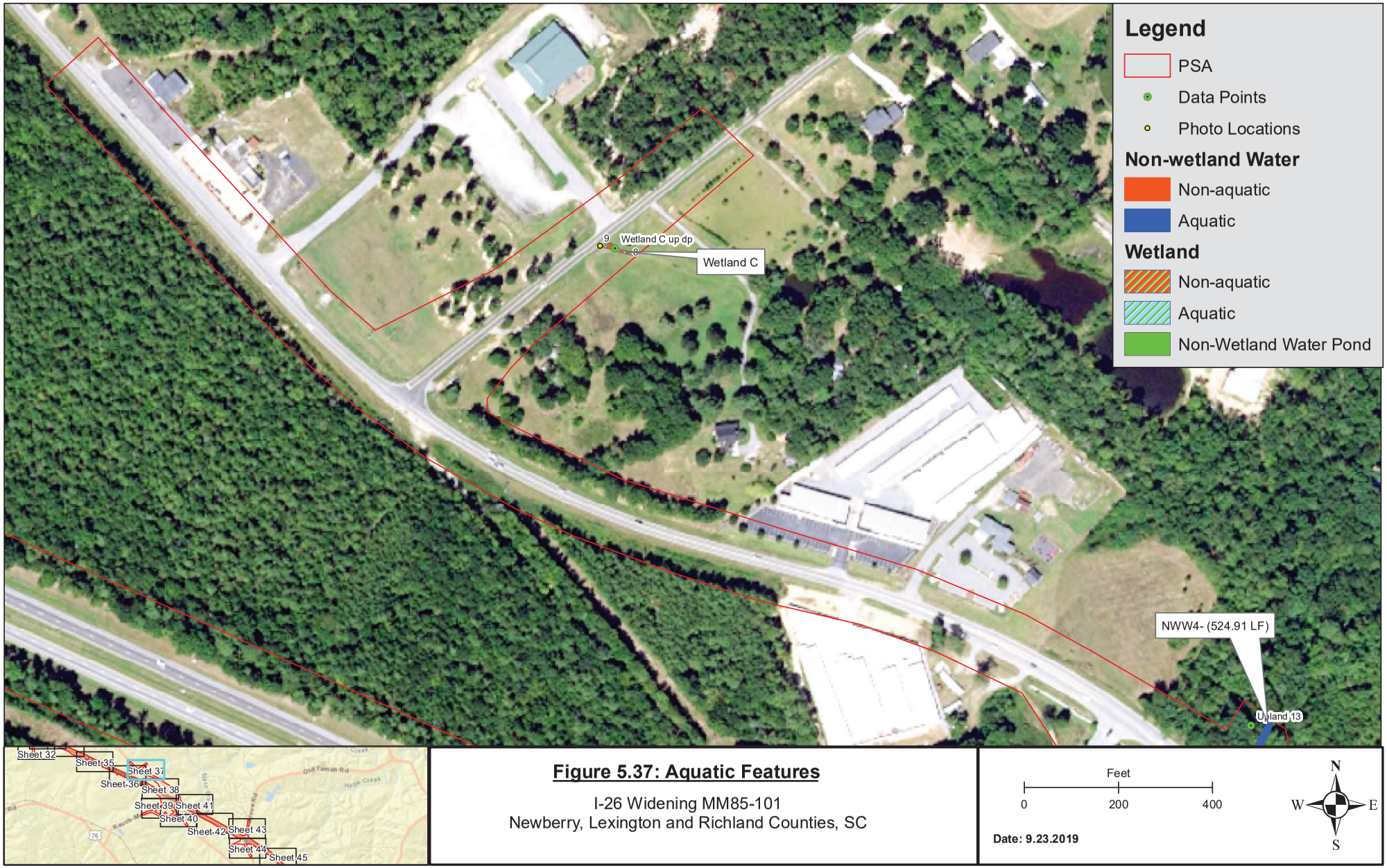

Figure 5.37: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

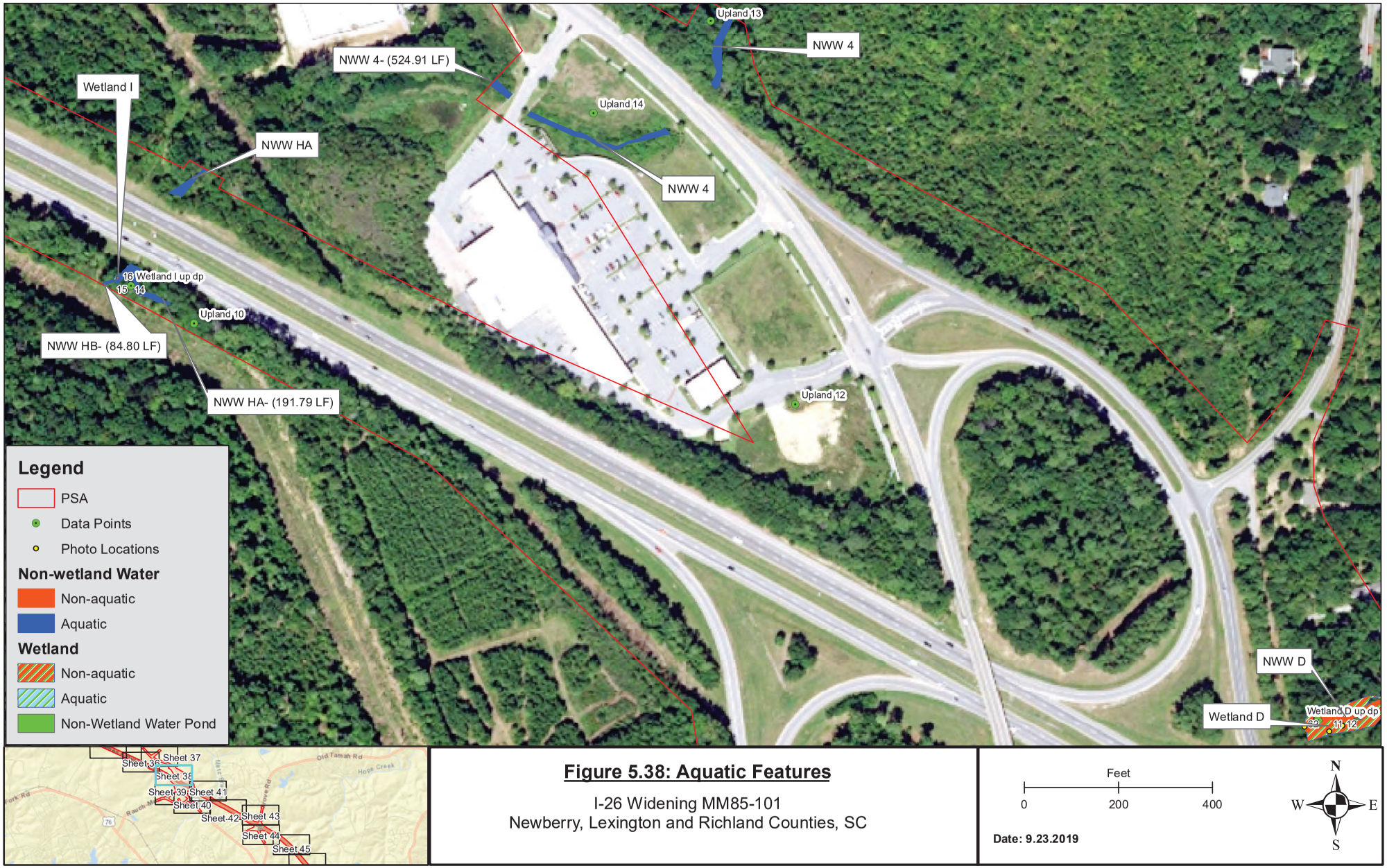

Figure 5.38: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.39: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

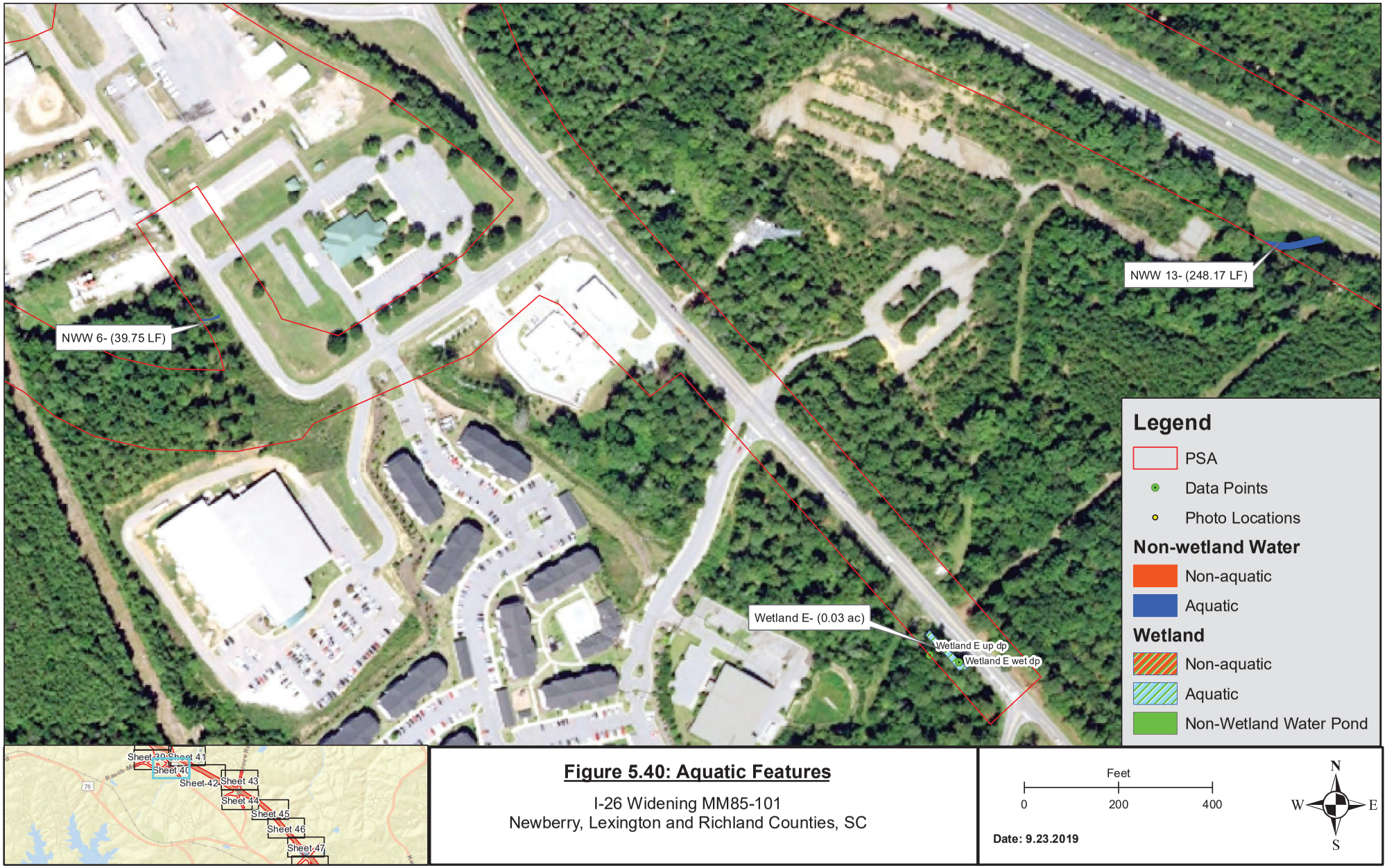

Figure 5.40: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

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Date: 9.23.2019

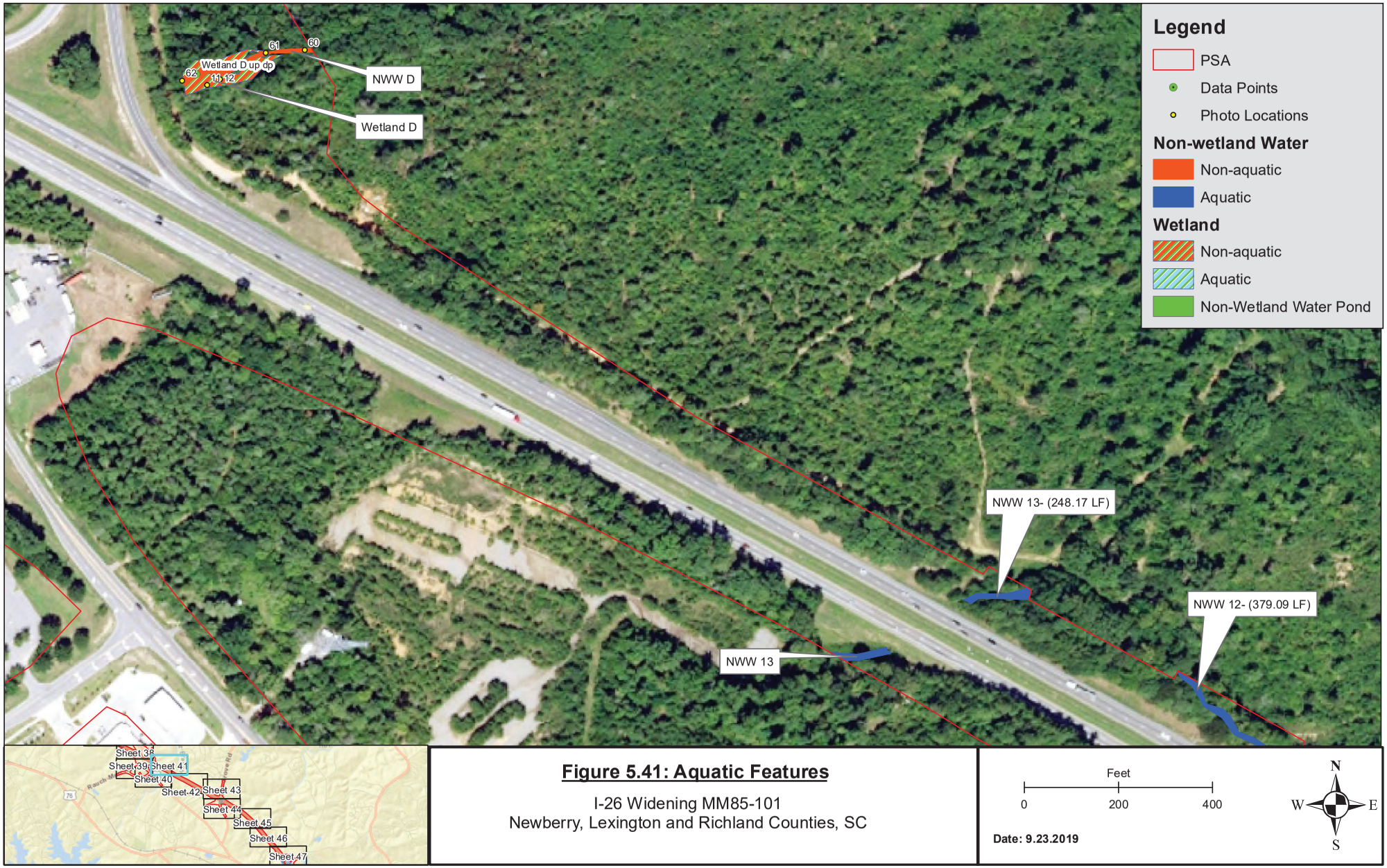


Figure 5.41: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Figure 5.42: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

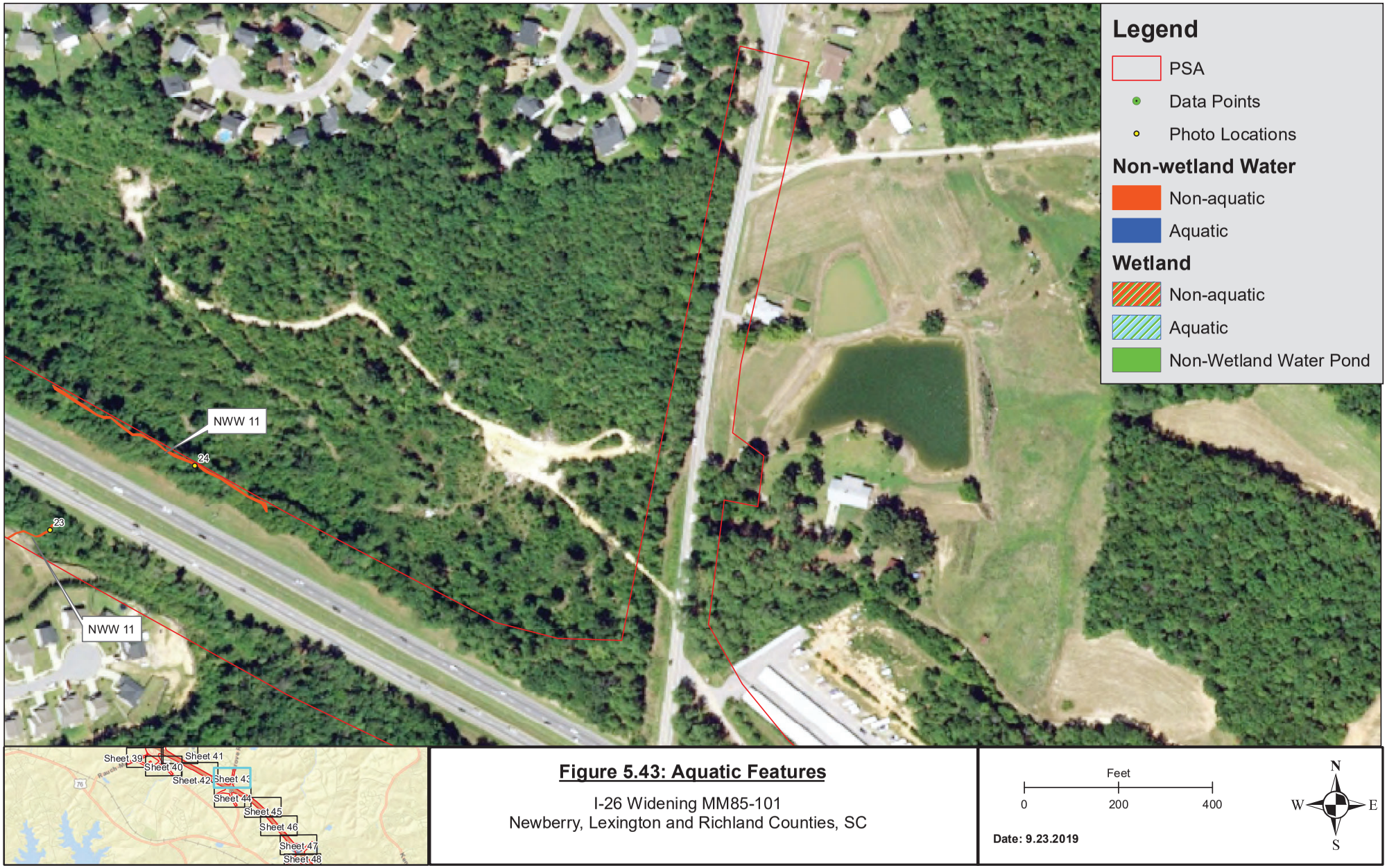


Figure 5.43: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

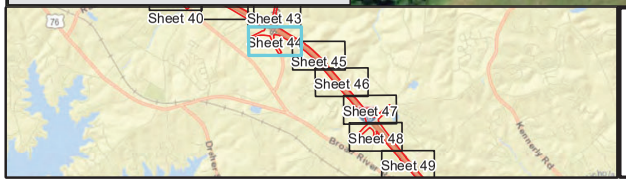


Figure 5.44: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
0 200 400

N
W E
S

Date: 9.23.2019

Figure 5.45: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.46: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

Figure 5.47: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019

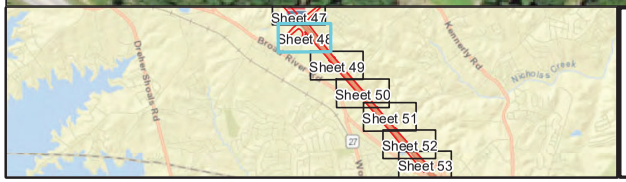


Figure 5.48: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
0 200 400

N
W E
S

Date: 9.23.2019

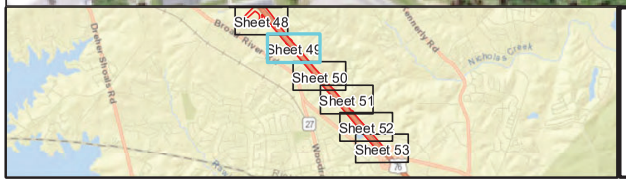


Figure 5.49: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
0 200 400

N
W E
S

Date: 9.23.2019

Figure 5.50: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Figure 5.51: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Date: 9.23.2019


Legend
PSA
Data Points
Photo Locations
Non-wetland Water
Non-aquatic
Aquatic
Wetland
Non-aquatic
Aquatic
Non-Wetland Water Pond
NWW Pond A (0.11 ac)
NWW 108- (117.03 LF)
NWW 108
Sheet 50
Sheet 51
Sheet 52
Sheet 53
Figure 5.52: Aquatic Features
I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC
Feet
0
200
400
Date: 9.23.2019
N
W
E
S

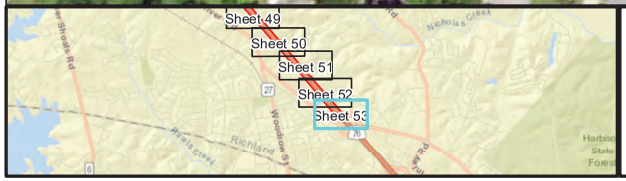


Figure 5.53: Aquatic Features

I-26 Widening MM85-101
Newberry, Lexington and Richland Counties, SC

Feet
0 200 400

N
W E
S

Date: 9.23.2019

Attachment D: Species List

LEXINGTON COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibians	None Found			
Birds	American wood stork (T)	*Mycteria americana*	February 15-September 1	Nesting season
	Bald eagle (BGEPA)	*Haliaeetus leucocephalus*	October 1-May 15	Nesting season
	Red-cockaded woodpecker (E)	*Picoides borealis*	March 1-July 31	Nesting season
Crustaceans	None Found			
Fishes	Robust redhorse (ARS)	*Moxostoma robustum*	Late April-early May	Temperature dependent: 16-24°C
Insects	Monarch butterfly (ARS)	*Danaus plexippus*	August-December	Overwinter population departs: March-April
Mammals	Tri-colored bat (ARS)	*Perimyotis subflavus*	Year round	Found in mines and caves in the winter
Mollusks	None Found			
Plants	Carolina-birds-in-a-nest (ARS)	*Macbridea caroliniana*	July-November	
	Ciliate-leaf tickseed (ARS)	*Coreopsis integrifolia*	August-November	
	Wire-leaved dropseed (ARS)	*Sporobolus teretifolius*	August-September	Following fire
Reptiles	Florida pine snake (ARS)	*Pituophis melanoleucus mugitus*	Most of year	
	Southern hognose snake (ARS)	*Heterodon simus*	Most of the year	
	Spotted turtle (ARS)	*Clemmys guttata*	February-mid April	

*	Contact National Marine Fisheries Service (NMFS) for more information on this species.
**	The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species.
ARS	Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.
ARS*	Species that are either former Candidate Species or are emerging conservation priority species.
BGEPA	Federally protected under the Bald and Golden Eagle Protection Act
C	FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species.
CH	Critical Habitat
E	Federally Endangered
P or P – CH	Proposed for listing or critical habitat in the Federal Register
S/A	Federally protected due to similarity of appearance to a listed species
T	Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit https://www.dnr.sc.gov/species/index.html.

NEWBERRY COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibians	None Found			
Birds	Bald eagle (BGEPA)	*Haliaeetus leucocephalus*	October 1-May 15	Nesting season
Crustaceans	Mimic crayfish (ARS)	*Distocambarus carlsoni*	November-April	
	Newberry burrowing crayfish (Saluda) (ARS)	*Distocambarus youngineri*	January-April	
Fishes	Robust redhorse (ARS)	*Moxostoma robustum*	Late April-early May	Temperature dependent: 16-24°C
Insects	Monarch butterfly (ARS)	*Danaus plexippus*	August-December	Overwinter population departs: March-April
Mammals	Tri-colored bat (ARS)	*Perimyotis subflavus*	Year round	Found in mines and caves in the winter
Mollusks	None Found			
Plants	None Found			
Reptiles	None Found			

*	Contact National Marine Fisheries Service (NMFS) for more information on this species.
**	The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species.
ARS	Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.
ARS*	Species that are either former Candidate Species or are emerging conservation priority species.
BGEPA	Federally protected under the Bald and Golden Eagle Protection Act
C	FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species.
CH	Critical Habitat
E	Federally Endangered
P or P – CH	Proposed for listing or critical habitat in the Federal Register
S/A	Federally protected due to similarity of appearance to a listed species
T	Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit https://www.dnr.sc.gov/species/index.html.

RICHLAND COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibians	Chamberlain's dwarf salamander (ARS)	*Eurycea chamberlaini*	Spring/Fall surveys	Breeding survey: November to February
Birds	American wood stork (T)	*Mycteria americana*	February 15-September 1	Nesting season
	Bald eagle (BGEPA)	*Haliaeetus leucocephalus*	October 1-May 15	Nesting season
	Red-cockaded woodpecker (E)	*Picoides borealis*	March 1-July 31	Nesting season
Crustaceans	Broad River spiny crayfish (ARS)	*Cambarus spicatus*	November-April	
Fishes	Robust redhorse (ARS)	*Moxostoma robustum*	Late April-early May	Temperature dependent: 16-24°C
	Shortnose sturgeon* (E)	*Acipenser brevirostrum**	February 1-April 30	Spawning migration
Insects	Monarch butterfly (ARS)	*Danaus plexippus*	August-December	Overwinter population departs: March-April
Mammals	Little brown bat (ARS)	*Myotis lucifugus*	Year round	Found in trees, rock crevices, and under bridges
	Tri-colored bat (ARS)	*Perimyotis subflavus*	Year round	Found in mines and caves in the winter
Mollusks	None Found			
Plants	Bog spicebush (ARS)	*Lindera subcoriacea*	March-August	
	Canby's dropwort (E)	*Oxpolis canbyi*	Mid-July-September	
	Carolina-birds-in-a-nest (ARS)	*Macbridea caroliniana*	July-November	
	Ciliate-leaf tickseed (ARS)	*Coreopsis integrifolia*	August-November	
	Georgia aster (ARS*)	*Symphyotrichum georgianum*	Early October-mid November	
	Purple balduina (ARS)	*Balduina atropurpurea*	August-November	
	Rough-leaved loosestrife (E)	*Lysimachia asperulaefolia*	Mid May-September	
	Smooth coneflower (E)	*Echinacea laevigata*	Late May-October	
Reptiles	Southern hognose snake (ARS)	*Heterodon simus*	Most of the year	

*	Contact National Marine Fisheries Service (NMFS) for more information on this species.
**	The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species.
ARS	Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.
ARS*	Species that are either former Candidate Species or are emerging conservation priority species.
BGEPA	Federally protected under the Bald and Golden Eagle Protection Act
C	FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species.
CH	Critical Habitat
E	Federally Endangered
P or P – CH	Proposed for listing or critical habitat in the Federal Register
S/A	Federally protected due to similarity of appearance to a listed species
T	Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit https://www.dnr.sc.gov/species/index.html.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
Phone: (843) 727-4707 Fax: (843) 727-4218
http://www.fws.gov/charleston/

In Reply Refer To: March 10, 2020
Consultation Code: 04ES1000-2020-SLI-0597
Event Code: 04ES1000-2020-E-01223
Project Name: I-26 Widening MM 85-101

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707

Project Summary

Consultation Code: 04ES1000-2020-SLI-0597

Event Code: 04ES1000-2020-E-01223

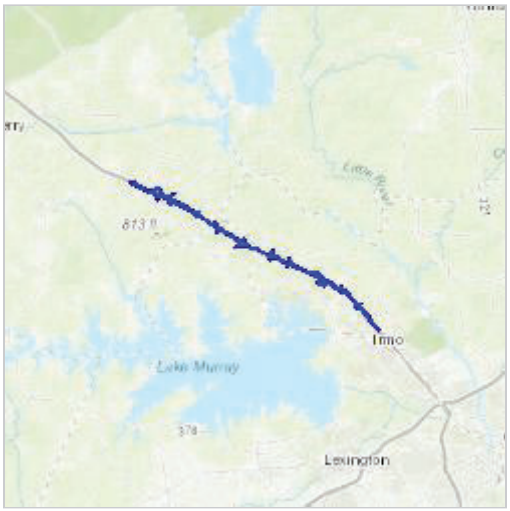
Project Name: I-26 Widening MM 85-101

Project Type: TRANSPORTATION

Project Description: Interstate Widening

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.166030302546034N81.29087016534643W



Counties: Lexington, SC | Newberry, SC | Richland, SC

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. 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.

Birds

NAME	STATUS
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered
Wood Stork *Mycteria americana* Population: AL, FL, GA, MS, NC, SC No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8477	Threatened

Flowering Plants

NAME	STATUS
Canby's Dropwort *Oxypolis canbyi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7738	Endangered
Rough-leaved Loosestrife *Lysimachia asperulaefolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2747	Endangered
Smooth Coneflower *Echinacea laevigata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3473	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

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.

REFUGE INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

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.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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
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. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
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

NAME	BREEDING SEASON
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) throughout its range in the continental USA and Alaska.	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.

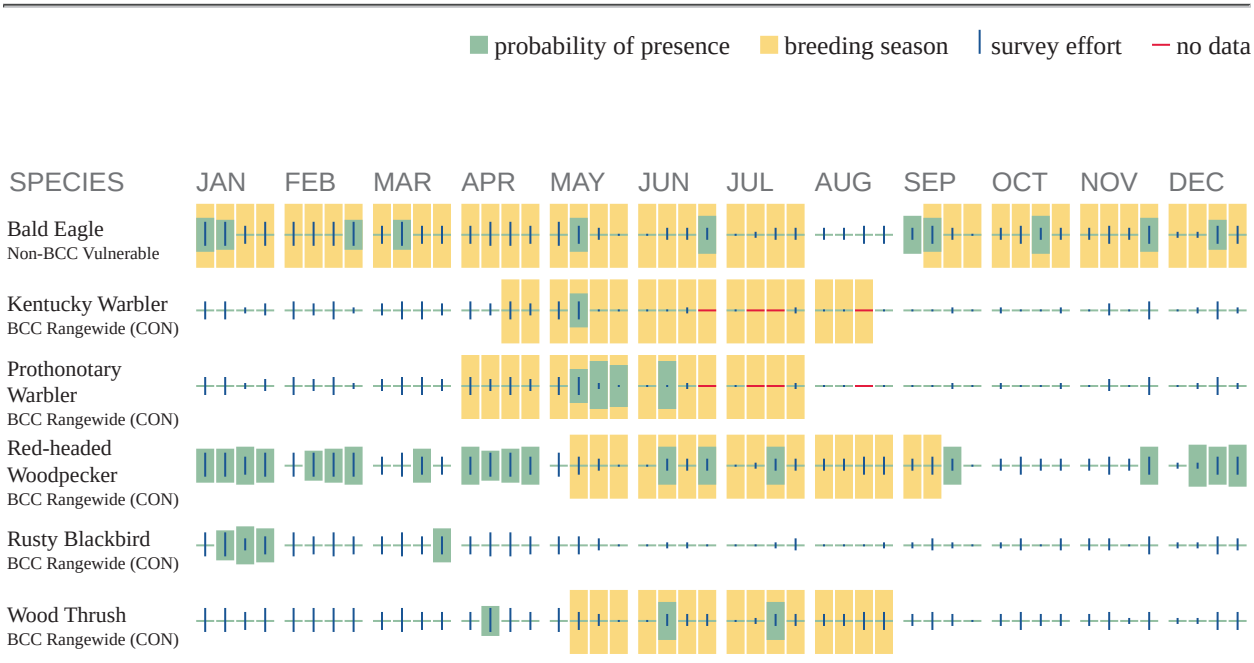
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

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.

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.



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

Migratory Birds FAQ

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 and/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.

ATTACHMENT E:

NOISE ADDENDUM

Noise Addendum #1
Executive Summary
South Carolina – Newberry, Lexington, and Richland Counties
Interstate 26 Widening and Interchange Improvements from
Mile Marker 85 to Mile Marker 101
May 21, 2020

Project Description: The proposed project would include improvements and upgrades to I-26 to accommodate existing and projected future traffic volumes. The South Carolina Department of Transportation (SCDOT) proposes widening I-26 and reconstructing three interchanges from mile marker (MM) 85 near Little Mountain, South Carolina to MM 101 near Irmo, South Carolina in Newberry, Lexington, and Richland counties.

Project Changes: SCDOT and the Design-Build (DB) Team identified an alternate interchange configuration for Columbia Road (Exit 91). Specifically, the proposed project would construct a partial cloverleaf to the west of the existing interchange instead of the previously proposed diverging diamond interchange at this location. The proposed design was developed as a result of further analysis regarding constructability, maintenance of traffic, operational conditions, and impacts to local businesses.

This addendum documents the geometric alignment changes proposed by the DB Team as design has been finalized for the Exit 91 interchange. Additionally, this addendum documents the analysis and resulting changes to the design of Noise Barriers 5 and 6 as a result of the final roadway design information.

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05/21/2020
Signature Date

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05/21/2020
Signature Date

David P. Kelly 5/22/2020
Approved By: SCDOT
Signature Date

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NOISE ADDENDUM #1
SOUTH CAROLINA - NEWBERRY, LEXINGTON, RICHLAND COUNTIES
INTERSTATE 26 WIDENING AND INTERCHANGE IMPROVEMENTS
May 21, 2020

1. INTRODUCTION

In compliance with 23 USC Section 109(h) and (i), the Federal Highway Administration (FHWA) established a standard for the assessment of highway traffic-generated noise. The standard, published as Part 772 of Title 23 of the Code of Federal Regulations (23 C.F.R. § 772), provides procedures to be followed in conducting noise analyses that will protect the public health, welfare and livability. In accordance with the Noise Control Act of 1972, coordination of this regulation with the Environmental Protection Agency (EPA) has been completed. The following assessment has been prepared in accordance with 23 C.F.R. § 772 and SCDOT Traffic Noise Abatement Policy.

This noise addendum serves as an update to the Traffic Noise Analysis Report (NIA) that was completed January 2018 (hereafter referred to as the January 2018 NIA). This addendum documents the geometric alignment changes proposed by the Design-Build (DB) Contractor as design has been finalized for the Exit 91 (Columbia Road) interchange. Additionally, this addendum documents the analysis and resulting changes to the design of Noise Barriers 5 and 6 as a result of the final I-26 roadway design.

1.1 What is The Proposed Project?

The proposed project would include improvements and upgrades to I-26 to accommodate existing and projected future traffic volumes. The South Carolina Department of Transportation (SCDOT) proposes widening I-26 and reconstructing three interchanges from mile marker (MM) 85 near Little Mountain, South Carolina to MM 101 near Irmo, South Carolina in Newberry, Lexington, and Richland Counties. Improvements would take place from 1.6 miles west of the South Carolina (SC) 202 (Exit 85) interchange to the US 176 (Exit 101) interchange. The improvements would widen the mainline of I-26 from SC 202 (Exit 85/MM 85) to Broad River Road (Exit 101/MM 101). I-26 would be widened to a total of six lanes, three in each direction, from Exit 85 to (Broad River Road) Exit 97 and to eight lanes, four in each direction, from Exit 97 to Exit 101. The widening would be constructed towards the existing median, minimizing impacts and areas of new disturbance. Interchange improvements would be provided at Exits 85, 91, and 97. A total of seven overpasses that cross I-26 would be replaced including S-36-167 (Parr Road), S-36-39 (Holy Trinity Church Road), S-32-49 (Peak Street), S-40-58 (Old Hilton Road), S-40-234 (Mt. Vernon Church Road), S-40-80 (Shady Grove Road), and S-40-58 (Koon Road). The truck weigh station near MM 94 would be improved as a weigh-in-motion station.

1.2 Project Changes

SCDOT and the DB Team identified an alternate interchange configuration for Exit 91. Specifically, the DB Team's proposed interchange configuration would construct a partial cloverleaf to the west of the existing interchange instead of the previously proposed diverging diamond interchange (DDI) at the existing location. The DB Team's proposed design was developed as a result of further analysis regarding constructability, maintenance of traffic, operational conditions, and impacts to local businesses. The following provides additional details regarding the issues and impacts associated with the DDI.

Constructability and Safety: The constructability review associated with the DDI presented numerous challenges since this configuration would require the interchange to be constructed at the same location as

the existing interchange. Constructing the DDI at the same location as the existing interchange would require complicated staging and undesirable traffic patterns that would compromise safety and extend construction time. Specifically, the DDI bridge would be constructed in two stages to maintain traffic and would have a 20-month construction duration. The new bridge would also be higher, thus requiring extensive sheeting resulting in additional obstructions and narrower lane widths. This results in new bridge construction activity taking place close to traffic, greatly increasing safety concerns. In addition, all four proposed DDI ramps would have major grade conflicts with existing ramps that would require multiple traffic shifts. These shifts would ultimately impact the operational efficiency and safety of the traveling public and construction team.

Property Impacts: Upon progressing the DDI design based on the Request for Proposals (RFP) requirements, it was determined that five commercial businesses along Columbia Avenue would be impacted and have to be relocated. These relocations were not initially identified in the environmental assessment (EA) but resulted from final design and RFP criteria for the DDI.

As a result of these challenges, the DB Team identified an alternative design that would allow the existing interchange to remain open throughout construction, avoiding the business relocations, reducing construction time, and improving operational function of the interchange.

The DB Team's design would construct a partial cloverleaf interchange approximately 1,000 feet west of the existing interchange and realign Columbia Avenue accordingly (see Attachment E). In addition, Ellett Road and Comalander Drive would be relocated. The existing interchange, including the overpass bridge, would be abandoned and demolished and a roundabout/cul-de-sac are proposed that would maintain access along existing Columbia Avenue. The proposed alternative would be constructed in one stage with traffic utilizing the existing interchange throughout construction. This would provide a more efficient construction schedule (i.e. 10 months) and provide a safer environment for both the traveling public and the construction team. In addition, the design provides a slight improvement in traffic operation over the DDI. The proposed design also avoids any relocations since the existing roadway and access will be maintained. While this alterative avoids numerous businesses, it will result in an increase of approximately 117 linear feet of stream impacts, 0.306 acre of open water impacts, and 0.014 acre of wetland impacts due the construction of the loop ramp along the westbound off-ramp. A meeting was conducted on October 29, 2019 at the Chapin Town Hall to present and discuss this proposal with the business stakeholders located in the immediate vicinity of Exit 91. The Town of Chapin and stakeholders were supportive of this design, with minor concerns regarding access and traffic flow. Therefore, based on the overall benefits to the public and local businesses, this proposed design was determined to be the preferred alternative.

1.3 Exit 91 Interchange DB Team 2020 Final Design Modifications

As a result of the DB Team's preferred alternative at Exit 91, the sound level results for the noise receivers within the interchange area were updated based on the new geometry as discussed in the previous section. Additionally, the traffic volumes associated with the updated geometry were input to the revised noise models. It should be noted that the mainline (I-26) volumes were not changed from the January 2018 NIA. The only change in volumes coded into the updated noise models was for the arterial roadways along Exit 91. Table 1 below, provides a summary of the receiver results from the January 2018 NIA and the results from the March 2020 Exit 91 results. These results are shown graphically in Attachment C. A summary of the sound levels for the receivers listed in table 1 is in Attachment E.

Table 1: Exit 91 Updated Sound Level Results Summary

Receiver	January 2018 NIA Sound Level Results (dBA)	2018 Impacts?	DB Team March 2020 Sound Level Results (dBA)	2020 Impacts?
E2	69.8	No	68.8	No
E3	71.6	No	67.0	No
E263	73.7	Yes	66.4	No
E264	76.2	Yes	67.1	No
E265	77.3	Yes	69.9	No
E266	68.9	No	62.4	No
E267	72.6	Yes	64.5	No
E268	73.7	Yes	67.9	No
B269	57.7	No	57.1	No
B270	58.1	No	58.3	No
B271	66.5	Yes	62.5	No
B272	66.5	Yes	62.3	No
B273	66.7	Yes	61.8	No
B274	70.3	Yes	65.6	No
B275	66.8	Yes	60.7	No
B276	66.9	Yes	59.3	No
E277	60.6	No	55.7	No
B309	77.7	Yes	75.3	Yes
E310	57.2	No	67.3	Yes
B311	67.8	Yes	64.4	No

As a result of the design change for Exit 91, 12 receivers (E263, E264, E265, E267, E268, B271, B272, B273, B274, B275, B276, B311) that were impacted under the January 2018 NIA were found to not be impacted under the DB Team (2020) final design. One receiver (E310) that was not impacted under the January 2018 NIA was found to be impacted under the DB Team (2020) final design.

One receiver (B309) that was considered impacted under the January 2018 NIA was found to still be impacted under the DB Team (2020) final design. Additionally, 6 receivers (E2, E3, E266, B269, B270, E277) that were considered not impacted under the January 2018 NIA were found to remain not impacted under the DB Team (2020) final design.

2. RE-EVALUATION OF NOISE BARRIERS

The final location of the noise barriers was determined based on noise impacts provided in the January 2018 NIA and as a result of DB Team (2020) final roadway design. The feasibleness, reasonableness, and design of Noise Barriers 5 and 6 were re-evaluated as part of this addendum. This re-evaluation determined whether Noise Barriers 5 and 6 would pass the feasible and reasonable criteria to construct each noise barrier. Additionally, the heights of the noise barrier panels were reviewed to determine if the same number of benefited receptors reported in the previously approved January 2018 NIA could be achieved with the DB Team's final noise barrier locations. Details regarding the feasible and reasonableness criteria are listed below.

According to the SCDOT Noise Policy, a 5dB(A) reduction must be achieved for 75 percent of the impacted receivers for the noise barrier to be acoustically feasible to construct. Additionally, the barrier shall pass the engineering feasibility criteria which includes a review of the following:

1. Topography – Determine if the abatement measure could be constructed given the topography of the location.
2. Safety – Maintaining a clear recovery zone, sight distance and accommodation of disabled vehicles.
3. Drainage – Issues created by directing water along, under, or away from an abatement measures.
4. Utilities – Large overhead power lines, underground water, sewer, gas, oil, etc., can have a significant impact on costs and design options.
5. Maintenance – Potential issues from location of abatement measure and construction materials.
6. Access – Refers to the ingress and egress to properties that would be affected by the noise abatement measure.
7. The exposed height of the noise abatement measure cannot exceed 25 feet based on constructability constraints.

According to the SCDOT Noise Policy, there are three mandatory reasonable factors that must be met for a noise barrier to be considered reasonable: Viewpoint of the property owners and residents of benefited receptors, cost effectiveness, and noise reduction design goal.

This addendum discusses the results of the re-evaluation for Noise Barriers 5, and 6 based on the revised DB Team (2020) final design. Overall, the roadway design and subsequent noise barrier design has been finalized using more refined and defined design elements. The noise barrier locations in general were found to be the same, however there were slight changes in the sound levels for the receivers that were located behind both Noise Barrier 5 and Noise Barrier 6.

2.1 Noise Barrier 5 Re-Evaluation

The location of Noise Barrier 5 was determined based on noise impacts provided in the January 2018 NIA and as a result of the DB Team (2020) final roadway design. Noise Barrier 5 was analyzed to begin at station 890+08 and end at station 932+36. It would be located approximately 85 feet to 140 feet from the centerline of I-26 and would be approximately 4,228 feet in length. The feasibleness and reasonableness of constructing Noise Barrier 5 was re-evaluated as part of this Noise Addendum.

Noise Barrier 5 was analyzed for feasibleness which resulted in 85 of the 87 (97 percent) impacted receivers behind the barrier experiencing a reduction in sound levels of 5 dB(A) or greater. Therefore, per the SCDOT policy, Noise Barrier 5 is feasible to construct.

The reasonable analysis for Noise Barrier 5 included noise barrier panels between 15 feet and 25 feet tall. This design achieves the largest number of benefited receptors while balancing the construction cost. The estimated construction cost for Noise Barrier 5 is $3,513,020. The benefit achieved by constructing Noise Barrier 5 is $18,686 per benefitted receiver which is below SCDOT policy of $30,000 per benefited receiver. Therefore, per SCDOT's policy, Noise Barrier 5 is reasonable to construct.

Noise Barrier 5 would see a small decrease in square footage and length in comparison to the barrier design completed for the January 2018 NIA. The associated design changes for Noise Barrier 5 are listed in Table 2. There was a decrease in the total number of impacts from 90 receivers to 87 receivers. There was an increase in the number of benefited receivers from 138 receivers to 188 receivers.

Table 2: Noise Barrier 5 Design Changes

Report	Area (S.F.)	Length (Ft.)	Wall Height Range (Min Ft. - Max Ft.)	No. of Impacted Receptors	No. of Benefited Receptors	Estimated Construction Cost ($)
January 2018 NIA	106,824	4,444	22	90	138	$3,738,480
DB Team (2020) Final Design	100,372	4,228	15-25	87	188	$3,513,020

The final noise barrier location and subsequent ground elevations have changed the relationship between the roadway and receivers specifically for receivers B73, B403, B456 as these receivers were considered impacted under the January 2018 NIA and are not impacted under the DB Team (2020) final design. The ground elevation for the bottom of the noise barrier has reduced the noise levels for the receivers under the build, no-barrier scenario. Therefore, the sound levels are lower for the receivers based on the location of the noise barrier.

The results of the revised Noise Barrier 5 evaluation are shown in Attachment A. The barrier height data is summarized in Attachment B. Noise barrier graphics are in Attachment C. The TNM 2.5 barrier design outputs are in Attachment D. The TNM 2.5 sound level outputs are in Attachment E. The TNM 2.5 runs for each noise barrier are in Attachment F. An updated SCDOT Feasibility and Reasonableness worksheet for Noise Barrier 5 is in Attachment G.

2.2 Noise Barrier 6 Re-Evaluation

The location of Noise Barrier 6 was determined based on noise impacts provided in the January 2018 NIA and as a result of DB Team (2020) final roadway design. Noise Barrier 6 was analyzed to begin at station 768+03 and end at station 789+00. It would be located approximately 80 feet to 140 feet from the centerline of I-26 and would be approximately 2,119 feet in length including the jogs and bends in the final Noise Barrier location. The feasibleness and reasonableness of constructing Noise Barrier 6 was re-evaluated as part of this Noise Addendum.

Noise Barrier 6 was analyzed for feasibleness which resulted in 36 of the 37 (97 percent) impacted receivers behind the barrier experiencing a reduction in sound levels of 5 dB(A) or greater. Therefore, per the SCDOT policy, Noise Barrier 6 is feasible to construct.

The reasonable analysis for Noise Barrier 6 included noise barrier panels between 17 feet and 25 feet tall. This design achieves the largest number of benefited receptors while balancing the construction cost. The estimated construction cost for Noise Barrier 6 is $1,712,480. The benefit achieved by constructing Noise Barrier 6 is $26,757 per benefitted receivers which is below SCDOT policy of $30,000 per benefited receiver. Therefore, per SCDOT's policy, Noise Barrier 6 is reasonable to construct.

Noise Barrier 6 would see a minor decrease in square footage and length in comparison to the barrier design completed for the January 2018 NIA. The associated design changes for Noise Barrier 6 are listed in Table 3. There was a decrease in the total number of impacts from 41 receivers to 37 receivers. There was a reduction in the number of benefits from 68 receivers to 64 receivers.

Table 3: Noise Barrier 6 Design Changes

Report	Area (S.F.)	Length (Ft.)	Wall Height Range (Min Ft. - Max Ft.)	No. of Impacted Receptors	No. of Benefited Receptors	Estimated Construction Cost ($)
January 2018 NIA	51,048	2,104	25	41	68*	$1,786,696
DB Team (2020) Final Design	48,928	2,119	17-25	37	64	$1,712,480

*January 2018 NIA documents 70 benefits, however, TNM exported provided as Reference Information Document (RID) only produces 68 benefits.

The final noise barrier location and subsequent ground elevations have changed the relationship between the roadway and receivers specifically for receivers B129, B130, B140, B214 as these receivers were considered impacted under the January 2018 NIA and are not impacted under the DB Team (2020) final design. The ground elevation for the bottom of the noise barrier has reduced the noise levels for the receivers under the build, no-barrier scenario. Therefore, the sound levels are lower for the receivers based on the location of the noise barrier.

The results of the revised Noise Barrier 6 evaluation are shown in Attachment A. The barrier height data is summarized in Attachment B. Noise barrier graphics are in Attachment C. The TNM 2.5 barrier design outputs are in Attachment D. The TNM 2.5 sound level outputs are in Attachment E. The TNM 2.5 runs for each noise barrier are in Attachment F. An updated SCDOT Feasibility and Reasonableness worksheet for Noise Barrier 6 is in Attachment G.

2.6 Project Updates: Impacts and Benefits

The DB Team (2020) final design updates, as discussed in Section 1, resulted in a change in the total number of noise impacts in the study area. A comparison of noise impacts and benefited receptors from the January 2018 NIA to this current DB Team (2020) final design Noise Addendum is summarized below in Table 4.

Table 4: Noise Impacts and Benefited Receptors Comparison

Report	January 2018 NIA	The DB Team (2020) Final Design
2040 Build Total Receivers that Approach or Exceed NAC (Mainline I-26)	244*	244
Exit 85 Alternative 1A Total Receivers that Approach or Exceed NAC	5*	5*
Exit 91 Alternative 3 Total Receivers that Approach or Exceed NAC	13*	2
Exit 97 Alternative 1 Total Receivers that Approach or Exceed NAC	9*	9*
Build Total Impacts	271	260
Total Number of Benefitted Receivers	206**	252

*Values collected from Exhibit B: Summary of Receivers Approaching or Exceed NAC, January 2018 NIA

**Calculated based on the values derived from the raw TNM exports provided by the SCDOT

Build Conditions

As a result of the DB Team (2020) final design for Exit 91, 12 receivers (E263, E264, E265, E267, E268, B271, B272, B273, B274, B275, B276, B311) that were impacted under the January 2018 NIA were found to not be impacted under the DB Team (2020) final design. One receiver (E310) that was not impacted under the January 2018 NIA was found to be impacted under the DB Team (2020) final design. Therefore, there is an overall reduction in project level impacts from 271 to 260 as a result of the DB Team's preferred alternative to Exit 91.

Build with Noise Barrier Conditions

The final design of Noise Barrier 5 and 6 would achieve an increase in 46 benefitted receivers (increase of 50 benefitted receivers for Noise Barrier 5 and net decrease of 4 benefitted receivers for Noise Barrier 6). The Build Condition sound level at these four receivers behind Noise Barrier 6 decreased as a result of the final noise barrier alignment when compared to the January 2018 NIA. These four receivers are not able to achieve a 5.0 dBA reduction even with a 25-foot noise barrier. Thus, the net sound level reduction is not as significant (less than 5.0 dBA) as the previous January 2018 NIA.

3. WHAT ARE THE CONCLUSIONS?

This addendum documents the geometric alignment changes proposed by the DB Team as design has been finalized for the Exit 91 interchange. Additionally, this addendum documents the analysis and resulting changes to the design of Noise Barriers 5 and 6 as a result of the final roadway design information.

SCDOT and the DB Team identified an alternate interchange configuration for Exit 91. Specifically, the proposed project would construct a partial cloverleaf to the west of the existing interchange instead of the previously proposed DDI at the existing location. The proposed design was developed as a result of further analysis regarding constructability, maintenance of traffic, operational conditions, and impacts to local businesses. The following provides additional details regarding the issues and impacts associated with the DDI.

Noise Barrier 5 and Noise Barrier 6 have been re-evaluated based on the final roadway design information provided by the DB Team's (2020) final design. The feasibleness and reasonableness of constructing each noise barrier was evaluated in this Noise Addendum.

Noise Barrier 5 – Recommended for Construction

The cost per benefitted receiver to construct Noise Barrier 5 is $18,686, below SCDOT policy of $30,000 per benefitted receiver. Therefore, it is reasonable to construct. The viewpoints for these property owners/residents was completed during the NEPA process and concluded that noise barriers would be constructed per the environmental commitments documented in the FONSI. 97% of the benefited receivers who returned surveys responded that they are in support of a noise barrier at this location, fulfilling the reasonableness criterion for this noise barrier location. An updated SCDOT Feasibility and Reasonableness worksheet for Noise Barrier 5 is in Attachment G. This noise addendum does not affect the outcome of the viewpoint summary that was completed in the FONSI.

Noise Barrier 6 – Recommended for Construction

The cost per benefitted receiver to construct Noise Barrier 6 is $26,757, below SCDOT policy of $30,000 per benefitted receiver. Therefore, it is reasonable to construct. The viewpoints from property owners/residents was completed during the NEPA process and concluded that noise barriers would be constructed per the environmental commitments documented in the FONSI. 100% of the benefited receivers who returned surveys responded that they are in support of a noise barrier at this location, fulfilling the reasonableness criterion for this noise barrier location. An updated SCDOT Feasibility and Reasonableness worksheet for Noise Barrier 6 is in Attachment G. This noise addendum does not affect the outcome of the viewpoint summary that was completed in the FONSI.

Attachment A – Noise Barrier Sound Level Comparison

Draft Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
22	4444	$ 3,738,840.00	$ 27,093.04	138	90		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B68	1	106,824	No	0	64.7	59.9	0	4.8
B69	1	106,824	Yes	1	65.3	60	0	5.3
B70	1	106,824	Yes	1	65.9	60.2	0	5.7
B71	1	106,824	Yes	1	65.8	60.1	0	5.7
B72	1	106,824	Yes	1	66.2	60.1	0	6.1
B73	1	106,824	Yes	1	66.4	60	0	6.4
B74	1	106,824	Yes	1	66.7	59.9	0	6.8
B75	1	106,824	Yes	1	67.3	60.1	0	7.2
B76	1	106,824	Yes	1	67.8	60.3	0	7.5
B77	1	106,824	Yes	1	68.4	60.5	0	7.9
B78	1	106,824	Yes	1	68.6	60.3	1	8.3
B79	1	106,824	Yes	1	68.3	60	1	8.3
B80	1	106,824	Yes	1	68	59.8	1	8.2
B81	1	106,824	Yes	1	67.9	59.7	1	8.2
B82	1	106,824	Yes	1	67.8	59.5	1	8.3
B83	1	106,824	Yes	1	67.5	59.3	1	8.2
B84	1	106,824	Yes	1	67.3	59.2	1	8.1
B85	1	106,824	Yes	1	66.2	58.8	0	7.4
B86	1	106,824	Yes	1	64.9	58.3	0	6.6
B87	1	106,824	Yes	1	62.8	57.5	0	5.3
B88	1	106,824	No	0	61.6	56.8	0	4.8
B89	1	106,824	No	0	61.2	56.4	0	4.8
B93	1	106,824	Yes	1	75.9	62.8	1	13.1
B94	1	106,824	Yes	1	71.3	61.7	1	9.6
B95	1	106,824	Yes	1	75.5	62.6	1	12.9
B96	1	106,824	Yes	1	71.2	61.5	1	9.7
B97	1	106,824	Yes	1	69.2	60.5	0	8.7
B98	1	106,824	Yes	1	76.1	62.8	1	13.3
B99	1	106,824	Yes	1	75.1	62.4	1	12.7
B100	1	106,824	Yes	1	69.9	61	1	8.9
B101	1	106,824	Yes	1	74.8	62.3	1	12.5
B102	1	106,824	Yes	1	71.1	61.7	1	9.4
B103	1	106,824	Yes	1	75.8	62.3	1	13.5
B104	1	106,824	Yes	1	69.3	61.2	0	8.1
B105	1	106,824	Yes	1	75.2	62.3	1	12.9
B106	1	106,824	Yes	1	75.1	62.5	1	12.6
B107	1	106,824	Yes	1	71.3	62.2	1	9.1
B108	1	106,824	Yes	1	75.1	62.4	1	12.7
B109	1	106,824	Yes	1	73.9	62.8	1	11.1
B110	1	106,824	Yes	1	71.1	63	1	8.1
B111	1	106,824	Yes	1	69.6	61.8	0	7.8
B112	1	106,824	Yes	1	69.1	62.4	0	6.7
B113	1	106,824	Yes	1	74	62.6	1	11.4
B114	1	106,824	Yes	1	73.1	63.1	1	10
B115	1	106,824	Yes	1	69.5	63.9	0	5.6
B116	1	106,824	No	0	67.9	63.4	0	4.5
B179	1	106,824	No	0	64.5	59.8	0	4.7
B180	1	106,824	Yes	1	65	58.6	0	6.4
B181	1	106,824	Yes	1	64	57.9	0	6.1

DB Team Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
15-25	4228	$ 3,513,020.00	$ 18,686.28	188	87		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B68	1	100,372	Yes	1	64.6	57.4	0	7.2
B69	1	100,372	Yes	1	65.1	57.5	0	7.6
B70	1	100,372	Yes	1	65.7	57.6	1	8.1
B71	1	100,372	Yes	1	65.8	57.5	1	8.3
B72	1	100,372	Yes	1	66.1	57.9	1	8.2
B73	1	100,372	Yes	1	65.9	57.8	1	8.1
B74	1	100,372	Yes	1	66	57.8	1	8.2
B75	1	100,372	Yes	1	66.4	57.9	1	8.5
B76	1	100,372	Yes	1	66.8	58.2	1	8.6
B77	1	100,372	Yes	1	67.4	58.5	1	8.9
B78	1	100,372	Yes	1	67.8	58.6	1	9.2
B79	1	100,372	Yes	1	67.6	58.4	1	9.2
B80	1	100,372	Yes	1	67.6	58.4	1	9.2
B81	1	100,372	Yes	1	67.7	58.4	1	9.3
B82	1	100,372	Yes	1	68	58.5	1	9.5
B83	1	100,372	Yes	1	68.1	58.6	1	9.5
B84	1	100,372	Yes	1	68	58.6	1	9.4
B85	1	100,372	Yes	1	67	58.6	1	8.4
B86	1	100,372	Yes	1	65.6	58.1	0	7.5
B87	1	100,372	Yes	1	63.3	57.2	0	6.1
B88	1	100,372	Yes	1	61.8	56.4	0	5.4
B89	1	100,372	Yes	1	61.4	55.9	0	5.5
B93	1	100,372	Yes	1	75.3	61.2	1	14.1
B94	1	100,372	Yes	1	70.5	59.4	1	11.1
B95	1	100,372	Yes	1	74.9	61	1	13.9
B96	1	100,372	Yes	1	70.5	59.6	1	10.9
B97	1	100,372	Yes	1	68.6	58.6	0	10
B98	1	100,372	Yes	1	75.3	61.7	1	13.6
B99	1	100,372	Yes	1	74	61.2	1	12.8
B100	1	100,372	Yes	1	69.4	59.5	1	9.9
B101	1	100,372	Yes	1	73.9	61.3	1	12.6
B102	1	100,372	Yes	1	70.3	60.2	1	10.1
B103	1	100,372	Yes	1	75.3	61.6	1	13.7
B104	1	100,372	Yes	1	68.6	59.5	0	9.1
B105	1	100,372	Yes	1	74.9	61.8	1	13.1
B106	1	100,372	Yes	1	74.4	62.1	1	12.3
B107	1	100,372	Yes	1	70.3	61	1	9.3
B108	1	100,372	Yes	1	73.6	62.5	1	11.1
B109	1	100,372	Yes	1	71.5	62.9	1	8.6
B110	1	100,372	Yes	1	70.1	62.1	1	8
B111	1	100,372	Yes	1	68.8	60.4	0	8.4
B112	1	100,372	Yes	1	68.3	61.4	0	6.9
B113	1	100,372	Yes	1	71.4	63.7	0	7.7
B114	1	100,372	Yes	1	71	64.4	0	6.6
B115	1	100,372	Yes	1	68.6	63.5	0	5.1
B116	1	100,372	No	0	67.6	62.8	0	4.8
B179	1	100,372	Yes	1	64.4	57.5	0	6.9
B180	1	100,372	Yes	1	64.9	56.6	1	8.3
B181	1	100,372	Yes	1	64.2	56.5	0	7.7

Draft Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
22	4444	$ 3,738,840.00	$ 27,093.04	138	90		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B182	1	106,824	Yes	1	63.5	57.3	0	6.2
B183	1	106,824	Yes	1	73.2	61.8	1	11.4
B184	1	106,824	Yes	1	72.8	61.7	1	11.1
B185	1	106,824	Yes	1	73.6	62	1	11.6
B186	1	106,824	Yes	1	74.2	62.2	1	12
B187	1	106,824	Yes	1	74	62.1	1	11.9
B188	1	106,824	Yes	1	74.7	62.2	1	12.5
B189	1	106,824	Yes	1	74.3	61.4	1	12.9
B190	1	106,824	Yes	1	74.4	61.5	1	12.9
B191	1	106,824	Yes	1	75	62	1	13
B192	1	106,824	Yes	1	75.3	62.1	1	13.2
B193	1	106,824	Yes	1	75.4	62	1	13.4
B194	1	106,824	Yes	1	75.3	62.3	1	13
B195	1	106,824	Yes	1	75.3	62.5	1	12.8
B196	1	106,824	Yes	1	75	62.5	1	12.5
B197	1	106,824	Yes	1	75.1	62.3	1	12.8
B198	1	106,824	Yes	1	75	62.3	1	12.7
B199	1	106,824	Yes	1	75.1	62.2	1	12.9
B200	1	106,824	Yes	1	67.2	59.7	0	7.5
B201	1	106,824	Yes	1	68.7	60.6	1	8.1
B202	1	106,824	Yes	1	68.8	60.7	1	8.1
B203	1	106,824	Yes	1	69.2	60.6	1	8.6
B204	1	106,824	Yes	1	69.3	60.3	1	9
B205	1	106,824	Yes	1	69.7	60.4	1	9.3
B206	1	106,824	Yes	1	69.9	60.5	1	9.4
B207	1	106,824	Yes	1	70	60.6	1	9.4
B208	1	106,824	Yes	1	70.6	60.9	1	9.7
B209	1	106,824	Yes	1	70.4	60.8	1	9.6
B210	1	106,824	Yes	1	70.6	60.9	1	9.7
B211	1	106,824	Yes	1	70.7	61.1	1	9.6
B212	1	106,824	Yes	1	70.2	60.8	1	9.4
B213	1	106,824	Yes	1	70.6	61	1	9.6
B343	1	106,824	Yes	1	63.7	58.5	0	5.2
B344	1	106,824	Yes	1	63.6	58.6	0	5
B345	1	106,824	No	0	63.2	58.5	0	4.7
B346	1	106,824	No	0	63.1	58.5	0	4.6
B347	1	106,824	No	0	62.9	58.5	0	4.4
B348	1	106,824	Yes	1	68.7	60.6	1	8.1
B349	1	106,824	Yes	1	65.8	59	0	6.8
B350	1	106,824	Yes	1	64.8	58.7	0	6.1
B351	1	106,824	Yes	1	64.5	58.7	0	5.8
B352	1	106,824	Yes	1	64.2	58.6	0	5.6
B367	1	106,824	Yes	1	62.7	57	0	5.7
B368	1	106,824	Yes	1	61.9	56.7	0	5.2
B369	1	106,824	Yes	1	61.4	56.2	0	5.2
B370	1	106,824	No	0	60.9	56.1	0	4.8
B371	1	106,824	No	0	60	55.5	0	4.5
B372	1	106,824	No	0	60.3	55.5	0	4.8
B373	1	106,824	No	0	59.4	54.9	0	4.5

DB Team Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
15-25	4228	$ 3,513,020.00	$ 18,686.28	188	87		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B182	1	100,372	Yes	1	63.7	56.4	0	7.3
B183	1	100,372	Yes	1	73.7	61.4	1	12.3
B184	1	100,372	Yes	1	73.2	61.2	1	12
B185	1	100,372	Yes	1	73.9	61.6	1	12.3
B186	1	100,372	Yes	1	74.3	61.8	1	12.5
B187	1	100,372	Yes	1	74.1	61.6	1	12.5
B188	1	100,372	Yes	1	74.6	61.7	1	12.9
B189	1	100,372	Yes	1	74	60.9	1	13.1
B190	1	100,372	Yes	1	74.1	61.1	1	13
B191	1	100,372	Yes	1	74.8	61.5	1	13.3
B192	1	100,372	Yes	1	75.1	61.6	1	13.5
B193	1	100,372	Yes	1	75.1	61.3	1	13.8
B194	1	100,372	Yes	1	74.9	61.3	1	13.6
B195	1	100,372	Yes	1	74.8	61.7	1	13.1
B196	1	100,372	Yes	1	74.5	61.1	1	13.4
B197	1	100,372	Yes	1	74.6	61	1	13.6
B198	1	100,372	Yes	1	74.4	60.8	1	13.6
B199	1	100,372	Yes	1	74.6	60.7	1	13.9
B200	1	100,372	Yes	1	67.2	58.7	1	8.5
B201	1	100,372	Yes	1	68.5	59.3	1	9.2
B202	1	100,372	Yes	1	68.6	59.4	1	9.2
B203	1	100,372	Yes	1	68.9	59.3	1	9.6
B204	1	100,372	Yes	1	69.1	59.1	1	10
B205	1	100,372	Yes	1	69.4	59.2	1	10.2
B206	1	100,372	Yes	1	69.5	59.2	1	10.3
B207	1	100,372	Yes	1	69.6	59.1	1	10.5
B208	1	100,372	Yes	1	70.2	59.3	1	10.9
B209	1	100,372	Yes	1	69.9	59.2	1	10.7
B210	1	100,372	Yes	1	69.9	59.3	1	10.6
B211	1	100,372	Yes	1	70	59.2	1	10.8
B212	1	100,372	Yes	1	69.4	58.8	1	10.6
B213	1	100,372	Yes	1	69.9	59	1	10.9
B343	1	100,372	Yes	1	63.9	55.9	1	8
B344	1	100,372	Yes	1	63.8	55.9	0	7.9
B345	1	100,372	Yes	1	63.5	55.8	0	7.7
B346	1	100,372	Yes	1	63.2	55.9	0	7.3
B347	1	100,372	Yes	1	63	55.9	0	7.1
B348	1	100,372	Yes	1	67.8	58.7	1	9.1
B349	1	100,372	Yes	1	65.7	58.2	0	7.5
B350	1	100,372	Yes	1	64.5	57.8	0	6.7
B351	1	100,372	Yes	1	64.6	56.4	1	8.2
B352	1	100,372	Yes	1	64.3	56.2	1	8.1
B367	1	100,372	Yes	1	63	55.5	0	7.5
B368	1	100,372	Yes	1	62.2	54.8	0	7.4
B369	1	100,372	Yes	1	61.7	54.6	0	7.1
B370	1	100,372	Yes	1	61.3	54.1	0	7.2
B371	1	100,372	Yes	1	60.5	53.6	0	6.9
B372	1	100,372	Yes	1	60.7	53.9	0	6.8
B373	1	100,372	Yes	1	59.9	53.2	0	6.7

Draft Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
22	4444	$ 3,738,840.00	$ 27,093.04	138	90		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B374	1	106,824	Yes	1	61.9	56.4	0	5.5
B375	1	106,824	Yes	1	62.3	56.7	0	5.6
B376	1	106,824	Yes	1	60.9	55.9	0	5
B377	1	106,824	No	0	59.9	55.2	0	4.7
B378	1	106,824	No	0	58.9	54.5	0	4.4
B379	1	106,824	No	0	58.3	54.1	0	4.2
B380	1	106,824	Yes	1	60.7	55.6	0	5.1
B381	1	106,824	No	0	59.6	55	0	4.6
B382	1	106,824	No	0	58.8	54.4	0	4.4
B383	1	106,824	No	0	59.7	55.3	0	4.4
B384	1	106,824	No	0	60.8	56.4	0	4.4
B385	1	106,824	No	0	61	56.6	0	4.4
B386	1	106,824	No	0	61.7	56.8	0	4.9
B387	1	106,824	Yes	1	63.8	57.4	0	6.4
B388	1	106,824	Yes	1	65.5	58.4	0	7.1
B389	1	106,824	Yes	1	66.6	59	0	7.6
B390	1	106,824	Yes	1	67	59.2	0	7.8
B391	1	106,824	Yes	1	67.1	58.9	0	8.2
B392	1	106,824	Yes	1	67	58.6	0	8.4
B393	1	106,824	Yes	1	67.4	58.9	0	8.5
B394	1	106,824	Yes	1	67.5	59	0	8.5
B395	1	106,824	Yes	1	67.7	59.2	0	8.5
B396	1	106,824	Yes	1	68	59.6	0	8.4
B397	1	106,824	Yes	1	67.9	59.6	0	8.3
B398	1	106,824	Yes	1	67.8	59.5	0	8.3
B399	1	106,824	Yes	1	67.6	59.5	0	8.1
B400	1	106,824	Yes	1	67.2	59.3	0	7.9
B401	1	106,824	Yes	1	65.4	58.9	0	6.5
B402	1	106,824	Yes	1	67.9	60.2	0	7.7
B403	1	106,824	Yes	1	66.1	59.3	0	6.8
B404	1	106,824	Yes	1	67.6	60.4	0	7.2
B405	1	106,824	Yes	1	65.9	59.4	0	6.5
B406	1	106,824	No	0	63.1	58.2	0	4.9
B407	1	106,824	Yes	1	63.6	58.2	0	5.4
B408	1	106,824	No	0	62.2	57.3	0	4.9
B409	1	106,824	No	0	61.1	56.5	0	4.6
B410	1	106,824	No	0	60.3	55.9	0	4.4
B411	1	106,824	Yes	1	62.5	57	0	5.5
B412	1	106,824	Yes	1	63.4	57.3	0	6.1
B413	1	106,824	Yes	1	63.4	57.1	0	6.3
B414	1	106,824	Yes	1	63.4	56.9	0	6.5
B415	1	106,824	Yes	1	63.6	56.7	0	6.9
B416	1	106,824	Yes	1	63.6	56.7	0	6.9
B417	1	106,824	Yes	1	63.3	56.5	0	6.8
B418	1	106,824	Yes	1	63.1	56.4	0	6.7
B419	1	106,824	Yes	1	62.9	56.3	0	6.6
B420	1	106,824	Yes	1	62.9	56.2	0	6.7
B421	1	106,824	Yes	1	61.8	55.8	0	6
B422	1	106,824	Yes	1	60.7	55.5	0	5.2
B423	1	106,824	No	0	59.6	55	0	4.6

DB Team Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
15-25	4228	$ 3,513,020.00	$ 18,686.28	188	87		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B374	1	100,372	Yes	1	62.2	55.4	0	6.8
B375	1	100,372	Yes	1	62.6	56	0	6.6
B376	1	100,372	Yes	1	61.2	55.2	0	6
B377	1	100,372	Yes	1	60.2	54.6	0	5.6
B378	1	100,372	Yes	1	59.3	53.7	0	5.6
B379	1	100,372	Yes	1	58.7	53.2	0	5.5
B380	1	100,372	Yes	1	61	54.6	0	6.4
B381	1	100,372	Yes	1	60	53.8	0	6.2
B382	1	100,372	Yes	1	59.2	53.2	0	6
B383	1	100,372	Yes	1	59.9	54.8	0	5.1
B384	1	100,372	Yes	1	61.3	55.8	0	5.5
B385	1	100,372	Yes	1	61.2	56	0	5.2
B386	1	100,372	Yes	1	61.8	56.2	0	5.6
B387	1	100,372	Yes	1	63.1	56.6	0	6.5
B388	1	100,372	Yes	1	65.3	57.3	0	8
B389	1	100,372	Yes	1	66.3	57.8	0	8.5
B390	1	100,372	Yes	1	66.7	57.8	0	8.9
B391	1	100,372	Yes	1	66.7	57.6	0	9.1
B392	1	100,372	Yes	1	66.2	57.4	0	8.8
B393	1	100,372	Yes	1	66.5	57.5	0	9
B394	1	100,372	Yes	1	66.7	57.5	0	9.2
B395	1	100,372	Yes	1	66.9	57.5	0	9.4
B396	1	100,372	Yes	1	67.3	57.7	0	9.6
B397	1	100,372	Yes	1	67.2	57.6	0	9.6
B398	1	100,372	Yes	1	67.2	57.6	0	9.6
B399	1	100,372	Yes	1	67.1	57.5	0	9.6
B400	1	100,372	Yes	1	66.7	57.4	0	9.3
B401	1	100,372	Yes	1	65.7	57.2	0	8.5
B402	1	100,372	Yes	1	67.6	58.5	0	9.1
B403	1	100,372	Yes	1	65.8	57.7	0	8.1
B404	1	100,372	Yes	1	66.9	58.8	0	8.1
B405	1	100,372	Yes	1	65.2	58	0	7.2
B406	1	100,372	Yes	1	63.2	56.8	0	6.4
B407	1	100,372	Yes	1	63.9	56.7	0	7.2
B408	1	100,372	Yes	1	62.7	56	0	6.7
B409	1	100,372	Yes	1	61.7	55.3	0	6.4
B410	1	100,372	Yes	1	60.8	54.6	0	6.2
B411	1	100,372	Yes	1	62.9	55.5	0	7.4
B412	1	100,372	Yes	1	63.6	55.7	0	7.9
B413	1	100,372	Yes	1	63.8	55.5	0	8.3
B414	1	100,372	Yes	1	63.4	55.4	0	8
B415	1	100,372	Yes	1	63.4	55.3	0	8.1
B416	1	100,372	Yes	1	63.4	55.4	0	8
B417	1	100,372	Yes	1	63.1	55.3	0	7.8
B418	1	100,372	Yes	1	62.7	55.2	0	7.5
B419	1	100,372	Yes	1	62.4	55.2	0	7.2
B420	1	100,372	Yes	1	62.2	55.2	0	7
B421	1	100,372	Yes	1	61.6	54.9	0	6.7
B422	1	100,372	Yes	1	60.8	54.8	0	6
B423	1	100,372	Yes	1	59.8	54.4	0	5.4

Draft Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
22	4444	$ 3,738,840.00	$ 27,093.04	138	90		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B424	1	106,824	Yes	1	61.1	55.7	0	5.4
B425	1	106,824	Yes	1	60.5	55.3	0	5.2
B426	1	106,824	Yes	1	60.6	55.4	0	5.2
B427	1	106,824	No	0	58.5	54	0	4.5
B428	1	106,824	No	0	59	54.1	0	4.9
B429	1	106,824	Yes	1	59.3	54.3	0	5
B430	1	106,824	Yes	1	60	54.7	0	5.3
B431	1	106,824	Yes	1	60.2	54.7	0	5.5
B432	1	106,824	Yes	1	60.2	54.7	0	5.5
B433	1	106,824	Yes	1	60.3	54.7	0	5.6
B434	1	106,824	Yes	1	59.8	54.5	0	5.3
B435	1	106,824	Yes	1	59.2	54.1	0	5.1
B436	1	106,824	No	0	58.7	53.9	0	4.8
B437	1	106,824	No	0	58.5	53.7	0	4.8
B438	1	106,824	No	0	58.4	53.8	0	4.6
B439	1	106,824	No	0	58.3	53.8	0	4.5
B440	1	106,824	No	0	56.7	52.7	0	4
B441	1	106,824	No	0	56.8	52.7	0	4.1
B442	1	106,824	No	0	56.6	52.6	0	4
B443	1	106,824	No	0	56.7	52.5	0	4.2
B444	1	106,824	No	0	56.7	52.5	0	4.2
B445	1	106,824	No	0	56.9	52.5	0	4.4
B446	1	106,824	No	0	57.4	52.8	0	4.6
B447	1	106,824	No	0	57.7	53	0	4.7
B448	1	106,824	No	0	57.8	53.1	0	4.7
B449	1	106,824	No	0	57.6	53.1	0	4.5
B450	1	106,824	No	0	57.3	52.9	0	4.4
B451	1	106,824	No	0	57.2	52.9	0	4.3
B452	1	106,824	No	0	57	52.8	0	4.2
B453	1	106,824	No	0	56.8	52.8	0	4
B454	1	106,824	Yes	1	68.5	61.3	0	7.2
B455	1	106,824	Yes	1	67.4	60.7	0	6.7
B456	1	106,824	Yes	1	66.3	60.1	0	6.2
B457	1	106,824	Yes	1	65.3	59.5	0	5.8
B458	1	106,824	No	0	63.5	58.7	0	4.8
B459	1	106,824	No	0	61.8	57.7	0	4.1
B460	1	106,824	No	0	61.1	57.1	0	4
B461	1	106,824	No	0	60.5	56.4	0	4.1
B462	1	106,824	No	0	59.4	55.6	0	3.8
B463	1	106,824	No	0	59	55.3	0	3.7
B464	1	106,824	No	0	60.5	56.2	0	4.3
B465	1	106,824	No	0	61.9	57.3	0	4.6
B466	1	106,824	Yes	1	66.9	61.3	0	5.6
B467	1	106,824	No	0	66.3	62.4	0	3.9
B468	1	106,824	No	0	65.2	60.4	0	4.8
B469	1	106,824	No	0	63.8	59.6	0	4.2
B517	1	106,824	No	0	61.5	56.8	0	4.7
B518	1	106,824	No	0	60.7	56.2	0	4.5
B519	1	106,824	Yes	1	63.1	57.4	0	5.7
					Impacted			Benefitted

DB Team Noise Impact Assessment Barrier 5 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
15-25	4228	$ 3,513,020.00	$ 18,686.28	188	87		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall		Decibel Reduction
B424	1	100,372	Yes	1	61.4	54.4	0	7
B425	1	100,372	Yes	1	60.7	53.9	0	6.8
B426	1	100,372	Yes	1	60.8	54.1	0	6.7
B427	1	100,372	Yes	1	59.1	52.9	0	6.2
B428	1	100,372	Yes	1	59.3	52.9	0	6.4
B429	1	100,372	Yes	1	59.6	53.1	0	6.5
B430	1	100,372	Yes	1	60.4	53.5	0	6.9
B431	1	100,372	Yes	1	60.4	53.6	0	6.8
B432	1	100,372	Yes	1	60.4	53.7	0	6.7
B433	1	100,372	Yes	1	60.4	53.7	0	6.7
B434	1	100,372	Yes	1	60.1	53.5	0	6.6
B435	1	100,372	Yes	1	59.3	53.3	0	6
B436	1	100,372	Yes	1	58.7	53.1	0	5.6
B437	1	100,372	Yes	1	58.1	53	0	5.1
B438	1	100,372	No	0	58.1	53.2	0	4.9
B439	1	100,372	No	0	58	53.3	0	4.7
B440	1	100,372	No	0	56.6	52	0	4.6
B441	1	100,372	No	0	56.6	52	0	4.6
B442	1	100,372	No	0	56.6	51.9	0	4.7
B443	1	100,372	No	0	56.5	51.8	0	4.7
B444	1	100,372	No	0	56.6	51.7	0	4.9
B445	1	100,372	Yes	1	56.7	51.7	0	5
B446	1	100,372	Yes	1	57	51.9	0	5.1
B447	1	100,372	Yes	1	57.4	52.1	0	5.3
B448	1	100,372	Yes	1	57.6	52.1	0	5.5
B449	1	100,372	Yes	1	57.7	52.1	0	5.6
B450	1	100,372	Yes	1	57.5	51.9	0	5.6
B451	1	100,372	Yes	1	57.5	51.9	0	5.6
B452	1	100,372	Yes	1	57.4	51.9	0	5.5
B453	1	100,372	Yes	1	57.2	51.8	0	5.4
B454	1	100,372	Yes	1	67.7	59.9	0	7.8
B455	1	100,372	Yes	1	66.6	59.4	0	7.2
B456	1	100,372	Yes	1	65.6	58.8	0	6.8
B457	1	100,372	Yes	1	64.7	58.3	0	6.4
B458	1	100,372	Yes	1	63.4	57.5	0	5.9
B459	1	100,372	Yes	1	61.9	56.6	0	5.3
B460	1	100,372	Yes	1	61.3	55.9	0	5.4
B461	1	100,372	Yes	1	60.6	55.1	0	5.5
B462	1	100,372	Yes	1	59.8	54.4	0	5.4
B463	1	100,372	Yes	1	59.7	54.2	0	5.5
B464	1	100,372	Yes	1	61.1	55.1	0	6
B465	1	100,372	Yes	1	62.3	56	0	6.3
B466	1	100,372	Yes	1	66.4	60.2	0	6.2
B467	1	100,372	No	0	66.3	61.7	0	4.6
B468	1	100,372	Yes	1	64.9	59.4	0	5.5
B469	1	100,372	Yes	1	63.8	58.6	0	5.2
B517	1	100,372	Yes	1	62	54.5	0	7.5
B518	1	100,372	Yes	1	61.1	54	0	7.1
B519	1	100,372	Yes	1	63.3	55.6	0	7.7
					Impacted			Benefitted

Barrier 6 Sound Level Comparison

Draft Noise Impact Assessment Barrier 6 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
24	2104	$ 1,786,696.00	$ 26,274.94	68	41		80.00%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall	First Row, Greater than 8 dBA?	Decibel Reduction
B118	1	51,048	No	0	70.6	69.6	0	1
B119	1	51,048	Yes	1	77.9	65	1	12.9
B120	1	51,048	Yes	1	74.1	63.7	1	10.4
B121	1	51,048	Yes	1	68.9	60.8	1	8.1
B122	1	51,048	Yes	1	71.1	62.2	1	8.9
B123	1	51,048	Yes	1	72.8	63.1	1	9.7
B124	1	51,048	Yes	1	74.6	64	1	10.6
B125	1	51,048	Yes	1	76.5	64.6	1	11.9
B126	1	51,048	Yes	1	77.2	64.9	1	12.3
B127	1	51,048	Yes	1	77.6	65.5	1	12.1
B128	1	51,048	Yes	1	77.5	65.4	1	12.1
B129	1	51,048	Yes	1	77.7	66.9	1	10.8
B130	1	51,048	Yes	1	77.9	68	1	9.9
B131	1	51,048	Yes	1	69.9	62	0	7.9
B132	1	51,048	Yes	1	71.2	63	1	8.2
B133	1	51,048	Yes	1	71.6	63.2	1	8.4
B134	1	51,048	Yes	1	71.6	63.5	1	8.1
B135	1	51,048	Yes	1	71.5	63	1	8.5
B136	1	51,048	Yes	1	72.5	63.5	1	9
B137	1	51,048	Yes	1	70.4	62.7	0	7.7
B138	1	51,048	Yes	1	74.1	64.3	1	9.8
B139	1	51,048	Yes	1	76.5	65.8	1	10.7
B140	1	51,048	Yes	1	77.1	66.1	1	11
B141	1	51,048	Yes	1	76.7	65.7	1	11
B142	1	51,048	Yes	1	73.5	64.5	1	9
B143	1	51,048	Yes	1	71.9	63.8	1	8.1
B144	1	51,048	Yes	1	71.1	63	1	8.1
B214	1	51,048	No	0	79.1	79	0	0.1
B470	1	51,048	Yes	1	67.3	59.8	0	7.5
B471	1	51,048	Yes	1	66	59	0	7
B472	1	51,048	Yes	1	64.8	58.2	0	6.6
B473	1	51,048	Yes	1	63.5	57.3	0	6.2
B474	1	51,048	Yes	1	62.3	56.6	0	5.7
B475	1	51,048	Yes	1	61	56	0	5
B476	1	51,048	No	0	59.9	55.3	0	4.6
B477	1	51,048	Yes	1	59.6	54.6	0	5
B478	1	51,048	Yes	1	59.4	54.2	0	5.2
B479	1	51,048	Yes	1	60.1	55	0	5.1
B480	1	51,048	Yes	1	59.8	54.5	0	5.3
B481	1	51,048	Yes	1	60.6	55.2	0	5.4
B482	1	51,048	Yes	1	60.6	55.1	0	5.5
B483	1	51,048	Yes	1	61.4	55.9	0	5.5
B484	1	51,048	Yes	1	61.2	55.5	0	5.7
B485	1	51,048	Yes	1	61.9	56.1	0	5.8
B486	1	51,048	Yes	1	62.8	56.8	0	6
B487	1	51,048	Yes	1	62.7	56.6	0	6.1
B488	1	51,048	Yes	1	64	57.6	0	6.4
B489	1	51,048	Yes	1	65.1	58.5	0	6.6
B490	1	51,048	Yes	1	66.1	59.3	0	6.8
B491	1	51,048	Yes	1	67.4	60.2	0	7.2
B492	1	51,048	Yes	1	64.4	58.3	0	6.1
B493	1	51,048	Yes	1	64.6	58.3	0	6.3
B494	1	51,048	Yes	1	65.2	58.6	0	6.6
B495	1	51,048	Yes	1	66.9	60.1	0	6.8
B496	1	51,048	Yes	1	67.8	60.9	0	6.9
B497	1	51,048	Yes	1	67.8	61.2	0	6.6
B498	1	51,048	Yes	1	66.7	60.6	0	6.1
B499	1	51,048	Yes	1	69.7	62.3	0	7.4
B500	1	51,048	Yes	1	68.7	62.1	0	6.6
B501	1	51,048	Yes	1	67.9	61.7	0	6.2
B502	1	51,048	Yes	1	66.9	61	0	5.9
B503	1	51,048	Yes	1	66.1	60.4	0	5.7
B504	1	51,048	Yes	1	65	59.2	0	5.8
B505	1	51,048	Yes	1	63.4	57.8	0	5.6
B506	1	51,048	Yes	1	62.2	56.6	0	5.6
B507	1	51,048	Yes	1	61.3	55.9	0	5.4
B508	1	51,048	Yes	1	60.9	55.6	0	5.3
B509	1	51,048	Yes	1	60.1	54.9	0	5.2
B510	1	51,048	Yes	1	59.5	54.5	0	5
B511	1	51,048	No	0	58.8	53.9	0	4.9
B512	1	51,048	No	0	60	56.7	0	3.3
B513	1	51,048	No	0	63.9	59	0	4.9
B514	1	51,048	Yes	1	64.5	58.9	0	5.6
B515	1	51,048	Yes	1	62.4	57.4	0	5
B516	1	51,048	No	0	59.6	55.8	0	3.8
					Impacted			Benefitted

DB Team Noise Impact Assessment Barrier 6 Design

Height Range	Wall Length	Barrier Cost	Cost Per Benefited Receiver	Total of Number of Benefitted Dwelling Units	Total Number of Impacted Receivers		Percentage of First Row 8 dBA reduction	
17-25	2119	$ 1,712,480.00	$ 26,757.50	64	37		96.67%	
Wall	# of Dwelling Units Represented	Barrier Area (sq foot)	Does Wall Achieve a 5 dBA Reduction	Benefitted Dwelling Units	Sound Level Without Wall	Sound Level With Wall	First Row, Greater than 8 dBA?	Decibel Reduction
B118	1	48,928	No	0	70.7	70.3	0	0.4
B119	1	48,928	Yes	1	77.2	62.1	1	15.1
B120	1	48,928	Yes	1	72.7	63.5	1	9.2
B121	1	48,928	Yes	1	67.4	59.2	1	8.2
B122	1	48,928	Yes	1	69.6	60.1	1	9.5
B123	1	48,928	Yes	1	71	60.9	1	10.1
B124	1	48,928	Yes	1	72.3	61.7	1	10.6
B125	1	48,928	Yes	1	73.7	62.2	1	11.5
B126	1	48,928	Yes	1	75.1	62.7	1	12.4
B127	1	48,928	Yes	1	76.2	62.8	1	13.4
B128	1	48,928	Yes	1	76.4	63.3	1	13.1
B129	1	48,928	Yes	1	76.9	63.3	1	13.6
B130	1	48,928	Yes	1	77.5	64	1	13.5
B131	1	48,928	Yes	1	68.5	59.7	1	8.8
B132	1	48,928	Yes	1	69.8	60.3	1	9.5
B133	1	48,928	Yes	1	70.3	60.4	1	9.9
B134	1	48,928	Yes	1	70.6	60.5	1	10.1
B135	1	48,928	Yes	1	70.8	60.4	1	10.4
B136	1	48,928	Yes	1	71.9	61.2	1	10.7
B137	1	48,928	Yes	1	69.8	60.2	1	9.6
B138	1	48,928	Yes	1	73.6	61.8	1	11.8
B139	1	48,928	Yes	1	76	62.9	1	13.1
B140	1	48,928	Yes	1	76.6	63.1	1	13.5
B141	1	48,928	Yes	1	76.1	63.1	1	13
B142	1	48,928	Yes	1	72.9	63.3	1	9.6
B143	1	48,928	Yes	1	71.3	62.4	1	8.9
B144	1	48,928	Yes	1	70.6	61.7	1	8.9
B214	1	48,928	Yes	1	75.9	64.5	1	11.4
B470	1	48,928	Yes	1	65.8	58.6	0	7.2
B471	1	48,928	Yes	1	64.6	58.1	0	6.5
B472	1	48,928	Yes	1	63.2	57.4	0	5.8
B473	1	48,928	Yes	1	62.3	56.6	0	5.7
B474	1	48,928	Yes	1	61.3	56.1	0	5.2
B475	1	48,928	No	0	60.2	55.6	0	4.6
B476	1	48,928	No	0	59.3	55.1	0	4.2
B477	1	48,928	No	0	58.9	54.2	0	4.7
B478	1	48,928	No	0	58.8	53.9	0	4.9
B479	1	48,928	Yes	1	59.4	54.4	0	5
B480	1	48,928	Yes	1	59.2	54.2	0	5
B481	1	48,928	Yes	1	59.8	54.5	0	5.3
B482	1	48,928	Yes	1	59.9	54.4	0	5.5
B483	1	48,928	Yes	1	60.6	55	0	5.6
B484	1	48,928	Yes	1	60.5	54.9	0	5.6
B485	1	48,928	Yes	1	61.2	55.4	0	5.8
B486	1	48,928	Yes	1	62	55.8	0	6.2
B487	1	48,928	Yes	1	61.9	55.7	0	6.2
B488	1	48,928	Yes	1	63	56.6	0	6.4
B489	1	48,928	Yes	1	64	57.2	0	6.8
B490	1	48,928	Yes	1	64.8	57.8	0	7
B491	1	48,928	Yes	1	66.1	58.5	0	7.6
B492	1	48,928	Yes	1	63.7	56.9	0	6.8
B493	1	48,928	Yes	1	63.9	57	0	6.9
B494	1	48,928	Yes	1	64.3	57.2	0	7.1
B495	1	48,928	Yes	1	66	58.3	0	7.7
B496	1	48,928	Yes	1	66.9	58.7	0	8.2
B497	1	48,928	Yes	1	67.1	58.9	0	8.2
B498	1	48,928	Yes	1	66.1	58.6	0	7.5
B499	1	48,928	Yes	1	69.2	60.9	1	8.3
B500	1	48,928	Yes	1	68.2	60.2	1	8
B501	1	48,928	Yes	1	67.3	59.7	0	7.6
B502	1	48,928	Yes	1	66.4	59	0	7.4
B503	1	48,928	Yes	1	65.6	58.4	0	7.2
B504	1	48,928	Yes	1	64.5	57.6	0	6.9
B505	1	48,928	Yes	1	62.8	56.5	0	6.3
B506	1	48,928	Yes	1	61.6	55.7	0	5.9
B507	1	48,928	Yes	1	60.7	55	0	5.7
B508	1	48,928	Yes	1	60.3	54.8	0	5.5
B509	1	48,928	Yes	1	59.5	54.2	0	5.3
B510	1	48,928	Yes	1	58.9	53.9	0	5
B511	1	48,928	No	0	58.2	53.4	0	4.8
B512	1	48,928	No	0	59.4	57.2	0	2.2
B513	1	48,928	No	0	62.8	59.5	0	3.3
B514	1	48,928	No	0	63.3	59.1	0	4.2
B515	1	48,928	No	0	61.4	57.7	0	3.7
B516	1	48,928	No	0	59.1	56.3	0	2.8
					Impacted			Benefitted

Attachment B – Noise Barrier Design Details

BARRIER 5 DESIGN							
Sta.	X	Y	Ground Elevation	Barrier Height	Length of Wall	Top of Wall	Cumm. Length
890+08.00	1,922,870.90	844,123.80	367.2	25	20	392.2	0
890+28.00	1,922,852.60	844,132.10	367.43	25	20	392.43	20
890+48.00	1,922,834.40	844,140.30	367.66	25	20	392.66	40
890+68.00	1,922,816.30	844,148.60	367.88	25	20	392.88	60
890+88.00	1,922,798.00	844,156.80	368.11	25	20	393.11	80
891+08.00	1,922,779.80	844,165.10	368.29	25	20	393.29	100
891+28.00	1,922,761.60	844,173.30	368.39	25	20	393.39	120
891+48.00	1,922,743.30	844,181.60	368.49	25	20	393.49	140
891+68.00	1,922,725.10	844,189.90	368.58	25	20	393.58	160
891+88.00	1,922,706.90	844,198.10	368.68	25	20	393.68	180
892+08.00	1,922,688.80	844,206.40	368.78	25	20	393.78	200
892+28.00	1,922,670.50	844,214.60	368.88	25	20	393.88	220
892+48.00	1,922,652.30	844,222.90	368.98	25	20	393.98	240
892+68.00	1,922,634.00	844,231.10	369.09	25	20	394.09	260
892+88.00	1,922,615.80	844,239.40	369.19	25	20	394.19	280
893+08.00	1,922,597.60	844,247.70	369.33	25	20	394.33	300
893+28.00	1,922,579.40	844,255.90	369.51	25	20	394.51	320
893+48.00	1,922,561.30	844,264.20	369.7	25	20	394.7	340
893+68.00	1,922,543.00	844,272.40	371.05	25	20	396.05	360
893+88.00	1,922,524.80	844,280.70	371.3	25	20	396.3	380
894+08.00	1,922,506.50	844,288.90	371.57	25	20	396.57	400
894+28.00	1,922,488.30	844,297.20	371.88	25	20	396.88	420
894+48.00	1,922,470.10	844,305.50	372.19	25	20	397.19	440
894+68.00	1,922,451.90	844,313.70	371.05	25	20	396.05	460
894+88.00	1,922,433.80	844,322.00	371.3	25	20	396.3	480
895+08.00	1,922,415.50	844,330.20	371.57	25	20	396.57	500
895+28.00	1,922,397.30	844,338.50	371.88	25	20	396.88	520
895+48.00	1,922,379.00	844,346.70	372.19	25	20	397.19	540
895+68.00	1,922,360.80	844,355.00	372.5	25	20	397.5	560
895+88.00	1,922,342.60	844,363.30	372.81	25	20	397.81	580
896+08.00	1,922,324.40	844,371.50	373.15	25	20	398.15	600
896+28.00	1,922,306.30	844,379.80	373.54	25	20	398.54	620
896+48.00	1,922,287.90	844,388.00	373.92	25	20	398.92	640
896+68.00	1,922,269.80	844,396.30	374.31	25	20	399.31	660
896+88.00	1,922,251.50	844,404.50	374.69	25	20	399.69	680
897+08.00	1,922,233.30	844,412.80	375.1	25	20	400.1	700
897+28.00	1,922,215.10	844,421.10	375.56	25	20	400.56	720
897+48.00	1,922,196.90	844,429.30	376.01	25	20	401.01	740
897+68.00	1,922,178.60	844,437.60	376.47	25	20	401.47	760
897+88.00	1,922,160.40	844,445.80	376.93	25	20	401.93	780
898+08.00	1,922,142.30	844,454.10	377.4	25	20	402.4	800
898+28.00	1,922,124.00	844,462.30	377.88	25	20	402.88	820
898+48.00	1,922,105.80	844,470.60	378.37	25	20	403.37	840
898+68.00	1,922,087.60	844,478.90	378.86	25	20	403.86	860
898+88.00	1,922,069.30	844,487.10	379.35	25	20	404.35	880
899+08.00	1,922,051.10	844,495.40	379.83	25	20	404.83	900
899+28.00	1,922,032.90	844,503.60	380.31	25	20	405.31	920
899+48.00	1,922,014.80	844,511.90	380.78	25	20	405.78	940
899+68.00	1,921,996.50	844,520.10	381.26	25	20	406.26	960
899+88.00	1,921,978.30	844,528.40	381.73	25	20	406.73	980
900+08.00	1,921,960.10	844,536.70	382.2	25	20	407.2	1000

BARRIER 5 DESIGN							
Sta.	X	Y	Ground Elevation	Barrier Height	Length of Wall	Top of Wall	Cumm. Length
900+28.00	1,921,941.80	844,544.90	382.66	25	20	407.66	1020
900+48.00	1,921,923.60	844,553.20	383.12	25	20	408.12	1040
900+68.00	1,921,905.40	844,561.40	383.58	25	20	408.58	1060
900+88.00	1,921,887.30	844,569.70	384.04	25	20	409.04	1080
901+08.00	1,921,869.00	844,577.90	384.49	25	20	409.49	1100
901+28.00	1,921,850.80	844,586.20	384.93	25	20	409.93	1120
901+48.00	1,921,832.50	844,594.40	385.38	25	20	410.38	1140
901+68.00	1,921,814.30	844,602.70	385.83	25	20	410.83	1160
901+88.00	1,921,796.10	844,611.00	386.27	25	20	411.27	1180
902+08.00	1,921,777.90	844,619.20	386.72	25	20	411.72	1200
902+28.00	1,921,759.80	844,627.50	387.17	25	20	412.17	1220
902+48.00	1,921,741.50	844,635.70	387.62	25	20	412.62	1240
902+68.00	1,921,723.30	844,644.00	388.06	25	20	413.06	1260
902+88.00	1,921,705.00	844,652.20	388.51	25	20	413.51	1280
903+08.00	1,921,686.80	844,660.50	388.96	25	20	413.96	1300
903+28.00	1,921,668.60	844,668.80	389.41	25	20	414.41	1320
903+48.00	1,921,650.40	844,677.00	389.86	25	20	414.86	1340
903+68.00	1,921,632.30	844,685.30	390.32	25	20	415.32	1360
903+88.00	1,921,613.90	844,693.50	390.77	25	20	415.77	1380
904+08.00	1,921,595.80	844,701.80	391.22	25	20	416.22	1400
904+28.00	1,921,577.50	844,710.00	391.68	25	20	416.68	1420
904+48.00	1,921,559.30	844,718.30	392.14	25	20	417.14	1440
904+68.00	1,921,541.10	844,726.60	392.6	25	20	417.6	1460
904+88.00	1,921,522.90	844,734.80	393.06	25	20	418.06	1480
905+08.00	1,921,504.80	844,743.10	393.76	25	2	418.76	1500
905+09.98	1,921,502.80	844,743.90	393.87	25	20	418.87	1502
905+29.98	1,921,489.40	844,758.70	394.94	25	20	419.94	1522
905+49.98	1,921,476.00	844,773.50	396.02	25	20	421.02	1542
905+69.98	1,921,462.60	844,788.40	397.09	25	20	422.09	1562
905+89.98	1,921,449.30	844,803.20	398.17	23	18	421.17	1582
906+08.08	1,921,437.00	844,816.60	399.14	23	20	422.14	1600
906+28.08	1,921,418.80	844,824.90	399.75	23	20	422.75	1620
906+48.08	1,921,400.60	844,833.10	400.36	23	20	423.36	1640
906+68.08	1,921,382.40	844,841.40	400.97	23	20	423.97	1660
906+88.08	1,921,364.10	844,849.60	401.58	23	20	424.58	1680
907+08.08	1,921,345.90	844,857.90	402.19	23	20	425.19	1700
907+28.08	1,921,327.80	844,866.10	402.84	23	20	425.84	1720
907+48.08	1,921,309.50	844,874.40	403.5	23	20	426.5	1740
907+68.08	1,921,291.30	844,882.70	404.15	23	20	427.15	1760
907+88.08	1,921,273.10	844,890.90	404.81	23	20	427.81	1780
908+08.08	1,921,254.80	844,899.20	405.47	23	20	428.47	1800
908+28.08	1,921,236.60	844,907.40	406.27	23	20	429.27	1820
908+48.08	1,921,218.40	844,915.70	407.08	23	20	430.08	1840
908+68.08	1,921,200.30	844,923.90	407.88	23	20	430.88	1860
908+88.08	1,921,182.00	844,932.20	408.69	23	20	431.69	1880
909+08.08	1,921,163.80	844,940.40	409.5	23	20	432.5	1900
909+28.08	1,921,145.50	844,948.70	411.33	23	20	434.33	1920
909+48.08	1,921,127.30	844,957.00	413.15	23	20	436.15	1940
909+68.08	1,921,109.10	844,965.20	414.98	23	20	437.98	1960
909+88.08	1,921,090.90	844,973.50	416.8	23	20	439.8	1980
910+08.08	1,921,072.80	844,981.70	418.62	23	20	441.62	2000

BARRIER 5 DESIGN							
Sta.	X	Y	Ground Elevation	Barrier Height	Length of Wall	Top of Wall	Cumm. Length
910+28.08	1,921,054.50	844,990.00	419.69	23	20	442.69	2020
910+48.08	1,921,036.30	844,998.20	420.75	23	20	443.75	2040
910+68.08	1,921,018.00	845,006.50	421.82	23	20	444.82	2060
910+88.08	1,920,999.80	845,014.80	422.89	23	20	445.89	2080
911+08.08	1,920,981.60	845,023.00	423.95	23	20	446.95	2100
911+28.08	1,920,963.40	845,031.30	424.69	23	20	447.69	2120
911+48.08	1,920,945.30	845,039.50	425.43	23	20	448.43	2140
911+68.08	1,920,926.90	845,047.80	426.17	23	20	449.17	2160
911+88.08	1,920,908.80	845,056.00	426.91	23	20	449.91	2180
912+08.08	1,920,890.50	845,064.30	427.65	23	20	450.65	2200
912+28.08	1,920,872.30	845,072.50	428.17	23	20	451.17	2220
912+48.08	1,920,854.10	845,080.80	428.69	23	20	451.69	2240
912+68.08	1,920,835.90	845,089.10	429.22	23	20	452.22	2260
912+88.08	1,920,817.60	845,097.30	429.74	23	20	452.74	2280
913+08.08	1,920,799.40	845,105.60	430.26	25	20	455.26	2300
913+28.08	1,920,781.30	845,113.80	429.33	25	20	454.33	2320
913+48.08	1,920,763.00	845,122.10	428.4	25	20	453.4	2340
913+68.08	1,920,744.80	845,130.30	427.47	25	20	452.47	2360
913+88.08	1,920,726.60	845,138.60	426.54	25	20	451.54	2380
914+08.08	1,920,708.30	845,146.90	425.62	25	20	450.62	2400
914+28.08	1,920,690.10	845,155.10	424.75	25	20	449.75	2420
914+48.08	1,920,671.90	845,163.40	423.89	25	20	448.89	2440
914+68.08	1,920,653.80	845,171.60	423.03	25	20	448.03	2460
914+88.08	1,920,635.50	845,179.90	422.16	25	20	447.16	2480
915+08.08	1,920,617.30	845,188.10	421.3	25	20	446.3	2500
915+28.08	1,920,599.00	845,196.40	420.43	25	20	445.43	2520
915+48.08	1,920,580.80	845,204.60	419.56	25	20	444.56	2540
915+68.08	1,920,562.60	845,212.90	418.68	25	20	443.68	2560
915+88.08	1,920,544.40	845,221.20	417.81	25	20	442.81	2580
916+08.08	1,920,526.30	845,229.40	416.94	15	20	431.94	2600
916+28.08	1,920,508.00	845,237.70	416.38	15	20	431.38	2620
916+48.08	1,920,489.80	845,245.90	415.82	15	20	430.82	2640
916+68.08	1,920,471.50	845,254.20	415.26	23	20	438.26	2660
916+88.08	1,920,453.30	845,262.40	414.7	23	20	437.7	2680
917+08.10	1,920,435.10	845,270.70	414.14	23	20	437.14	2700
917+28.10	1,920,415.80	845,265.60	413.56	23	20	436.56	2720
917+48.10	1,920,396.40	845,260.40	412.92	23	20	435.92	2740
917+68.10	1,920,377.10	845,255.30	412.28	23	20	435.28	2760
917+88.10	1,920,357.80	845,250.10	411.63	23	8	434.63	2780
917+96.17	1,920,350.00	845,248.10	411.37	23	20	434.37	2788
918+16.17	1,920,331.80	845,256.30	410.73	23	20	433.73	2808
918+36.17	1,920,313.50	845,264.60	410.41	23	20	433.41	2828
918+56.17	1,920,295.30	845,272.80	410.25	23	20	433.25	2848
918+76.17	1,920,277.10	845,281.10	410.09	23	20	433.09	2868
918+96.17	1,920,258.90	845,289.40	409.93	23	20	432.93	2888
919+16.17	1,920,240.80	845,297.60	409.77	23	20	432.77	2908
919+36.17	1,920,222.50	845,305.90	409.63	23	20	432.63	2928
919+56.17	1,920,204.30	845,314.10	409.51	23	20	432.51	2948
919+76.17	1,920,186.00	845,322.40	409.38	23	20	432.38	2968
919+96.17	1,920,167.80	845,330.60	409.25	23	20	432.25	2988
920+16.17	1,920,149.60	845,338.90	409.13	23	20	432.13	3008

BARRIER 5 DESIGN							
Sta.	X	Y	Ground Elevation	Barrier Height	Length of Wall	Top of Wall	Cumm. Length
920+36.17	1,920,131.40	845,347.20	408.68	23	20	431.68	3028
920+56.17	1,920,113.30	845,355.40	408.07	23	20	431.07	3048
920+76.17	1,920,094.90	845,363.70	407.46	23	20	430.46	3068
920+96.17	1,920,076.80	845,371.90	406.85	23	20	429.85	3088
921+16.17	1,920,058.50	845,380.20	406.24	23	20	429.24	3108
921+36.17	1,920,040.30	845,388.40	405.91	23	20	428.91	3128
921+56.17	1,920,022.10	845,396.70	405.74	23	20	428.74	3148
921+76.17	1,920,003.90	845,405.00	405.57	23	20	428.57	3168
921+96.17	1,919,985.80	845,413.20	405.4	23	20	428.4	3188
922+16.17	1,919,967.40	845,421.50	405.23	23	20	428.23	3208
922+36.17	1,919,949.30	845,429.70	404.86	23	20	427.86	3228
922+56.17	1,919,931.00	845,438.00	404.39	23	20	427.39	3248
922+76.17	1,919,912.80	845,446.20	403.91	23	20	426.91	3268
922+96.17	1,919,894.60	845,454.50	403.44	23	20	426.44	3288
923+16.17	1,919,876.40	845,462.80	402.97	23	20	425.97	3308
923+36.17	1,919,858.10	845,471.00	402.54	23	20	425.54	3328
923+56.17	1,919,839.90	845,479.30	402.13	23	20	425.13	3348
923+76.17	1,919,821.80	845,487.50	401.72	23	20	424.72	3368
923+96.17	1,919,803.50	845,495.80	401.32	23	20	424.32	3388
924+16.17	1,919,785.30	845,504.00	400.91	23	20	423.91	3408
924+36.17	1,919,767.10	845,512.30	400.5	23	20	423.5	3428
924+56.17	1,919,748.80	845,520.50	400.1	23	20	423.1	3448
924+76.17	1,919,730.60	845,528.80	399.69	23	20	422.69	3468
924+96.17	1,919,712.40	845,537.10	399.28	23	20	422.28	3488
925+16.17	1,919,694.30	845,545.30	398.87	23	20	421.87	3508
925+36.17	1,919,676.00	845,553.60	398.47	23	20	421.47	3528
925+56.17	1,919,657.80	845,561.80	398.07	23	20	421.07	3548
925+76.17	1,919,639.50	845,570.10	397.67	23	20	420.67	3568
925+96.17	1,919,621.30	845,578.30	397.28	23	20	420.28	3588
926+16.17	1,919,603.10	845,586.60	396.88	23	20	419.88	3608
926+36.17	1,919,584.90	845,594.90	396.5	23	20	419.5	3628
926+56.17	1,919,566.80	845,603.10	396.13	23	20	419.13	3648
926+76.17	1,919,548.50	845,611.40	395.75	23	20	418.75	3668
926+96.17	1,919,530.30	845,619.60	395.38	23	20	418.38	3688
927+16.17	1,919,512.00	845,627.90	395.01	23	20	418.01	3708
927+36.17	1,919,493.80	845,636.10	394.61	23	20	417.61	3728
927+56.17	1,919,475.60	845,644.40	394.2	23	20	417.2	3748
927+76.17	1,919,457.40	845,652.70	393.79	23	20	416.79	3768
927+96.17	1,919,439.30	845,660.90	393.38	23	20	416.38	3788
928+16.17	1,919,421.00	845,669.20	392.97	23	20	415.97	3808
928+36.17	1,919,402.80	845,677.40	392.51	23	20	415.51	3828
928+56.17	1,919,384.50	845,685.70	392.02	23	20	415.02	3848
928+76.17	1,919,366.30	845,693.90	391.54	23	20	414.54	3868
928+96.17	1,919,348.10	845,702.20	391.05	23	20	414.05	3888
929+16.17	1,919,329.90	845,710.50	390.57	23	20	413.57	3908
929+36.17	1,919,311.80	845,718.70	390.2	23	20	413.2	3928
929+56.17	1,919,293.40	845,727.00	389.88	23	20	412.88	3948
929+76.17	1,919,275.30	845,735.20	389.57	23	20	412.57	3968
929+96.17	1,919,257.00	845,743.50	389.26	23	20	412.26	3988
930+16.17	1,919,238.80	845,751.70	388.95	23	20	411.95	4008
930+36.17	1,919,220.60	845,760.00	388.59	23	20	411.59	4028

BARRIER 5 DESIGN							
Sta.	**X**	**Y**	**Ground Elevation**	**Barrier Height**	**Length of Wall**	**Top of Wall**	**Cumm. Length**
930+56.17	1,919,202.40	845,768.30	388.22	23	20	411.22	4048
930+76.17	1,919,184.10	845,776.50	387.85	23	20	410.85	4068
930+96.17	1,919,165.90	845,784.80	387.47	23	20	410.47	4088
931+16.17	1,919,147.80	845,793.00	387.1	23	20	410.1	4108
931+36.17	1,919,129.50	845,801.30	386.96	23	20	409.96	4128
931+56.17	1,919,111.30	845,809.50	386.94	23	20	409.94	4148
931+76.17	1,919,093.10	845,817.80	386.92	21	20	407.92	4168
931+96.17	1,919,074.80	845,826.10	386.9	21	20	407.9	4188
932+16.17	1,919,056.60	845,834.30	386.89	19	20	405.89	4208
932+36.17	1,919,038.40	845,842.60	387.37	19	0	406.37	4228

BARRIER 6 DESIGN							
Sta.	**X**	**Y**	**Elevation**	**Barrier Height**	**Length of Wall**	**Top of Wall**	**Cumm. Length**
768+00.00	1,933,586.64	838,278.86	382.1071	21	20	403.1071	0
768+20.00	1,933,569.10	838,288.47	381.4361	21	20	402.4361	20
768+40.00	1,933,551.56	838,298.08	380.7651	21	20	401.7651	40
768+60.00	1,933,534.02	838,307.68	380.094	21	20	401.094	60
768+80.00	1,933,516.48	838,317.29	379.423	21	20	400.423	80
769+00.00	1,933,498.94	838,326.90	378.752	21	20	399.752	100
769+20.00	1,933,481.40	838,336.51	377.6475	21	20	398.6475	120
769+40.00	1,933,463.86	838,346.12	376.543	23	20	399.543	140
769+60.00	1,933,446.32	838,355.73	375.4385	23	20	398.4385	160
769+80.00	1,933,428.78	838,365.34	374.334	23	20	397.334	180
770+00.00	1,933,411.24	838,374.95	373.2294	23	20	396.2294	200
770+20.00	1,933,393.70	838,384.56	372.6206	23	20	395.6206	220
770+40.00	1,933,376.16	838,394.17	372.0117	23	20	395.0117	240
770+60.00	1,933,358.62	838,403.78	371.4028	23	20	394.4028	260
770+80.00	1,933,341.08	838,413.39	370.7939	23	20	393.7939	280
771+00.00	1,933,323.54	838,423.00	370.185	23	20	393.185	300
771+20.00	1,933,306.00	838,432.61	370.586	23	20	393.586	320
771+40.00	1,933,288.46	838,442.21	370.987	23	20	393.987	340
771+60.00	1,933,270.92	838,451.82	371.388	23	20	394.388	360
771+80.00	1,933,253.38	838,461.43	371.7891	23	20	394.7891	380
772+00.00	1,933,235.84	838,471.04	372.1901	23	20	395.1901	400
772+20.00	1,933,218.30	838,480.65	371.6933	23	20	394.6933	420
772+40.00	1,933,200.76	838,490.26	371.1965	23	20	394.1965	440
772+60.00	1,933,183.21	838,499.87	370.6997	25	20	395.6997	460
772+80.00	1,933,165.67	838,509.48	370.2029	25	20	395.2029	480
773+00.00	1,933,148.13	838,519.09	369.7061	25	20	394.7061	500
773+20.00	1,933,130.59	838,528.70	368.2252	25	20	393.2252	520
773+40.00	1,933,113.05	838,538.31	366.6531	25	20	391.6531	540
773+60.00	1,933,095.56	838,547.97	364.2256	25	20	389.2256	560
773+80.00	1,933,083.67	838,564.05	362.7785	25	20	387.7785	580
774+00.00	1,933,071.79	838,580.14	365.6687	25	20	390.6687	600
774+20.00	1,933,059.90	838,596.22	361.8037	25	20	386.8037	620
774+40.00	1,933,048.01	838,612.31	363.223	25	20	388.223	640
774+60.00	1,933,036.13	838,628.39	365.9492	25	20	390.9492	660
774+80.00	1,933,021.42	838,641.24	367.618	25	20	392.618	680
775+00.00	1,933,003.88	838,650.85	368.2661	25	20	393.2661	700
775+20.00	1,932,986.34	838,660.46	367.6915	25	20	392.6915	720
775+40.00	1,932,968.80	838,670.07	367.53	25	20	392.53	740
775+60.00	1,932,951.26	838,679.68	367.3686	25	20	392.3686	760
775+80.00	1,932,933.72	838,689.29	367.2071	25	20	392.2071	780
776+00.00	1,932,916.18	838,698.90	367.0456	25	20	392.0456	800
776+20.00	1,932,898.64	838,708.51	366.6843	25	19	391.6843	820
776+40.00	1,932,879.91	838,713.54	365.9041	25	20	390.9041	839
776+60.00	1,932,859.91	838,713.65	363.1969	23	20	386.1969	859
776+80.00	1,932,839.91	838,713.77	365.9736	23	20	388.9736	879
777+00.00	1,932,819.91	838,713.88	369.7243	23	20	392.7243	899
777+20.00	1,932,799.91	838,713.99	373.3466	23	20	396.3466	919
777+40.00	1,932,782.21	838,722.97	373.8364	23	20	396.8364	939
777+60.00	1,932,764.67	838,732.58	374.2498	23	20	397.2498	959
777+80.00	1,932,747.13	838,742.19	374.6633	23	20	397.6633	979

BARRIER 6 DESIGN							
Sta.	**X**	**Y**	**Elevation**	**Barrier Height**	**Length of Wall**	**Top of Wall**	**Cumm. Length**
778+00.00	1,932,729.59	838,751.80	375.0768	23	20	398.0768	999
778+20.00	1,932,712.05	838,761.41	375.4903	23	20	398.4903	1019
778+40.00	1,932,694.51	838,771.02	375.9526	23	20	398.9526	1039
778+60.00	1,932,676.97	838,780.63	376.4179	23	20	399.4179	1059
778+80.00	1,932,659.43	838,790.24	376.8832	23	20	399.8832	1079
779+00.00	1,932,641.89	838,799.85	377.3484	23	20	400.3484	1099
779+20.00	1,932,624.35	838,809.46	377.8137	23	20	400.8137	1119
779+40.00	1,932,606.81	838,819.07	377.9003	23	20	400.9003	1139
779+60.00	1,932,589.27	838,828.68	377.9644	23	20	400.9644	1159
779+80.00	1,932,571.73	838,838.29	378.0285	23	20	401.0285	1179
780+00.00	1,932,554.19	838,847.89	378.0927	23	20	401.0927	1199
780+20.00	1,932,536.65	838,857.50	378.1568	23	20	401.1568	1219
780+40.00	1,932,519.11	838,867.11	377.5535	23	20	400.5535	1239
780+60.00	1,932,501.57	838,876.72	376.9105	23	20	399.9105	1259
780+80.00	1,932,484.03	838,886.33	376.2676	23	20	399.2676	1279
781+00.00	1,932,466.49	838,895.94	375.6246	23	20	398.6246	1299
781+20.00	1,932,448.95	838,905.55	374.9817	23	20	397.9817	1319
781+40.00	1,932,431.40	838,915.16	374.0713	23	20	397.0713	1339
781+60.00	1,932,413.86	838,924.77	373.145	23	20	396.145	1359
781+80.00	1,932,396.32	838,934.38	372.2187	23	20	395.2187	1379
782+00.00	1,932,378.78	838,943.99	371.2925	23	20	394.2925	1399
782+20.00	1,932,361.24	838,953.60	370.3662	23	20	393.3662	1419
782+40.00	1,932,343.70	838,963.21	369.2134	23	20	392.2134	1439
782+60.00	1,932,326.16	838,972.81	368.0471	23	20	391.0471	1459
782+80.00	1,932,308.62	838,982.42	366.8808	23	20	389.8808	1479
783+00.00	1,932,291.08	838,992.03	365.7146	25	20	390.7146	1499
783+20.00	1,932,273.54	839,001.64	364.5483	25	20	389.5483	1519
783+40.00	1,932,256.00	839,011.25	363.9733	25	20	388.9733	1539
783+60.00	1,932,238.46	839,020.86	363.4334	25	20	388.4334	1559
783+80.00	1,932,220.92	839,030.47	362.8935	25	20	387.8935	1579
784+00.00	1,932,203.38	839,040.08	362.3536	25	20	387.3536	1599
784+20.00	1,932,185.84	839,049.69	361.8137	25	20	386.8137	1619
784+40.00	1,932,168.30	839,059.30	362.5176	25	20	387.5176	1639
784+60.00	1,932,150.76	839,068.91	363.2952	25	20	388.2952	1659
784+80.00	1,932,133.22	839,078.52	364.0728	25	20	389.0728	1679
785+00.00	1,932,115.68	839,088.13	364.8504	25	20	389.8504	1699
785+20.00	1,932,098.14	839,097.73	365.628	23	20	388.628	1719
785+40.00	1,932,080.60	839,107.34	364.6597	23	20	387.6597	1739
785+60.00	1,932,063.06	839,116.95	363.5878	23	20	386.5878	1759
785+80.00	1,932,045.52	839,126.56	362.5159	23	20	385.5159	1779
786+00.00	1,932,027.98	839,136.17	361.4439	23	20	384.4439	1799
786+20.00	1,932,010.44	839,145.78	360.372	23	20	383.372	1819
786+40.00	1,931,992.90	839,155.39	359.6037	23	20	382.6037	1839
786+60.00	1,931,975.36	839,165.00	358.8535	23	20	381.8535	1859
786+80.00	1,931,957.82	839,174.61	358.1032	23	20	381.1032	1879
787+00.00	1,931,940.28	839,184.22	357.353	23	20	380.353	1899
787+20.00	1,931,922.74	839,193.83	356.6027	23	20	379.6027	1919
787+40.00	1,931,905.20	839,203.44	356.8986	21	20	377.8986	1939
787+60.00	1,931,887.66	839,213.05	357.2566	21	20	378.2566	1959
787+80.00	1,931,870.11	839,222.65	357.6145	19	20	376.6145	1979

Barrier Design Details

BARRIER 6 DESIGN							
Sta.	**X**	**Y**	**Elevation**	**Barrier Height**	**Length of Wall**	**Top of Wall**	**Cumm. Length**
788+00.00	1,931,852.57	839,232.26	357.9725	19	20	376.9725	1999
788+20.00	1,931,835.03	839,241.87	358.3305	19	20	377.3305	2019
788+40.00	1,931,817.49	839,251.48	358.5398	19	20	377.5398	2039
788+60.00	1,931,799.95	839,261.09	358.7402	17	20	375.7402	2059
788+80.00	1,931,782.41	839,270.70	358.9407	17	20	375.9407	2079
789+00.00	1,931,764.87	839,280.31	359.1412	17	20	376.1412	2099
789+20.00	1,931,747.33	839,289.92	359.3416	17	20	376.3416	2119

Attachment C – Graphics

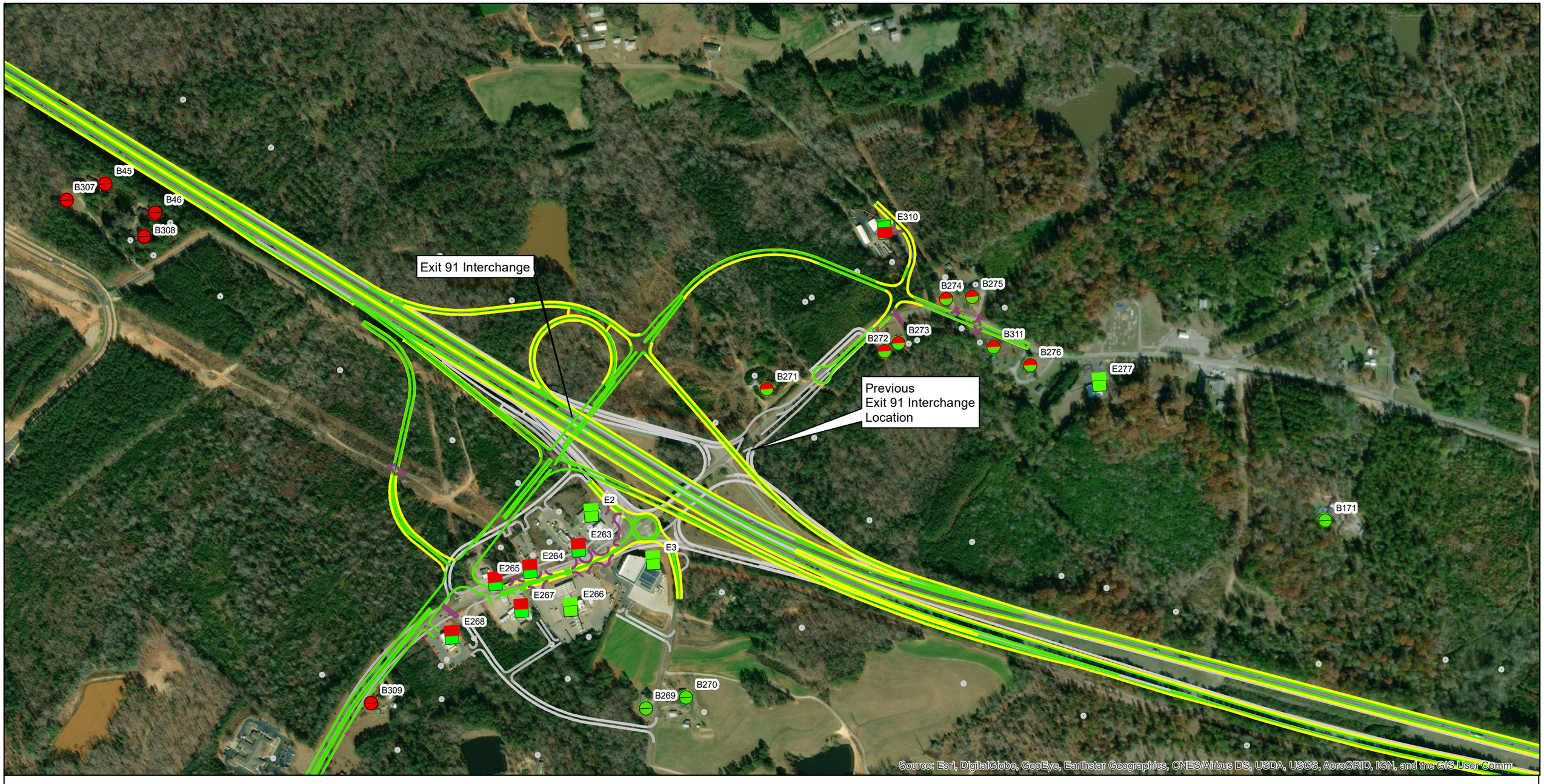


Figure 2: Exit 91 Build Sound Level Impacts
Interstate 26 Widening and Interchange Improvements
Newberry, Lexington and Richland Counties, South Carolina

0 320 640 1,280 1,920 2,560 Feet

Source: USDA - NAIP 2013

Legend

2018 Results
2020 Results

N
W E
S

Noise Impacts

B, Not Impacted

B, Impacted

Bridge Line
Edge of Pavement
Edge of Shoulder
Noise Barrier

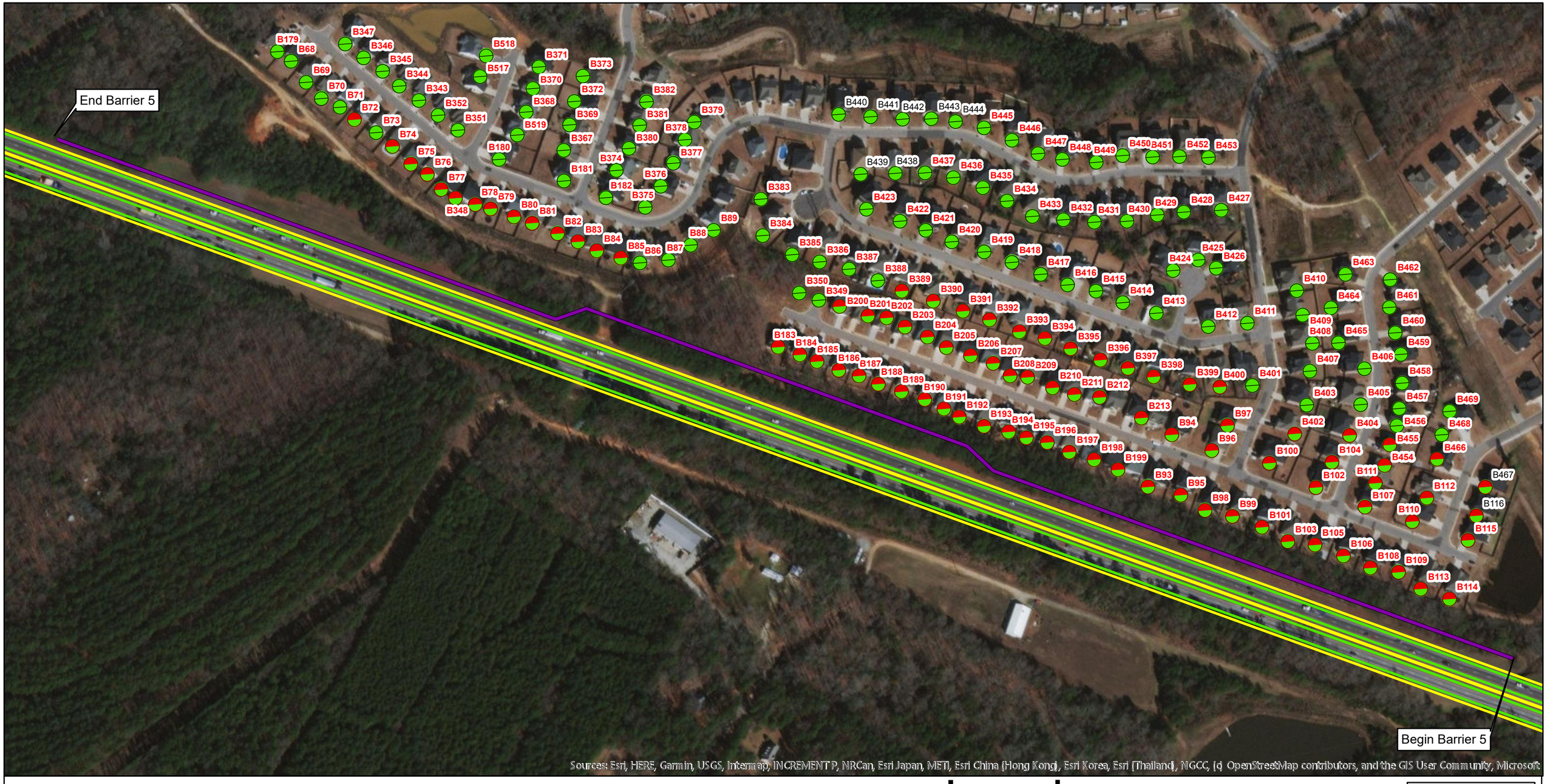


Figure 1A: Barrier 5
Interstate 26 Widening and Interchange Improvements
Newberry, Lexington and Richland Counties, South Carolina

0 155 310 620 930 1,240 Feet

Source: USDA - NAIP 2013

Legend

Without Barrier
With Barrier

Noise Impacts

B, Not Impacted

B, Impacted

N W E S

Bridge Line
Edge of Pavement
Edge of Shoulder
Noise Barrier

Benefitted Receiver (5 dB(A) Reduction)

Non-Benefitted Receiver

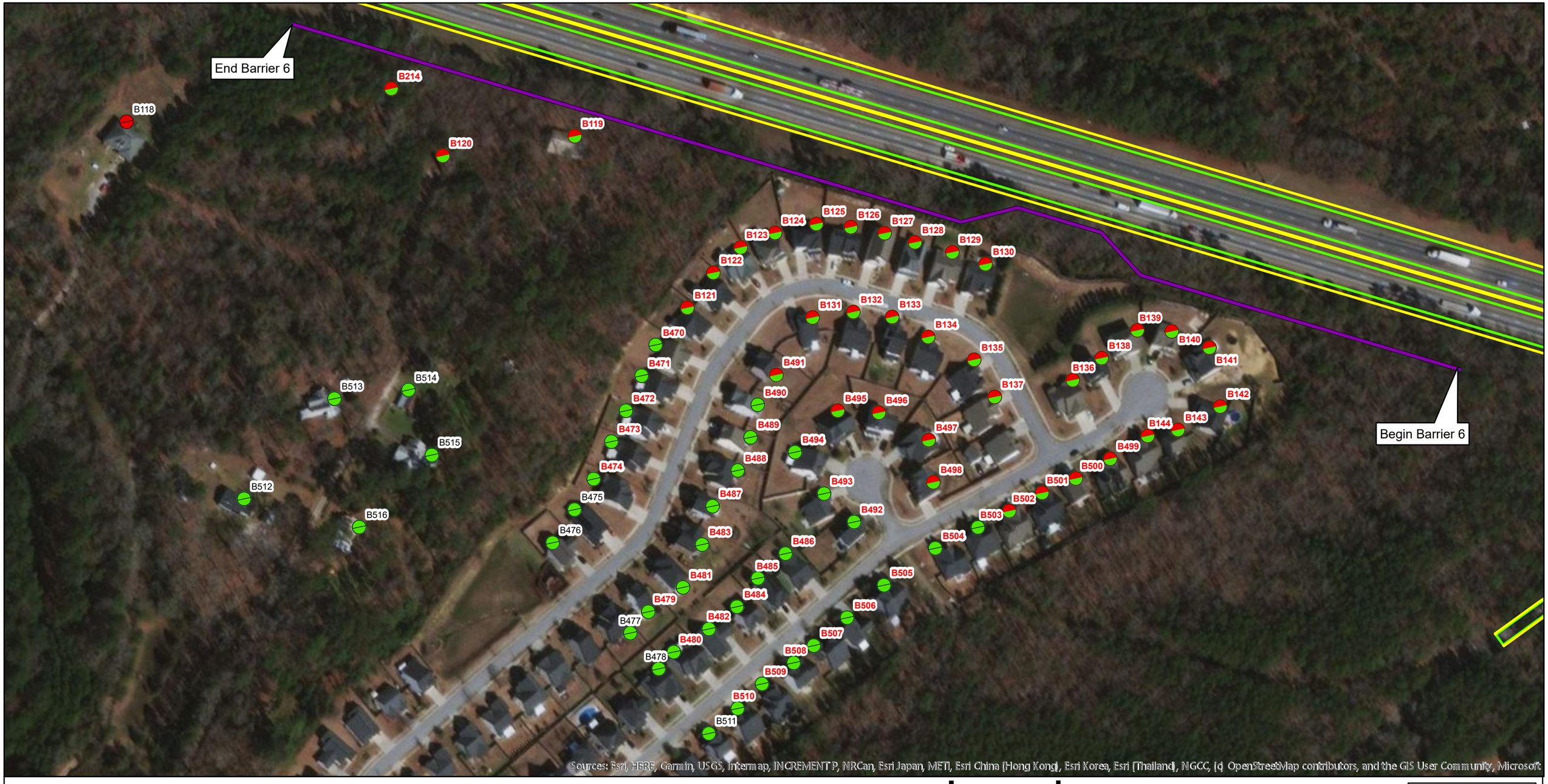


Figure 1B: Barrier 6
Interstate 26 Widening and Interchange Improvements
Newberry, Lexington and Richland Counties, South Carolina

0 100 200 400 600 800 Feet

Source: USDA - NAIP 2013

Legend

Without Barrier
With Barrier

Noise Impacts

B, Not Impacted

B, Impacted

- Bridge Line
- Edge of Pavement
- Edge of Shoulder
- Noise Barrier

Benefitted Receiver (5 dB(A) Reduction)

Non-Benefitted Receiver

Attachment D – TNM Noise Barrier Design Exports

CECS 31 March 2020
JLS TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: 916
RUN: I-26 Widening Barrier 5 Westcott
BARRIER DESIGN: Feasible

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First	Average	Second		Area	On	Important	Volume	
				Point		Point			Struc?	Reflections?		
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier 5 -Barrier41-Barrier42	W	890+08.00	747	25.00	25.00	25.00	20	501				0
		890+28.00	748	25.00	25.00	25.00	20	500				0
		890+48.00	749	25.00	25.00	25.00	20	499				0
		890+68.00	750	25.00	25.00	25.00	20	500				0
		890+88.00	751	25.00	25.00	25.00	20	501				0
		891+08.00	752	25.00	25.00	25.00	20	497				0
		891+28.00	753	25.00	25.00	25.00	20	504				0
		891+48.00	754	25.00	25.00	25.00	20	498				0
		891+68.00	755	25.00	25.00	25.00	20	501				0
		891+88.00	756	25.00	25.00	25.00	20	498				0
		892+08.00	757	25.00	25.00	25.00	20	501				0
		892+28.00	758	25.00	25.00	25.00	20	501				0
		892+48.00	759	25.00	25.00	25.00	20	501				0
		892+68.00	760	25.00	25.00	25.00	20	501				0
		892+88.00	761	25.00	25.00	25.00	20	499				0
		893+08.00	762	25.00	25.00	25.00	20	500				0
		893+28.00	764	25.00	25.00	25.00	20	499				0
		893+48.00	532	25.00	25.00	25.00	20	500				0
		893+68.00	533	25.00	25.00	25.00	20	501				0
		893+88.00	534	25.00	25.00	25.00	20	500				0
		894+08.00	535	25.00	25.00	25.00	20	501				0
		894+28.00	536	25.00	25.00	25.00	20	499				0
		894+48.00	537	25.00	25.00	25.00	20	500				0
		894+68.00	538	25.00	25.00	25.00	20	499				0
		894+88.00	539	25.00	25.00	25.00	20	500				0
		895+08.00	540	25.00	25.00	25.00	20	501				0

		895+28.00	541	25.00	25.00	25.00	20	500				0
		895+48.00	542	25.00	25.00	25.00	20	501				0
		895+68.00	543	25.00	25.00	25.00	20	499				0
		895+88.00	544	25.00	25.00	25.00	20	500				0
		896+08.00	545	25.00	25.00	25.00	20	499				0
		896+28.00	546	25.00	25.00	25.00	20	503				0
		896+48.00	547	25.00	25.00	25.00	20	499				0
		896+68.00	548	25.00	25.00	25.00	20	500				0
		896+88.00	549	25.00	25.00	25.00	20	501				0
		897+08.00	550	25.00	25.00	25.00	20	499				0
		897+28.00	551	25.00	25.00	25.00	20	500				0
		897+48.00	552	25.00	25.00	25.00	20	501				0
		897+68.00	553	25.00	25.00	25.00	20	500				0
		897+88.00	554	25.00	25.00	25.00	20	499				0
		898+08.00	555	25.00	25.00	25.00	20	500				0
		898+28.00	556	25.00	25.00	25.00	20	501				0
		898+48.00	557	25.00	25.00	25.00	20	498				0
		898+68.00	558	25.00	25.00	25.00	20	504				0
		898+88.00	559	25.00	25.00	25.00	20	498				0
		899+08.00	560	25.00	25.00	25.00	20	501				0
		899+28.00	561	25.00	25.00	25.00	20	498				0
		899+48.00	562	25.00	25.00	25.00	20	501				0
		899+68.00	563	25.00	25.00	25.00	20	501				0
		899+88.00	564	25.00	25.00	25.00	20	499				0
		900+08.00	565	25.00	25.00	25.00	20	503				0
		900+28.00	566	25.00	25.00	25.00	20	499				0
		900+48.00	567	25.00	25.00	25.00	20	500				0
		900+68.00	568	25.00	25.00	25.00	20	499				0
		900+88.00	569	25.00	25.00	25.00	20	500				0
		901+08.00	570	25.00	25.00	25.00	20	501				0
		901+28.00	571	25.00	25.00	25.00	20	500				0
		901+48.00	572	25.00	25.00	25.00	20	501				0
		901+68.00	573	25.00	25.00	25.00	20	499				0
		901+88.00	574	25.00	25.00	25.00	20	500				0
		902+08.00	575	25.00	25.00	25.00	20	499				0
		902+28.00	576	25.00	25.00	25.00	20	500				0
		902+48.00	577	25.00	25.00	25.00	20	501				0
		902+68.00	578	25.00	25.00	25.00	20	500				0
		902+88.00	579	25.00	25.00	25.00	20	501				0

		903+08.00	580	25.00	25.00	25.00	20	499				0
		903+28.00	581	25.00	25.00	25.00	20	500				0
		903+48.00	582	25.00	25.00	25.00	20	499				0
		903+68.00	583	25.00	25.00	25.00	20	503				0
		903+88.00	584	25.00	25.00	25.00	20	499				0
		904+08.00	585	25.00	25.00	25.00	20	500				0
		904+28.00	586	25.00	25.00	25.00	20	501				0
		904+48.00	587	25.00	25.00	25.00	20	499				0
		904+68.00	588	25.00	25.00	25.00	20	500				0
		904+88.00	589	25.00	25.00	25.00	20	499				0
		905+08.00	590	25.00	25.00	25.00	2	53				0
		905+09.98	591	25.00	25.00	25.00	20	499				0
		905+29.98	592	25.00	25.00	25.00	20	499				0
		905+49.98	593	25.00	25.00	25.00	20	500				0
		905+69.98	594	25.00	25.00	25.00	20	499				0
		905+89.98	595	23.00	23.00	23.00	18	418				0
		906+08.08	596	23.00	23.00	23.00	20	461				0
		906+28.08	597	23.00	23.00	23.00	20	458				0
		906+48.08	598	23.00	23.00	23.00	20	461				0
		906+68.08	599	23.00	23.00	23.00	20	461				0
		906+88.08	600	23.00	23.00	23.00	20	461				0
		907+08.08	601	23.00	23.00	23.00	20	458				0
		907+28.08	602	23.00	23.00	23.00	20	461				0
		907+48.08	603	23.00	23.00	23.00	20	461				0
		907+68.08	604	23.00	23.00	23.00	20	457				0
		907+88.08	605	23.00	23.00	23.00	20	464				0
		908+08.08	606	23.00	23.00	23.00	20	457				0
		908+28.08	607	23.00	23.00	23.00	20	461				0
		908+48.08	608	23.00	23.00	23.00	20	457				0
		908+68.08	609	23.00	23.00	23.00	20	461				0
		908+88.08	610	23.00	23.00	23.00	20	460				0
		909+08.08	611	23.00	23.00	23.00	20	461				0
		909+28.08	612	23.00	23.00	23.00	20	461				0
		909+48.08	613	23.00	23.00	23.00	20	457				0
		909+68.08	614	23.00	23.00	23.00	20	461				0
		909+88.08	615	23.00	23.00	23.00	20	457				0
		910+08.08	616	23.00	23.00	23.00	20	461				0
		910+28.08	617	23.00	23.00	23.00	20	460				0
		910+48.08	618	23.00	23.00	23.00	20	461				0

		910+68.08	619	23.00	23.00	23.00	20	461				0
		910+88.08	620	23.00	23.00	23.00	20	457				0
		911+08.08	621	23.00	23.00	23.00	20	461				0
		911+28.08	622	23.00	23.00	23.00	20	457				0
		911+48.08	623	23.00	23.00	23.00	20	464				0
		911+68.08	624	23.00	23.00	23.00	20	457				0
		911+88.08	625	23.00	23.00	23.00	20	461				0
		912+08.08	626	23.00	23.00	23.00	20	460				0
		912+28.08	627	23.00	23.00	23.00	20	459				0
		912+48.08	628	23.00	23.00	23.00	20	461				0
		912+68.08	629	23.00	23.00	23.00	20	460				0
		912+88.08	630	23.00	23.00	23.00	20	461				0
		913+08.08	631	25.00	25.00	25.00	20	497				0
		913+28.08	632	25.00	25.00	25.00	20	501				0
		913+48.08	633	25.00	25.00	25.00	20	500				0
		913+68.08	634	25.00	25.00	25.00	20	499				0
		913+88.08	635	25.00	25.00	25.00	20	504				0
		914+08.08	636	25.00	25.00	25.00	20	498				0
		914+28.08	637	25.00	25.00	25.00	20	501				0
		914+48.08	638	25.00	25.00	25.00	20	498				0
		914+68.08	639	25.00	25.00	25.00	20	501				0
		914+88.08	640	25.00	25.00	25.00	20	501				0
		915+08.08	641	25.00	25.00	25.00	20	501				0
		915+28.08	642	25.00	25.00	25.00	20	501				0
		915+48.08	643	25.00	25.00	25.00	20	498				0
		915+68.08	644	25.00	25.00	25.00	20	501				0
		915+88.08	645	25.00	25.00	25.00	20	497				0
		916+08.08	646	15.00	15.00	15.00	20	301				0
		916+28.08	647	15.00	15.00	15.00	20	300				0
		916+48.08	648	15.00	15.00	15.00	20	301				0
		916+68.08	649	23.00	23.00	23.00	20	460				0
		916+88.08	650	23.00	23.00	23.00	20	459				0
		917+08.10	652	23.00	23.00	23.00	20	461				0
		917+28.10	653	23.00	23.00	23.00	20	462				0
		917+48.10	654	23.00	23.00	23.00	20	458				0
		917+68.10	655	23.00	23.00	23.00	20	461				0
		917+88.10	656	23.00	23.00	23.00	8	184				0
		917+96.17	657	23.00	23.00	23.00	20	460				0
		918+16.17	658	23.00	23.00	23.00	20	461				0

		918+36.17	659	23.00	23.00	23.00	20	460				0
		918+56.17	660	23.00	23.00	23.00	20	459				0
		918+76.17	661	23.00	23.00	23.00	20	461				0
		918+96.17	662	23.00	23.00	23.00	20	458				0
		919+16.17	663	23.00	23.00	23.00	20	461				0
		919+36.17	664	23.00	23.00	23.00	20	461				0
		919+56.17	665	23.00	23.00	23.00	20	461				0
		919+76.17	666	23.00	23.00	23.00	20	461				0
		919+96.17	667	23.00	23.00	23.00	20	458				0
		920+16.17	668	23.00	23.00	23.00	20	461				0
		920+36.17	669	23.00	23.00	23.00	20	457				0
		920+56.17	670	23.00	23.00	23.00	20	464				0
		920+76.17	671	23.00	23.00	23.00	20	457				0
		920+96.17	672	23.00	23.00	23.00	20	461				0
		921+16.17	673	23.00	23.00	23.00	20	460				0
		921+36.17	674	23.00	23.00	23.00	20	459				0
		921+56.17	675	23.00	23.00	23.00	20	461				0
		921+76.17	676	23.00	23.00	23.00	20	457				0
		921+96.17	677	23.00	23.00	23.00	20	464				0
		922+16.17	678	23.00	23.00	23.00	20	457				0
		922+36.17	679	23.00	23.00	23.00	20	461				0
		922+56.17	680	23.00	23.00	23.00	20	460				0
		922+76.17	681	23.00	23.00	23.00	20	459				0
		922+96.17	682	23.00	23.00	23.00	20	461				0
		923+16.17	683	23.00	23.00	23.00	20	460				0
		923+36.17	684	23.00	23.00	23.00	20	461				0
		923+56.17	685	23.00	23.00	23.00	20	457				0
		923+76.17	686	23.00	23.00	23.00	20	461				0
		923+96.17	687	23.00	23.00	23.00	20	460				0
		924+16.17	688	23.00	23.00	23.00	20	459				0
		924+36.17	689	23.00	23.00	23.00	20	463				0
		924+56.17	690	23.00	23.00	23.00	20	459				0
		924+76.17	691	23.00	23.00	23.00	20	461				0
		924+96.17	692	23.00	23.00	23.00	20	457				0
		925+16.17	693	23.00	23.00	23.00	20	461				0
		925+36.17	694	23.00	23.00	23.00	20	460				0
		925+56.17	695	23.00	23.00	23.00	20	461				0
		925+76.17	696	23.00	23.00	23.00	20	460				0
		925+96.17	697	23.00	23.00	23.00	20	459				0

		926+16.17	698	23.00	23.00	23.00	20	461				0
		926+36.17	699	23.00	23.00	23.00	20	458				0
		926+56.17	700	23.00	23.00	23.00	20	461				0
		926+76.17	701	23.00	23.00	23.00	20	461				0
		926+96.17	702	23.00	23.00	23.00	20	461				0
		927+16.17	703	23.00	23.00	23.00	20	461				0
		927+36.17	704	23.00	23.00	23.00	20	458				0
		927+56.17	705	23.00	23.00	23.00	20	461				0
		927+76.17	706	23.00	23.00	23.00	20	457				0
		927+96.17	707	23.00	23.00	23.00	20	461				0
		928+16.17	708	23.00	23.00	23.00	20	460				0
		928+36.17	709	23.00	23.00	23.00	20	461				0
		928+56.17	710	23.00	23.00	23.00	20	460				0
		928+76.17	711	23.00	23.00	23.00	20	459				0
		928+96.17	712	23.00	23.00	23.00	20	461				0
		929+16.17	713	23.00	23.00	23.00	20	457				0
		929+36.17	714	23.00	23.00	23.00	20	464				0
		929+56.17	715	23.00	23.00	23.00	20	457				0
		929+76.17	716	23.00	23.00	23.00	20	461				0
		929+96.17	717	23.00	23.00	23.00	20	460				0
		930+16.17	718	23.00	23.00	23.00	20	459				0
		930+36.17	719	23.00	23.00	23.00	20	461				0
		930+56.17	720	23.00	23.00	23.00	20	460				0
		930+76.17	721	23.00	23.00	23.00	20	461				0
		930+96.17	722	23.00	23.00	23.00	20	457				0
		931+16.17	723	23.00	23.00	23.00	20	461				0
		931+36.17	724	23.00	23.00	23.00	20	460				0
		931+56.17	725	23.00	23.00	23.00	20	459				0
		931+76.17	726	21.00	21.00	21.00	20	424				0
		931+96.17	727	21.00	21.00	21.00	20	418				0
		932+16.17	728	19.00	19.00	19.00	20	381				0
		932+36.17	729	0.00	0.00	0.00	0	0				0
		932+56.17	730	0.00	0.00	0.00	0	0				0
		932+76.17	731	0.00	0.00	0.00	0	0				0
		932+96.17	732	0.00	0.00	0.00	0	0				0
		933+16.17	733	0.00	0.00	0.00	0	0				0
		933+36.17	734	0.00	0.00	0.00	0	0				0
		933+56.17	735	0.00	0.00	0.00	0	0				0
		933+76.17	736	0.00	0.00	0.00	0	0				0

		933+96.17	737	0.00	0.00	0.00	0	0				0
		934+16.17	738	0.00	0.00	0.00	0	0				0

CECS 31 March 2020
JLS TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: 916
RUN: I-26 Widening Barrier 6 Arbor Springs
BARRIER DESIGN: Barrier 6 Final

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First	Average	Second		Area	On	Important	Volume	
				Point		Point			Struc?	Reflections?		
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier9	W	768+00.00	335	21.00	21.00	21.00	20	419				0
		768+20.00	336	21.00	21.00	21.00	20	419				0
		768+40.00	337	21.00	21.00	21.00	20	421				0
		768+60.00	338	21.00	21.00	21.00	20	419				0
		768+80.00	339	21.00	21.00	21.00	20	421				0
		769+00.00	340	21.00	21.00	21.00	20	419				0
		769+20.00	341	21.00	21.00	21.00	20	419				0
		769+40.00	342	23.00	23.00	23.00	20	461				0
		769+60.00	343	23.00	23.00	23.00	20	459				0
		769+80.00	344	23.00	23.00	23.00	20	459				0
		770+00.00	345	23.00	23.00	23.00	20	461				0
		770+20.00	346	23.00	23.00	23.00	20	459				0
		770+40.00	347	23.00	23.00	23.00	20	462				0
		770+60.00	348	23.00	23.00	23.00	20	459				0
		770+80.00	349	23.00	23.00	23.00	20	462				0
		771+00.00	350	23.00	23.00	23.00	20	459				0
		771+20.00	351	23.00	23.00	23.00	20	459				0
		771+40.00	352	23.00	23.00	23.00	20	462				0
		771+60.00	353	23.00	23.00	23.00	20	459				0
		771+80.00	354	23.00	23.00	23.00	20	462				0
		772+00.00	355	23.00	23.00	23.00	20	460				0
		772+20.00	356	23.00	23.00	23.00	20	459				0
		772+40.00	357	23.00	23.00	23.00	20	459				0
		772+60.00	358	25.00	25.00	25.00	20	499				0
		772+80.00	359	25.00	25.00	25.00	20	502				0
		773+00.00	360	25.00	25.00	25.00	20	499				0

		773+20.00	361	25.00	25.00	25.00	20	499				0
		773+40.00	362	25.00	25.00	25.00	20	500				0
		773+60.00	363	25.00	25.00	25.00	20	501				0
		773+80.00	364	25.00	25.00	25.00	20	500				0
		774+00.00	365	25.00	25.00	25.00	20	499				0
		774+20.00	366	25.00	25.00	25.00	20	501				0
		774+40.00	367	25.00	25.00	25.00	20	499				0
		774+60.00	368	25.00	25.00	25.00	20	488				0
		774+80.00	369	25.00	25.00	25.00	20	500				0
		775+00.00	370	25.00	25.00	25.00	20	502				0
		775+20.00	371	25.00	25.00	25.00	20	499				0
		775+40.00	372	25.00	25.00	25.00	20	499				0
		775+60.00	373	25.00	25.00	25.00	20	499				0
		775+80.00	374	25.00	25.00	25.00	20	499				0
		776+00.00	375	25.00	25.00	25.00	20	502				0
		776+20.00	376	25.00	25.00	25.00	19	485				0
		776+40.00	377	25.00	25.00	25.00	20	500				0
		776+60.00	378	23.00	23.00	23.00	20	460				0
		776+80.00	379	23.00	23.00	23.00	20	460				0
		777+00.00	380	23.00	23.00	23.00	20	460				0
		777+20.00	381	23.00	23.00	23.00	20	455				0
		777+40.00	382	23.00	23.00	23.00	20	459				0
		777+60.00	383	23.00	23.00	23.00	20	461				0
		777+80.00	384	23.00	23.00	23.00	20	459				0
		778+00.00	385	23.00	23.00	23.00	20	461				0
		778+20.00	386	23.00	23.00	23.00	20	459				0
		778+40.00	387	23.00	23.00	23.00	20	459				0
		778+60.00	388	23.00	23.00	23.00	20	461				0
		778+80.00	389	23.00	23.00	23.00	20	459				0
		779+00.00	390	23.00	23.00	23.00	20	463				0
		779+20.00	391	23.00	23.00	23.00	20	459				0
		779+40.00	392	23.00	23.00	23.00	20	459				0
		779+60.00	393	23.00	23.00	23.00	20	459				0
		779+80.00	394	23.00	23.00	23.00	20	459				0
		780+00.00	395	23.00	23.00	23.00	20	462				0
		780+20.00	396	23.00	23.00	23.00	20	459				0
		780+40.00	397	23.00	23.00	23.00	20	459				0
		780+60.00	398	23.00	23.00	23.00	20	462				0
		780+80.00	399	23.00	23.00	23.00	20	459				0

		781+00.00	400	23.00	23.00	23.00	20	463				0
		781+20.00	401	23.00	23.00	23.00	20	459				0
		781+40.00	402	23.00	23.00	23.00	20	459				0
		781+60.00	403	23.00	23.00	23.00	20	461				0
		781+80.00	404	23.00	23.00	23.00	20	459				0
		782+00.00	405	23.00	23.00	23.00	20	459				0
		782+20.00	406	23.00	23.00	23.00	20	459				0
		782+40.00	407	23.00	23.00	23.00	20	459				0
		782+60.00	408	23.00	23.00	23.00	20	461				0
		782+80.00	409	23.00	23.00	23.00	20	459				0
		783+00.00	410	25.00	25.00	25.00	20	502				0
		783+20.00	411	25.00	25.00	25.00	20	500				0
		783+40.00	412	25.00	25.00	25.00	20	499				0
		783+60.00	413	25.00	25.00	25.00	20	502				0
		783+80.00	414	25.00	25.00	25.00	20	499				0
		784+00.00	415	25.00	25.00	25.00	20	501				0
		784+20.00	416	25.00	25.00	25.00	20	499				0
		784+40.00	417	25.00	25.00	25.00	20	499				0
		784+60.00	418	25.00	25.00	25.00	20	499				0
		784+80.00	419	25.00	25.00	25.00	20	499				0
		785+00.00	420	25.00	25.00	25.00	20	501				0
		785+20.00	421	23.00	23.00	23.00	20	459				0
		785+40.00	422	23.00	23.00	23.00	20	460				0
		785+60.00	423	23.00	23.00	23.00	20	462				0
		785+80.00	424	23.00	23.00	23.00	20	459				0
		786+00.00	425	23.00	23.00	23.00	20	462				0
		786+20.00	426	23.00	23.00	23.00	20	459				0
		786+40.00	427	23.00	23.00	23.00	20	459				0
		786+60.00	428	23.00	23.00	23.00	20	462				0
		786+80.00	429	23.00	23.00	23.00	20	459				0
		787+00.00	430	23.00	23.00	23.00	20	459				0
		787+20.00	431	23.00	23.00	23.00	20	459				0
		787+40.00	432	21.00	21.00	21.00	20	419				0
		787+60.00	433	21.00	21.00	21.00	20	422				0
		787+80.00	434	19.00	19.00	19.00	20	379				0
		788+00.00	435	19.00	19.00	19.00	20	381				0
		788+20.00	436	19.00	19.00	19.00	20	379				0
		788+40.00	437	19.00	19.00	19.00	20	379				0
		788+60.00	438	17.00	17.00	17.00	20	341				0

		788+80.00	439	17.00	17.00	17.00	20	340				0
		789+00.00	440	17.00	17.00	17.00	20	341				0

Attachment E – TNM Sound Level Exports

<Organization?>
<Analysis By?>

7 April 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: <Run Title?>
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
G1	2	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
E5	3	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
E6	4	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B45	33	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B46	34	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B47	35	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B48	36	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B49	37	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B50	38	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B51	39	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B52	40	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B53	41	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B54	42	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B55	43	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B56	44	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B57	45	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B58	46	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B59	47	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B60	48	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B61	49	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B62	50	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B63	51	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B64	52	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B65	53	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

B66	54	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B67	55	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B68	56	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B69	57	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B70	58	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B71	59	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B72	60	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B73	61	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B74	62	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B75	63	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B76	64	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B77	65	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B78	66	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B79	67	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B80	68	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B81	69	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B82	70	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B83	71	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B84	72	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B85	73	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B86	74	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B87	75	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B88	76	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B89	77	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
E90	78	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B91	79	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
E92	80	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B93	81	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B94	82	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B95	83	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B96	84	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B97	85	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B98	86	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B99	87	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B100	88	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B101	89	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B102	90	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B103	91	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B104	92	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B105	93	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B106	94	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

B107	95	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B108	96	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B109	97	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B110	98	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B111	99	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B112	100	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B113	101	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B114	102	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B115	103	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B116	104	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B171	156	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B172	157	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B173	158	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B174	159	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B175	160	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B176	161	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B177	162	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B178	163	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B179	164	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B180	165	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B181	166	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B182	167	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B183	168	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B184	169	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B185	170	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B186	171	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B187	172	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B188	173	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B189	174	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B190	175	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B191	176	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B192	177	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B193	178	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B194	179	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B195	180	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B196	181	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B197	182	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B198	183	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B199	184	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B200	185	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B201	186	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

B202	187	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B203	188	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B204	189	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B205	190	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B206	191	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B207	192	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B208	193	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B209	194	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B210	195	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B211	196	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B212	197	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B213	198	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
G249	205	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
G250	206	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B307	224	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B308	225	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B312	226	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B313	227	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B314	228	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B315	229	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B316	230	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B317	231	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B318	232	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B319	233	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B320	234	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B321	235	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B322	236	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B323	237	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B324	238	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B325	239	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B326	240	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B327	241	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B328	243	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B329	244	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B330	245	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B331	246	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B332	247	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B333	248	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
E334	249	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B335	250	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B336	251	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

B337	252	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B338	253	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
C339	254	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B340	255	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B341	256	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
C342	257	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B343	258	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B344	259	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B345	260	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B346	261	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B347	262	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B348	263	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B349	264	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B350	265	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B351	266	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B352	267	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B353	268	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B367	281	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B368	282	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B369	283	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B370	284	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B371	285	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B372	286	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B373	287	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B374	288	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B375	289	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B376	290	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B377	291	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B378	292	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B379	293	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B380	294	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B381	295	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B382	296	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B383	297	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B384	298	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B385	299	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B386	300	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B387	301	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B388	302	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B389	303	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B390	304	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

B391	305	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B392	306	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B393	307	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B394	308	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B395	309	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B396	310	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B397	311	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B398	312	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B399	313	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B400	314	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B401	315	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B402	316	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B403	317	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B404	318	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B405	319	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B406	320	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B407	321	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B408	322	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B409	323	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B410	324	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B411	325	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B412	326	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B413	327	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B414	328	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B415	329	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B416	330	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B417	331	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B418	332	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B419	333	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B420	334	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B421	335	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B422	336	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B423	337	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B424	338	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B425	339	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B426	340	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B427	341	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B428	342	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B429	343	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B430	344	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B431	345	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

B432	346	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B433	347	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B434	348	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B435	349	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B436	350	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B437	351	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B438	352	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B439	353	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B440	354	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B441	355	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B442	356	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B443	357	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B444	358	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B445	359	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B446	360	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B447	361	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B448	362	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B449	363	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B450	364	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B451	365	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B452	366	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B453	367	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B454	368	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B455	369	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B456	370	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B457	371	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B458	372	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B459	373	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B460	374	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B461	375	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B462	376	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B463	377	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B464	378	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B465	379	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B466	380	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B467	381	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B468	382	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B469	383	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B517	431	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B518	432	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
B519	433	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

E2	477	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
E3	478	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
E1	479	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
E263	480	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
E264	481	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
E265	482	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
E266	483	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
E267	484	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
E268	485	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
B269	486	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
B270	487	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
B271	488	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
B272	489	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
B273	491	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
B274	492	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
B275	493	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
B276	494	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0
E277	495	1	0.0	55.7	66	55.7	10	----	55.7	0.0	8	-8.0
B309	496	1	0.0	75.3	66	75.3	10	Snd Lvl	75.3	0.0	8	-8.0
E310	497	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
B311	499	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	291	0.0	0.0	0.0
All Impacted	9	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

CECS 31 March 2020
JLS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 916
RUN: I-26 Widening Barrier 5 Westcott
BARRIER DESIGN: Feasible
ATMOSPHERICS: 87 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
B68	162	1	0.0	64.6	66	64.6	15	----	57.4	7.2	8	-0.8
B69	163	1	0.0	65.1	66	65.1	15	----	57.5	7.6	8	-0.4
B70	164	1	0.0	65.7	66	65.7	15	----	57.6	8.1	8	0.1
B71	165	1	0.0	65.8	66	65.8	15	----	57.5	8.3	8	0.3
B72	166	1	0.0	66.1	66	66.1	15	Snd Lvl	57.9	8.2	8	0.2
B73	167	1	0.0	65.9	66	65.9	15	----	57.8	8.1	8	0.1
B74	168	1	0.0	66.0	66	66.0	15	Snd Lvl	57.8	8.2	8	0.2
B75	169	1	0.0	66.4	66	66.4	15	Snd Lvl	57.9	8.5	8	0.5
B76	170	1	0.0	66.8	66	66.8	15	Snd Lvl	58.2	8.6	8	0.6
B77	171	1	0.0	67.4	66	67.4	15	Snd Lvl	58.5	8.9	8	0.9
B78	172	1	0.0	67.8	66	67.8	15	Snd Lvl	58.6	9.2	8	1.2
B79	173	1	0.0	67.6	66	67.6	15	Snd Lvl	58.4	9.2	8	1.2
B80	174	1	0.0	67.6	66	67.6	15	Snd Lvl	58.4	9.2	8	1.2
B81	175	1	0.0	67.7	66	67.7	15	Snd Lvl	58.4	9.3	8	1.3
B82	176	1	0.0	68.0	66	68.0	15	Snd Lvl	58.5	9.5	8	1.5
B83	177	1	0.0	68.1	66	68.1	15	Snd Lvl	58.6	9.5	8	1.5
B84	178	1	0.0	68.0	66	68.0	15	Snd Lvl	58.6	9.4	8	1.4
B85	179	1	0.0	67.0	66	67.0	15	Snd Lvl	58.6	8.4	8	0.4
B86	180	1	0.0	65.6	66	65.6	15	----	58.1	7.5	8	-0.5
B87	181	1	0.0	63.3	66	63.3	15	----	57.2	6.1	8	-1.9
B88	182	1	0.0	61.8	66	61.8	15	----	56.4	5.4	8	-2.6
B89	183	1	0.0	61.4	66	61.4	15	----	55.9	5.5	8	-2.5
B93	184	1	0.0	75.3	66	75.3	15	Snd Lvl	61.2	14.1	8	6.1
B94	185	1	0.0	70.5	66	70.5	15	Snd Lvl	59.4	11.1	8	3.1

B95	186	1	0.0	74.9	66	74.9	15	Snd Lvl	61.0	13.9	8	5.9
B96	187	1	0.0	70.5	66	70.5	15	Snd Lvl	59.6	10.9	8	2.9
B97	188	1	0.0	68.6	66	68.6	15	Snd Lvl	58.6	10.0	8	2.0
B98	391	1	0.0	75.3	66	75.3	15	Snd Lvl	61.7	13.6	8	5.6
B99	594	1	0.0	74.0	66	74.0	15	Snd Lvl	61.2	12.8	8	4.8
B100	595	1	0.0	69.4	66	69.4	15	Snd Lvl	59.5	9.9	8	1.9
B101	596	1	0.0	73.9	66	73.9	15	Snd Lvl	61.3	12.6	8	4.6
B102	597	1	0.0	70.3	66	70.3	15	Snd Lvl	60.2	10.1	8	2.1
B103	598	1	0.0	75.3	66	75.3	15	Snd Lvl	61.6	13.7	8	5.7
B104	599	1	0.0	68.6	66	68.6	15	Snd Lvl	59.5	9.1	8	1.1
B105	600	1	0.0	74.9	66	74.9	15	Snd Lvl	61.8	13.1	8	5.1
B106	601	1	0.0	74.4	66	74.4	15	Snd Lvl	62.1	12.3	8	4.3
B107	602	1	0.0	70.3	66	70.3	15	Snd Lvl	61.0	9.3	8	1.3
B108	603	1	0.0	73.6	66	73.6	15	Snd Lvl	62.5	11.1	8	3.1
B109	604	1	0.0	71.5	66	71.5	15	Snd Lvl	62.9	8.6	8	0.6
B110	605	1	0.0	70.1	66	70.1	15	Snd Lvl	62.1	8.0	8	0.0
B111	606	1	0.0	68.8	66	68.8	15	Snd Lvl	60.4	8.4	8	0.4
B112	607	1	0.0	68.3	66	68.3	15	Snd Lvl	61.4	6.9	8	-1.1
B113	608	1	0.0	71.4	66	71.4	15	Snd Lvl	63.7	7.7	8	-0.3
B114	610	1	0.0	71.0	66	71.0	15	Snd Lvl	64.4	6.6	8	-1.4
B115	611	1	0.0	68.6	66	68.6	15	Snd Lvl	63.5	5.1	8	-2.9
B116	612	1	0.0	67.6	66	67.6	15	Snd Lvl	62.8	4.8	8	-3.2
B179	613	1	0.0	64.4	66	64.4	15	----	57.5	6.9	8	-1.1
B180	614	1	0.0	64.9	66	64.9	15	----	56.6	8.3	8	0.3
B181	615	1	0.0	64.2	66	64.2	15	----	56.5	7.7	8	-0.3
B182	616	1	0.0	63.7	66	63.7	15	----	56.4	7.3	8	-0.7
B183	617	1	0.0	73.7	66	73.7	15	Snd Lvl	61.4	12.3	8	4.3
B184	618	1	0.0	73.2	66	73.2	15	Snd Lvl	61.2	12.0	8	4.0
B185	619	1	0.0	73.9	66	73.9	15	Snd Lvl	61.6	12.3	8	4.3
B186	620	1	0.0	74.3	66	74.3	15	Snd Lvl	61.8	12.5	8	4.5
B187	621	1	0.0	74.1	66	74.1	15	Snd Lvl	61.6	12.5	8	4.5
B188	622	1	0.0	74.6	66	74.6	15	Snd Lvl	61.7	12.9	8	4.9
B189	623	1	0.0	74.0	66	74.0	15	Snd Lvl	60.9	13.1	8	5.1
B190	624	1	0.0	74.1	66	74.1	15	Snd Lvl	61.1	13.0	8	5.0
B191	625	1	0.0	74.8	66	74.8	15	Snd Lvl	61.5	13.3	8	5.3
B192	626	1	0.0	75.1	66	75.1	15	Snd Lvl	61.6	13.5	8	5.5
B193	627	1	0.0	75.1	66	75.1	15	Snd Lvl	61.3	13.8	8	5.8
B194	628	1	0.0	74.9	66	74.9	15	Snd Lvl	61.3	13.6	8	5.6
B195	629	1	0.0	74.8	66	74.8	15	Snd Lvl	61.7	13.1	8	5.1
B196	630	1	0.0	74.5	66	74.5	15	Snd Lvl	61.1	13.4	8	5.4
B197	631	1	0.0	74.6	66	74.6	15	Snd Lvl	61.0	13.6	8	5.6

B198	632	1	0.0	74.4	66	74.4	15	Snd Lvl	60.8	13.6	8	5.6
B199	633	1	0.0	74.6	66	74.6	15	Snd Lvl	60.7	13.9	8	5.9
B200	634	1	0.0	67.2	66	67.2	15	Snd Lvl	58.7	8.5	8	0.5
B201	635	1	0.0	68.5	66	68.5	15	Snd Lvl	59.3	9.2	8	1.2
B202	636	1	0.0	68.6	66	68.6	15	Snd Lvl	59.4	9.2	8	1.2
B203	637	1	0.0	68.9	66	68.9	15	Snd Lvl	59.3	9.6	8	1.6
B204	638	1	0.0	69.1	66	69.1	15	Snd Lvl	59.1	10.0	8	2.0
B205	639	1	0.0	69.4	66	69.4	15	Snd Lvl	59.2	10.2	8	2.2
B206	640	1	0.0	69.5	66	69.5	15	Snd Lvl	59.2	10.3	8	2.3
B207	749	1	0.0	69.6	66	69.6	15	Snd Lvl	59.1	10.5	8	2.5
B208	688	1	0.0	70.2	66	70.2	15	Snd Lvl	59.3	10.9	8	2.9
B209	689	1	0.0	69.9	66	69.9	15	Snd Lvl	59.2	10.7	8	2.7
B210	690	1	0.0	69.9	66	69.9	15	Snd Lvl	59.3	10.6	8	2.6
B211	691	1	0.0	70.0	66	70.0	15	Snd Lvl	59.2	10.8	8	2.8
B212	692	1	0.0	69.4	66	69.4	15	Snd Lvl	58.8	10.6	8	2.6
B213	693	1	0.0	69.9	66	69.9	15	Snd Lvl	59.0	10.9	8	2.9
B343	694	1	0.0	63.9	66	63.9	15	----	55.9	8.0	8	0.0
B344	695	1	0.0	63.8	66	63.8	15	----	55.9	7.9	8	-0.1
B345	696	1	0.0	63.5	66	63.5	15	----	55.8	7.7	8	-0.3
B346	697	1	0.0	63.2	66	63.2	15	----	55.9	7.3	8	-0.7
B347	698	1	0.0	63.0	66	63.0	15	----	55.9	7.1	8	-0.9
B348	699	1	0.0	67.8	66	67.8	15	Snd Lvl	58.7	9.1	8	1.1
B349	735	1	0.0	65.7	66	65.7	15	----	58.2	7.5	8	-0.5
B350	736	1	0.0	64.5	66	64.5	15	----	57.8	6.7	8	-1.3
B351	749	1	0.0	64.6	66	64.6	15	----	56.4	8.2	8	0.2
B352	749	1	0.0	64.3	66	64.3	15	----	56.2	8.1	8	0.1
B367	749	1	0.0	63.0	66	63.0	15	----	55.5	7.5	8	-0.5
B368	749	1	0.0	62.2	66	62.2	15	----	54.8	7.4	8	-0.6
B369	749	1	0.0	61.7	66	61.7	15	----	54.6	7.1	8	-0.9
B370	749	1	0.0	61.3	66	61.3	15	----	54.1	7.2	8	-0.8
B371	749	1	0.0	60.5	66	60.5	15	----	53.6	6.9	8	-1.1
B372	749	1	0.0	60.7	66	60.7	15	----	53.9	6.8	8	-1.2
B373	749	1	0.0	59.9	66	59.9	15	----	53.2	6.7	8	-1.3
B374	749	1	0.0	62.2	66	62.2	15	----	55.4	6.8	8	-1.2
B375	749	1	0.0	62.6	66	62.6	15	----	56.0	6.6	8	-1.4
B376	749	1	0.0	61.2	66	61.2	15	----	55.2	6.0	8	-2.0
B377	749	1	0.0	60.2	66	60.2	15	----	54.6	5.6	8	-2.4
B378	749	1	0.0	59.3	66	59.3	15	----	53.7	5.6	8	-2.4
B379	749	1	0.0	58.7	66	58.7	15	----	53.2	5.5	8	-2.5
B380	749	1	0.0	61.0	66	61.0	15	----	54.6	6.4	8	-1.6
B381	749	1	0.0	60.0	66	60.0	15	----	53.8	6.2	8	-1.8

B382	749	1	0.0	59.2	66	59.2	15	----	53.2	6.0	8	-2.0
B383	749	1	0.0	59.9	66	59.9	15	----	54.8	5.1	8	-2.9
B384	749	1	0.0	61.3	66	61.3	15	----	55.8	5.5	8	-2.5
B385	749	1	0.0	61.2	66	61.2	15	----	56.0	5.2	8	-2.8
B386	749	1	0.0	61.8	66	61.8	15	----	56.2	5.6	8	-2.4
B387	749	1	0.0	63.1	66	63.1	15	----	56.6	6.5	8	-1.5
B388	749	1	0.0	65.3	66	65.3	15	----	57.3	8.0	8	0.0
B389	749	1	0.0	66.3	66	66.3	15	Snd Lvl	57.8	8.5	8	0.5
B390	749	1	0.0	66.7	66	66.7	15	Snd Lvl	57.8	8.9	8	0.9
B391	749	1	0.0	66.7	66	66.7	15	Snd Lvl	57.6	9.1	8	1.1
B392	749	1	0.0	66.2	66	66.2	15	Snd Lvl	57.4	8.8	8	0.8
B393	749	1	0.0	66.5	66	66.5	15	Snd Lvl	57.5	9.0	8	1.0
B394	749	1	0.0	66.7	66	66.7	15	Snd Lvl	57.5	9.2	8	1.2
B395	749	1	0.0	66.9	66	66.9	15	Snd Lvl	57.5	9.4	8	1.4
B396	750	1	0.0	67.3	66	67.3	15	Snd Lvl	57.7	9.6	8	1.6
B397	750	1	0.0	67.2	66	67.2	15	Snd Lvl	57.6	9.6	8	1.6
B398	750	1	0.0	67.2	66	67.2	15	Snd Lvl	57.6	9.6	8	1.6
B399	750	1	0.0	67.1	66	67.1	15	Snd Lvl	57.5	9.6	8	1.6
B400	750	1	0.0	66.7	66	66.7	15	Snd Lvl	57.4	9.3	8	1.3
B401	750	1	0.0	65.7	66	65.7	15	----	57.2	8.5	8	0.5
B402	750	1	0.0	67.6	66	67.6	15	Snd Lvl	58.5	9.1	8	1.1
B403	750	1	0.0	65.8	66	65.8	15	----	57.7	8.1	8	0.1
B404	750	1	0.0	66.9	66	66.9	15	Snd Lvl	58.8	8.1	8	0.1
B405	750	1	0.0	65.2	66	65.2	15	----	58.0	7.2	8	-0.8
B406	750	1	0.0	63.2	66	63.2	15	----	56.8	6.4	8	-1.6
B407	750	1	0.0	63.9	66	63.9	15	----	56.7	7.2	8	-0.8
B408	750	1	0.0	62.7	66	62.7	15	----	56.0	6.7	8	-1.3
B409	750	1	0.0	61.7	66	61.7	15	----	55.3	6.4	8	-1.6
B410	750	1	0.0	60.8	66	60.8	15	----	54.6	6.2	8	-1.8
B411	750	1	0.0	62.9	66	62.9	15	----	55.5	7.4	8	-0.6
B412	750	1	0.0	63.6	66	63.6	15	----	55.7	7.9	8	-0.1
B413	750	1	0.0	63.8	66	63.8	15	----	55.5	8.3	8	0.3
B414	8	1	0.0	63.4	66	63.4	15	----	55.4	8.0	8	0.0
B415	752	1	0.0	63.4	66	63.4	15	----	55.3	8.1	8	0.1
B416	753	1	0.0	63.4	66	63.4	15	----	55.4	8.0	8	0.0
B417	754	1	0.0	63.1	66	63.1	15	----	55.3	7.8	8	-0.2
B418	755	1	0.0	62.7	66	62.7	15	----	55.2	7.5	8	-0.5
B419	756	1	0.0	62.4	66	62.4	15	----	55.2	7.2	8	-0.8
B420	757	1	0.0	62.2	66	62.2	15	----	55.2	7.0	8	-1.0
B421	758	1	0.0	61.6	66	61.6	15	----	54.9	6.7	8	-1.3
B422	759	1	0.0	60.8	66	60.8	15	----	54.8	6.0	8	-2.0

B423	760	1	0.0	59.8	66	59.8	15	----	54.4	5.4	8	-2.6
B424	761	1	0.0	61.4	66	61.4	15	----	54.4	7.0	8	-1.0
B425	762	1	0.0	60.7	66	60.7	15	----	53.9	6.8	8	-1.2
B426	763	1	0.0	60.8	66	60.8	15	----	54.1	6.7	8	-1.3
B427	764	1	0.0	59.1	66	59.1	15	----	52.9	6.2	8	-1.8
B428	765	1	0.0	59.3	66	59.3	15	----	52.9	6.4	8	-1.6
B429	766	1	0.0	59.6	66	59.6	15	----	53.1	6.5	8	-1.5
B430	767	1	0.0	60.4	66	60.4	15	----	53.5	6.9	8	-1.1
B431	768	1	0.0	60.4	66	60.4	15	----	53.6	6.8	8	-1.2
B432	769	1	0.0	60.4	66	60.4	15	----	53.7	6.7	8	-1.3
B433	770	1	0.0	60.4	66	60.4	15	----	53.7	6.7	8	-1.3
B434	771	1	0.0	60.1	66	60.1	15	----	53.5	6.6	8	-1.4
B435	772	1	0.0	59.3	66	59.3	15	----	53.3	6.0	8	-2.0
B436	773	1	0.0	58.7	66	58.7	15	----	53.1	5.6	8	-2.4
B437	774	1	0.0	58.1	66	58.1	15	----	53.0	5.1	8	-2.9
B438	775	1	0.0	58.1	66	58.1	15	----	53.2	4.9	8	-3.1
B439	776	1	0.0	58.0	66	58.0	15	----	53.3	4.7	8	-3.3
B440	777	1	0.0	56.6	66	56.6	15	----	52.0	4.6	8	-3.4
B441	778	1	0.0	56.6	66	56.6	15	----	52.0	4.6	8	-3.4
B442	779	1	0.0	56.6	66	56.6	15	----	51.9	4.7	8	-3.3
B443	780	1	0.0	56.5	66	56.5	15	----	51.8	4.7	8	-3.3
B444	781	1	0.0	56.6	66	56.6	15	----	51.7	4.9	8	-3.1
B445	782	1	0.0	56.7	66	56.7	15	----	51.7	5.0	8	-3.0
B446	783	1	0.0	57.0	66	57.0	15	----	51.9	5.1	8	-2.9
B447	784	1	0.0	57.4	66	57.4	15	----	52.1	5.3	8	-2.7
B448	785	1	0.0	57.6	66	57.6	15	----	52.1	5.5	8	-2.5
B449	786	1	0.0	57.7	66	57.7	15	----	52.1	5.6	8	-2.4
B450	787	1	0.0	57.5	66	57.5	15	----	51.9	5.6	8	-2.4
B451	788	1	0.0	57.5	66	57.5	15	----	51.9	5.6	8	-2.4
B452	789	1	0.0	57.4	66	57.4	15	----	51.9	5.5	8	-2.5
B453	790	1	0.0	57.2	66	57.2	15	----	51.8	5.4	8	-2.6
B454	791	1	0.0	67.7	66	67.7	15	Snd Lvl	59.9	7.8	8	-0.2
B455	792	1	0.0	66.6	66	66.6	15	Snd Lvl	59.4	7.2	8	-0.8
B456	793	1	0.0	65.6	66	65.6	15	----	58.8	6.8	8	-1.2
B457	794	1	0.0	64.7	66	64.7	15	----	58.3	6.4	8	-1.6
B458	795	1	0.0	63.4	66	63.4	15	----	57.5	5.9	8	-2.1
B459	796	1	0.0	61.9	66	61.9	15	----	56.6	5.3	8	-2.7
B460	797	1	0.0	61.3	66	61.3	15	----	55.9	5.4	8	-2.6
B461	798	1	0.0	60.6	66	60.6	15	----	55.1	5.5	8	-2.5
B462	799	1	0.0	59.8	66	59.8	15	----	54.4	5.4	8	-2.6
B463	800	1	0.0	59.7	66	59.7	15	----	54.2	5.5	8	-2.5

B464	801	1	0.0	61.1	66	61.1	15	----	55.1	6.0	8	-2.0
B465	802	1	0.0	62.3	66	62.3	15	----	56.0	6.3	8	-1.7
B466	803	1	0.0	66.4	66	66.4	15	Snd Lvl	60.2	6.2	8	-1.8
B467	804	1	0.0	66.3	66	66.3	15	Snd Lvl	61.7	4.6	8	-3.4
B468	805	1	0.0	64.9	66	64.9	15	----	59.4	5.5	8	-2.5
B469	806	1	0.0	63.8	66	63.8	15	----	58.6	5.2	8	-2.8
B517	807	1	0.0	62.0	66	62.0	15	----	54.5	7.5	8	-0.5
B518	808	1	0.0	61.1	66	61.1	15	----	54.0	7.1	8	-0.9
B519	809	1	0.0	63.3	66	63.3	15	----	55.6	7.7	8	-0.3
B520	810	1	0.0	63.5	66	63.5	15	----	60.4	3.1	8	-4.9
B521	811	1	0.0	62.6	66	62.6	15	----	60.0	2.6	8	-5.4
B522	812	1	0.0	61.0	66	61.0	15	----	58.4	2.6	8	-5.4
B523	813	1	0.0	59.9	66	59.9	15	----	57.4	2.5	8	-5.5
B524	814	1	0.0	59.0	66	59.0	15	----	56.4	2.6	8	-5.4
B525	815	1	0.0	58.3	66	58.3	15	----	55.6	2.7	8	-5.3
B526	816	1	0.0	57.5	66	57.5	15	----	54.7	2.8	8	-5.2
B527	817	1	0.0	57.0	66	57.0	15	----	54.0	3.0	8	-5.0
B528	818	1	0.0	58.8	66	58.8	15	----	55.2	3.6	8	-4.4
B529	819	1	0.0	59.7	66	59.7	15	----	55.9	3.8	8	-4.2
B530	820	1	0.0	60.9	66	60.9	15	----	57.0	3.9	8	-4.1
B531	821	1	0.0	62.2	66	62.2	15	----	58.6	3.6	8	-4.4
B532	822	1	0.0	60.9	66	60.9	15	----	57.7	3.2	8	-4.8
B533	823	1	0.0	59.8	66	59.8	15	----	56.7	3.1	8	-4.9

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	211	2.5	7.8	14.1
All Impacted	87	4.6	10.2	14.1
All that meet NR Goal	92	8.0	10.3	14.1

CECS 31 March 2020
JLS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 916
RUN: I-26 Widening Barrier 6 Arbor Springs
BARRIER DESIGN: Barrier 6 Final
ATMOSPHERICS: 87 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
B118	162	1	0.0	70.7	66	70.7	15	Snd Lvl	70.3	0.4	8	-7.6
B119	163	1	0.0	77.2	66	77.2	15	Snd Lvl	62.1	15.1	8	7.1
B120	164	1	0.0	72.7	66	72.7	15	Snd Lvl	63.5	9.2	8	1.2
B121	165	1	0.0	67.4	66	67.4	15	Snd Lvl	59.2	8.2	8	0.2
B122	166	1	0.0	69.6	66	69.6	15	Snd Lvl	60.1	9.5	8	1.5
B123	167	1	0.0	71.0	66	71.0	15	Snd Lvl	60.9	10.1	8	2.1
B124	168	1	0.0	72.3	66	72.3	15	Snd Lvl	61.7	10.6	8	2.6
B125	169	1	0.0	73.7	66	73.7	15	Snd Lvl	62.2	11.5	8	3.5
B126	170	1	0.0	75.1	66	75.1	15	Snd Lvl	62.7	12.4	8	4.4
B127	171	1	0.0	76.2	66	76.2	15	Snd Lvl	62.8	13.4	8	5.4
B128	172	1	0.0	76.4	66	76.4	15	Snd Lvl	63.3	13.1	8	5.1
B129	173	1	0.0	76.9	66	76.9	15	Snd Lvl	63.3	13.6	8	5.6
B130	174	1	0.0	77.5	66	77.5	15	Snd Lvl	64.0	13.5	8	5.5
B131	175	1	0.0	68.5	66	68.5	15	Snd Lvl	59.7	8.8	8	0.8
B132	176	1	0.0	69.8	66	69.8	15	Snd Lvl	60.3	9.5	8	1.5
B133	177	1	0.0	70.3	66	70.3	15	Snd Lvl	60.4	9.9	8	1.9
B134	178	1	0.0	70.6	66	70.6	15	Snd Lvl	60.5	10.1	8	2.1
B135	179	1	0.0	70.8	66	70.8	15	Snd Lvl	60.4	10.4	8	2.4
B136	180	1	0.0	71.9	66	71.9	15	Snd Lvl	61.2	10.7	8	2.7
B137	181	1	0.0	69.8	66	69.8	15	Snd Lvl	60.2	9.6	8	1.6
B138	182	1	0.0	73.6	66	73.6	15	Snd Lvl	61.8	11.8	8	3.8
B139	183	1	0.0	76.0	66	76.0	15	Snd Lvl	62.9	13.1	8	5.1
B140	184	1	0.0	76.6	66	76.6	15	Snd Lvl	63.1	13.5	8	5.5
B141	185	1	0.0	76.1	66	76.1	15	Snd Lvl	63.1	13.0	8	5.0

B142	186	1	0.0	72.9	66	72.9	15	Snd Lvl	63.3	9.6	8	1.6
B143	187	1	0.0	71.3	66	71.3	15	Snd Lvl	62.4	8.9	8	0.9
B144	188	1	0.0	70.6	66	70.6	15	Snd Lvl	61.7	8.9	8	0.9
B214	391	1	0.0	75.9	66	75.9	15	Snd Lvl	64.5	11.4	8	3.4
B470	594	1	0.0	65.8	66	65.8	15	----	58.6	7.2	8	-0.8
B471	595	1	0.0	64.6	66	64.6	15	----	58.1	6.5	8	-1.5
B472	596	1	0.0	63.2	66	63.2	15	----	57.4	5.8	8	-2.2
B473	597	1	0.0	62.3	66	62.3	15	----	56.6	5.7	8	-2.3
B474	598	1	0.0	61.3	66	61.3	15	----	56.1	5.2	8	-2.8
B475	599	1	0.0	60.2	66	60.2	15	----	55.6	4.6	8	-3.4
B476	600	1	0.0	59.3	66	59.3	15	----	55.1	4.2	8	-3.8
B477	601	1	0.0	58.9	66	58.9	15	----	54.2	4.7	8	-3.3
B478	602	1	0.0	58.8	66	58.8	15	----	53.9	4.9	8	-3.1
B479	603	1	0.0	59.4	66	59.4	15	----	54.4	5.0	8	-3.0
B480	604	1	0.0	59.2	66	59.2	15	----	54.2	5.0	8	-3.0
B481	605	1	0.0	59.8	66	59.8	15	----	54.5	5.3	8	-2.7
B482	606	1	0.0	59.9	66	59.9	15	----	54.4	5.5	8	-2.5
B483	607	1	0.0	60.6	66	60.6	15	----	55.0	5.6	8	-2.4
B484	608	1	0.0	60.5	66	60.5	15	----	54.9	5.6	8	-2.4
B485	610	1	0.0	61.2	66	61.2	15	----	55.4	5.8	8	-2.2
B486	611	1	0.0	62.0	66	62.0	15	----	55.8	6.2	8	-1.8
B487	612	1	0.0	61.9	66	61.9	15	----	55.7	6.2	8	-1.8
B488	613	1	0.0	63.0	66	63.0	15	----	56.6	6.4	8	-1.6
B489	614	1	0.0	64.0	66	64.0	15	----	57.2	6.8	8	-1.2
B490	615	1	0.0	64.8	66	64.8	15	----	57.8	7.0	8	-1.0
B491	616	1	0.0	66.1	66	66.1	15	Snd Lvl	58.5	7.6	8	-0.4
B492	617	1	0.0	63.7	66	63.7	15	----	56.9	6.8	8	-1.2
B493	618	1	0.0	63.9	66	63.9	15	----	57.0	6.9	8	-1.1
B494	619	1	0.0	64.3	66	64.3	15	----	57.2	7.1	8	-0.9
B495	620	1	0.0	66.0	66	66.0	15	Snd Lvl	58.3	7.7	8	-0.3
B496	621	1	0.0	66.9	66	66.9	15	Snd Lvl	58.7	8.2	8	0.2
B497	622	1	0.0	67.1	66	67.1	15	Snd Lvl	58.9	8.2	8	0.2
B498	623	1	0.0	66.1	66	66.1	15	Snd Lvl	58.6	7.5	8	-0.5
B499	624	1	0.0	69.2	66	69.2	15	Snd Lvl	60.9	8.3	8	0.3
B500	625	1	0.0	68.2	66	68.2	15	Snd Lvl	60.2	8.0	8	0.0
B501	626	1	0.0	67.3	66	67.3	15	Snd Lvl	59.7	7.6	8	-0.4
B502	627	1	0.0	66.4	66	66.4	15	Snd Lvl	59.0	7.4	8	-0.6
B503	628	1	0.0	65.6	66	65.6	15	----	58.4	7.2	8	-0.8
B504	629	1	0.0	64.5	66	64.5	15	----	57.6	6.9	8	-1.1
B505	630	1	0.0	62.8	66	62.8	15	----	56.5	6.3	8	-1.7
B506	631	1	0.0	61.6	66	61.6	15	----	55.7	5.9	8	-2.1

B507	632	1	0.0	60.7	66	60.7	15	----	55.0	5.7	8	-2.3
B508	633	1	0.0	60.3	66	60.3	15	----	54.8	5.5	8	-2.5
B509	634	1	0.0	59.5	66	59.5	15	----	54.2	5.3	8	-2.7
B510	635	1	0.0	58.9	66	58.9	15	----	53.9	5.0	8	-3.0
B511	636	1	0.0	58.2	66	58.2	15	----	53.4	4.8	8	-3.2
B512	637	1	0.0	59.4	66	59.4	15	----	57.2	2.2	8	-5.8
B513	638	1	0.0	62.8	66	62.8	15	----	59.5	3.3	8	-4.7
B514	639	1	0.0	63.3	66	63.3	15	----	59.1	4.2	8	-3.8
B515	640	1	0.0	61.4	66	61.4	15	----	57.7	3.7	8	-4.3
B516	641	1	0.0	59.1	66	59.1	15	----	56.3	2.8	8	-5.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	75	0.4	7.7	15.1
All Impacted	37	0.4	10.0	15.1
All that meet NR Goal	30	8.2	10.8	15.1

Attachment F – TNM 2.5 (digital copy only)

Attachment G – Reasonable and Feasible Worksheets

SCDOT Feasibility and Reasonableness Worksheet

Date: March 31 2020

Project Name I-26 Interstate Widening

Highway Traffic Noise Abatement Measure Noise Barrier 5

Feasibility

Number of Impacted Receivers: 87

Number of Benefited Receivers: 188

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 97

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☒ Yes	☐ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

A power line crosses barrier 5 perpendicularly that has been surveyed and the final barrier 5 design i.e., panel heights has been developed in accordance with the radial clearance necessary for this above ground power line.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 188

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 92

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 80

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 3,513,020

Estimated cost per Benefited Receiver: 18,686

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☒ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above): 188

Number of Benefited Receivers in **support** of noise abatement measure: 100

Percentage of Benefited Receivers in **support** of noise abatement measure: 97%

Number of Benefited Receivers **opposed** to noise abatement measure: 3

Percentage of Benefited Receivers **opposed** to noise abatement measure: 3%

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure: 85

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure: 45%

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure

Attachment G - Barrier 5 Viewpoint Summary

ID	Barrier	Response	Name	Address	City	State	Zip	Receiver	Benefitted
1	5	Yes	Adkins	225 Cayden	Chaplin	South Carolina	29036	B405	Yes
2	5	Yes	Allen	553 Everton	Chaplin	South Carolina	29036	B388	Yes
3	5	Yes	Altman	319 Massey	Chaplin	South Carolina	29036	B83	Yes
4	5	Yes	Amin	175 Westcott Ridge	Chaplin	South Carolina	29036	B409	Yes
5	5	Yes	Andrews	377 Massey	Chaplin	South Carolina	29036	B71	Yes
6	5	Yes	Anfinson	335 Hollow Cove	Chaplin	South Carolina	29036	B205	Yes
7	5	Yes	Anon	Anonymous	Chaplin	South Carolina	29036	-	#N/A
8	5	Yes	Anonymous	Anonymous	Chaplin	South Carolina	29036	-	#N/A
9	5	No	Anonymous	Anonymous	Chaplin	South Carolina	29036	-	#N/A
10	6	Yes	Arnold	276 Glen Arbor	Chaplin	South Carolina	29036	-	#N/A
11	5	Yes	Baker	135 Breedlove	Chaplin	South Carolina	29036	B381	Yes
12	5	Yes	Baxley	278 Massey	Chaplin	South Carolina	29036	B379	Yes
13	5	Yes	Black	524 Everton	Chaplin	South Carolina	29036	B415	Yes
14	5	Yes	Bostick	300 Hollow Cove	Chaplin	South Carolina	29036	B183	Yes
15	5	Yes	Brock	317 Hollow Cove	Chaplin	South Carolina	29036	B201	Yes
16	5	Yes	Brown	305 Massey	Chaplin	South Carolina	29036	B86	Yes
17	5	Yes	Bugs	428 Hollow Cove	Chaplin	South Carolina	29036	B106	Yes
18	5	Yes	Bunce	356 Massey	Chaplin	South Carolina	29036	B351	Yes
19	5	Yes	Burgess	380 Hollow Cove	Chaplin	South Carolina	29036	B199	Yes
20	5	Yes	Burk	320 Hollow Cove	Chaplin	South Carolina	29036	B187	Yes
21	5	Yes	Callahan	414 Hollow Cove	Chaplin	South Carolina	29036	B103	Yes
22	5	Yes	Carnes	22 Grovemont	Chaplin	South Carolina	29036	B370	Yes
23	5	Yes	Cirmella	321 Hollow Cove	Chaplin	South Carolina	29036	B202	Yes
24	5	Yes	Clerc	248 Massey	Chaplin	South Carolina	29036	B441	No
25	5	No	Clifton	241 Massey	Chaplin	South Carolina	29036	B437	Yes
26	5	Yes	Cochran	293 Massey	Chaplin	South Carolina	29036	B89	Yes
27	5	Yes	Colbert	561 Everton	Chaplin	South Carolina	29036	B386	Yes
28	5	Yes	Collins	205 Massey	Chaplin	South Carolina	29036	B428	Yes
29	5	Yes	Conte	521 Everton	Chaplin	South Carolina	29036	B396	Yes
30	5	Yes	Cox	454 Hollow Cove	Chaplin	South Carolina	29036	B114	Yes
31	5	Yes	Crews	141 Breedlove	Chaplin	South Carolina	29036	B380	Yes
32	5	Yes	Cummings	6 Kagel	Chaplin	South Carolina	29036	B426	Yes
33	5	Yes	Cutlip	537 Everton	Chaplin	South Carolina	29036	B392	Yes
34	5	Yes	Dahl	384 Massey	Chaplin	South Carolina	29036	B347	Yes
35	5	Yes	Davis	314 Hollow Cove	Chaplin	South Carolina	29036	B186	Yes
36	5	Yes	Davis	364 Massey	Chaplin	South Carolina	29036	B343	Yes
37	5	Yes	Dickerson	528 Everton	Chaplin	South Carolina	29036	B416	Yes
38	5	Yes	Dornburg	244 Massey	Chaplin	South Carolina	29036	B442	No
39	5	No	Dunbar	129 Breedlove	Chaplin	South Carolina	29036	B382	Yes
40	5	Yes	Ficeto	391 Massey	Chaplin	South Carolina	29036	B68	Yes
41	5	Yes	Fleetwood	5 Kagle Ct	Chaplin	South Carolina	29036	B424	Yes
42	5	Yes	Goodale	306 Hollow Cove	Chaplin	South Carolina	29036	B184	Yes
43	5	Yes	Green	450 Hollow Cove	Chaplin	South Carolina	29036	B113	Yes
44	5	Yes	Gujral	250 Cayden	Chaplin	South Carolina	29036	B461	Yes
45	5	Yes	Hales	212 Cayden	Chaplin	South Carolina	29036	B111	Yes
46	5	Yes	Hall	218 Cayden	Chaplin	South Carolina	29036	B455	Yes
47	5	Yes	Hall	331 Hollow Cove	Chaplin	South Carolina	29036	B204	Yes
48	5	Yes	Heath	291 Massey	Chaplin	South Carolina	29036	-	#N/A
49	5	Yes	Hendrick	295 Cayden	Chaplin	South Carolina	29036	-	#N/A
50	5	Yes	Herron	533 Everton	Chaplin	South Carolina	29036	B393	Yes
51	5	Yes	Hipps	241 Cayden	Chaplin	South Carolina	29036	B465	Yes

Attachment G - Barrier 5 Viewpoint Summary

ID	Barrier	Response	Name	Address	City	State	Zip	Receiver	Benefitted
52	5	Yes	Howell	228 Cayden	Chaplin	South Carolina	29036	B458	Yes
53	5	Yes	Hutto	147 Breedlove	Chaplin	South Carolina	29036	B374	Yes
54	5	Yes	James	220 Massey	Chaplin	South Carolina	29036	B448	Yes
55	5	Yes	Jones	345 Massey	Chaplin	South Carolina	29036	B78	Yes
56	5	Yes	Kessler	271 Massey	Chaplin	South Carolina	29036	-	#N/A
57	5	Yes	Keys	187 Westcott Ridge	Chaplin	South Carolina	29036	B403	Yes
58	5	Yes	Khan	179 Westcott Ridge	Chaplin	South Carolina	29036	B408	Yes
59	5	Yes	King	552 Everton	Chaplin	South Carolina	29036	B422	Yes
60	5	Yes	Klein	202 Massey	Chaplin	South Carolina	29036	B452	Yes
61	5	Yes	Kozak	517 Everton	Chaplin	South Carolina	29036	B397	Yes
62	5	Yes	Land	219 Cayden	Chaplin	South Carolina	29036	B404	Yes
63	5	Yes	Lawson	529 Everton	Chaplin	South Carolina	29036	B394	Yes
64	5	Yes	LeGrand	360 Massey	Chaplin	South Carolina	29036	B352	Yes
65	5	Yes	Leonard	331 Massey	Chaplin	South Carolina	29036	B81	Yes
66	5	Yes	Livingston	211 Cayden	Chaplin	South Carolina	29036	B104	Yes
67	5	Yes	Livingston	360 Hollow Cove	Chaplin	South Carolina	29036	B196	Yes
68	5	Yes	Luther	500 Everton	Chaplin	South Carolina	29036	B411	Yes
69	5	Yes	Lynch	258 Massey	Chaplin	South Carolina	29036	-	#N/A
70	5	Yes	Mason	355 Massey	Chaplin	South Carolina	29036	B76	Yes
71	5	Yes	Mattei	688 Autumn Ridge	Chaplin	South Carolina	29036	B466	Yes
72	5	Yes	Matthews	505 Everton	Chaplin	South Carolina	29036	B400	Yes
73	5	Yes	McNeal	390 Hollow Cove	Chaplin	South Carolina	29036	B95	Yes
74	5	Yes	Mechling	222 Cayden	Chaplin	South Carolina	29036	B456	Yes
75	5	Yes	Melchert	420 Hollow Cove	Chaplin	South Carolina	29036	B105	Yes
76	5	Yes	Menning	692 Autumn Ridge	Chaplin	South Carolina	29036	B112	Yes
77	5	Yes	Metler	28 Grovemont	Chaplin	South Carolina	29036	B371	Yes
78	5	Yes	Miller	151 Breedlove	Chaplin	South Carolina	29036	B182	Yes
79	5	Yes	Moorey	545 Everton	Chaplin	South Carolina	29036	B390	Yes
80	5	No	Nelson	16 Grovemont	Chaplin	South Carolina	29036	B368	Yes
81	5	Yes	O'Hara	544 Everton	Chaplin	South Carolina	29036	B420	Yes
82	5	Yes	Parker	571 Everton	Chaplin	South Carolina	29036	-	#N/A
83	5	Yes	Patel	549 Everton	Chaplin	South Carolina	29036	B389	Yes
84	5	Yes	Peeples	381 Massey	Chaplin	South Carolina	29036	B70	Yes
85	5	Yes	Perez	557 Everton	Chaplin	South Carolina	29036	B387	Yes
86	5	Yes	Poyner	252 Massey	Chaplin	South Carolina	29036	B440	No
87	5	Yes	Prince	377 Hollow Cove	Chaplin	South Carolina	29036	B213	Yes
88	5	Yes	Pross	363 Hollow Cove	Chaplin	South Carolina	29036	B211	Yes
89	5	Yes	**Question**	577 Everon	Chaplin	South Carolina	29036	-	#N/A
90	5	Yes	Quintana	134 Breedlove	Chaplin	South Carolina	29036	B372	Yes
91	5	Yes	Ratliff	185 Westcott Ridge	Chaplin	South Carolina	29036	B407	Yes
92	5	Yes	Resident	374 Hollow Cove	Chaplin	South Carolina	29036	B199	Yes
93	5	Yes	Riordan	408 Hollow Cove	Chaplin	South Carolina	29036	B101	Yes
94	5	Yes	Roberts	525 Everton	Chaplin	South Carolina	29036	B395	Yes
95	5	Yes	Robertson	301 Massey	Chaplin	South Carolina	29036	B87	Yes
96	5	Yes	Rownd	370 Massey	Chaplin	South Carolina	29036	B344	Yes
97	5	Yes	Sarkis	19 Grovemeont	Chaplin	South Carolina	29036	B517	Yes
98	5	Yes	Schuler	381 Hollow Cove	Chaplin	South Carolina	29036	-	#N/A
99	5	Yes	Shealy	351 Massey	Chaplin	South Carolina	29036	B77	Yes
100	5	Yes	Shelton	504 Everton	Chaplin	South Carolina	29036	B412	Yes
101	5	No	Shockley	266 Massey	Chaplin	South Carolina	29036	-	#N/A
102	5	Yes	Simpson	236 Massey	Chaplin	South Carolina	29036	B444	No

Attachment G - Barrier 5 Viewpoint Summary

ID	Barrier	Response	Name	Address	City	State	Zip	Receiver	Benefitted
103	5	Yes	Slodski	146 Breedlove	Chaplin	South Carolina	29036	B367	Yes
104	5	Yes	Smith	200 Massey	Chaplin	South Carolina	29036	B453	Yes
105	5	Yes	Smith	359 Massey	Chaplin	South Carolina	29036	B75	Yes
106	5	Yes	Sorapuru	229 Massey	Chaplin	South Carolina	29036	B434	Yes
107	5	Yes	Stanley	696 Autumn Ridge	Chaplin	South Carolina	29036	B110	Yes
108	5	Yes	Steadman	195 Westcott Ridge	Chaplin	South Carolina	29036	B100	Yes
109	5	Yes	Steinhilper	224 Massey	Chaplin	South Carolina	29036	B447	Yes
110	5	Yes	Still	228 Massey	Chaplin	South Carolina	29036	B446	Yes
111	5	Yes	Sweeper	353 Hollow Cove	Chaplin	South Carolina	29036	B209	Yes
112	5	Yes	Thomas	509 Everton	Chaplin	South Carolina	29036	B399	Yes
113	5	Yes	Timmerman	442 Hollow Cove	Chaplin	South Carolina	29036	B109	Yes
114	5	Yes	Trembly	286 Massey	Chaplin	South Carolina	29036	B377	Yes
115	5	Yes	Vaught	7 Kagel	Chaplin	South Carolina	29036	B425	Yes
116	5	Yes	Voigt	240 Cayden	Chaplin	South Carolina	29036	B460	Yes
117	5	Yes	Welch	325 Massey	Chaplin	South Carolina	29036	B82	Yes
118	5	Yes	Whitehead	373 Massey	Chaplin	South Carolina	29036	B72	Yes
119	5	Yes	Yague	209 Massey	Chaplin	South Carolina	29036	B429	Yes

Vote not counted towards or against viewpoints calculation

SCDOT Feasibility and Reasonableness Worksheet

Date: March 31 2020

Project Name I-26 Interstate Widening

Highway Traffic Noise Abatement Measure Noise Barrier 6

Feasibility

Number of Impacted Receivers: 37

Number of Benefited Receivers: 64

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 97

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers	64	Number of Benefited Receivers that achieve at least an 8 dBA reduction	31

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable. 96

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure	35	Estimated construction cost for noise abatement measure	1,712,480
Estimated cost per Benefited Receiver	26,757		

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? ☒ Yes ☐ No
NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above)	64		
Number of Benefited Receivers in **support** of noise abatement measure	32	Percentage of Benefited Receivers in **support** of noise abatement measure	100%
Number of Benefited Receivers **opposed** to noise abatement measure	0	Percentage of Benefited Receivers **opposed** to noise abatement measure	0%
Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure	32	Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure	50%

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

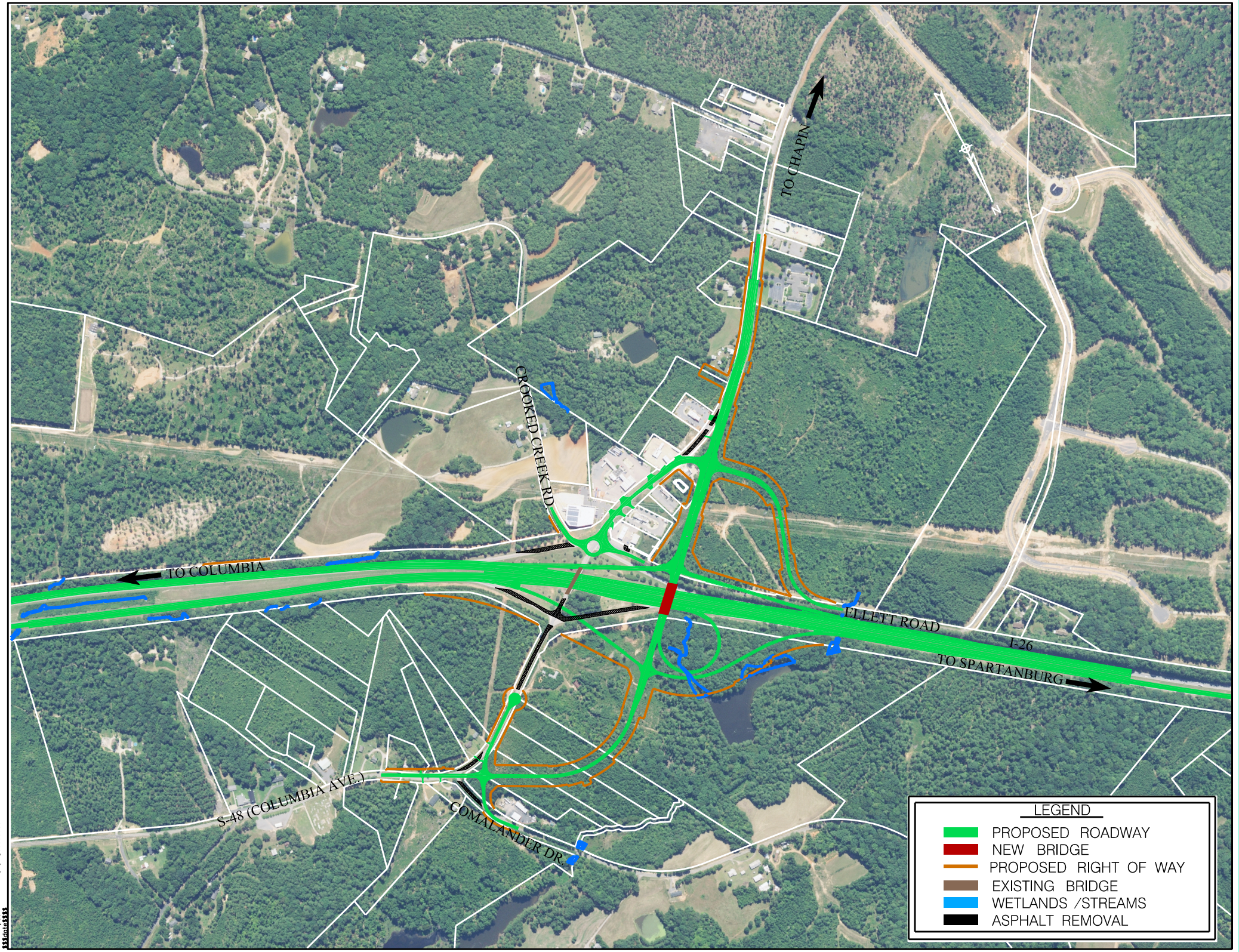
Final Determination for Noise Abatement Measure

Attachment G - Barrier 6 Viewpoints Summary

ID	Barrier	Response	Name	Address	City	State	Zip	Reciever	Beneffited
1	6	Yes	Arnold	276 Glen Arbor	Irmo	South Carolina	29063	B488	Yes
2	6	Yes	Austin	293 Glen Arbor	Irmo	South Carolina	29063	B122	Yes
3	6	Yes	Biernaski	160 Arbor Springs	Irmo	South Carolina	29063	B507	Yes
4	6	Yes	Bitterwolf	336 Glen Arbor	Irmo	South Carolina	29063	-	#N/A
5	6	Yes	Blackwell	196 Arbor Springs	Irmo	South Carolina	29063	B142	Yes
6	6	Yes	Blair	6 Bent Water	Irmo	South Carolina	29063	B497	Yes
7	6	Yes	Buckley	297 Glen Arbor	Irmo	South Carolina	29063	B122	Yes
8	6	Yes	Burnette	328 Glen Arbor	Irmo	South Carolina	29063	B135	Yes
9	6	Yes	Campbell	180 Arbor Springs	Irmo	South Carolina	29063	B502	Yes
10	6	Yes	Dalick	273 Glen Arbor	Irmo	South Carolina	29063	B473	Yes
11	6	Yes	Davis	176 Arbor Springs	Irmo	South Carolina	29063	B503	Yes
12	6	Yes	Eichelberger	305 Glen Arbor	Irmo	South Carolina	29063	B125	Yes
13	6	Yes	Gunning	300 Glen Arbor	Irmo	South Carolina	29063	B131	Yes
14	6	Yes	Hansford	5 Bent Water	Irmo	South Carolina	29063	B493	Yes
15	6	Yes	Johns	184 Arbor Springs	Irmo	South Carolina	29063	B501	Yes
16	6	Yes	Jumper	321 Glen Arbor	Irmo	South Carolina	29063	B129	Yes
17	6	Yes	Lowman	322 Glen Arbor	Irmo	South Carolina	29063	B134	Yes
18	6	Yes	McCallister	277 Glen Arbor	Irmo	South Carolina	29063	B472	Yes
19	6	Yes	Middleton	312 Glen Arbor	Irmo	South Carolina	29063	B132	Yes
20	6	Yes	Naik	11 Bent Water Court	Irmo	South Carolina	29063	B495	Yes
21	6	Yes	Phillips	325 Glen Arbor	Irmo	South Carolina	29063	B130	Yes
22	6	Yes	Reed	268 Glen Arbor	Irmo	South Carolina	29063	B483	Yes
23	6	Yes	Resident	151 Arbor Springs	Irmo	South Carolina	29063	B482	Yes
24	6	Yes	Sawyer	267 Glen Arbor	Irmo	South Carolina	29063	B474	Yes
25	6	Yes	Schumpert	10940 Broad River	Irmo	South Carolina	29063	B118	No
26	6	Yes	Sloan	284 Glen Arbor	Irmo	South Carolina	29063	B489	Yes
27	6	Yes	Taylor	159 Arbor Springs	Irmo	South Carolina	29063	B485	Yes
28	6	Yes	Vess	197 Arbor Springs	Irmo	South Carolina	29063	B140	Yes
29	6	Yes	Walker	191 Arbor Springs	Irmo	South Carolina	29063	B136	Yes
30	6	Yes	Warick	192 Arbor Springs	Irmo	South Carolina	29063	B144	Yes
31	6	Yes	Warren	2 Bent Water	Irmo	South Carolina	29063	B498	Yes
32	6	Yes	Weissman	281 Glen Arbor	Irmo	South Carolina	29063	B471	Yes
33	6	Yes	Wilkins	316 Glen Arbor	Irmo	South Carolina	29063	B133	Yes
34	6	Yes	Wood	289 Glen Arbor	Irmo	South Carolina	29063	B121	Yes

Vote not counted towards or against viewpoints calculation

Attachment H – Design Roll Plot


TO CHAPIN
CROOKED CREEK RD.
TO COLUMBIA
ELLETT ROAD
I-26
TO SPARTANBURG
S-48 (COLUMBIA AVE.)
COMALANDER DR.
LEGEND
PROPOSED ROADWAY
NEW BRIDGE
PROPOSED RIGHT OF WAY
EXISTING BRIDGE
WETLANDS /STREAMS
ASPHALT REMOVAL

Attachment I – Volume Diagrams

Figure 54 - 2040 Design Hour Volumes (Exits 82-85)

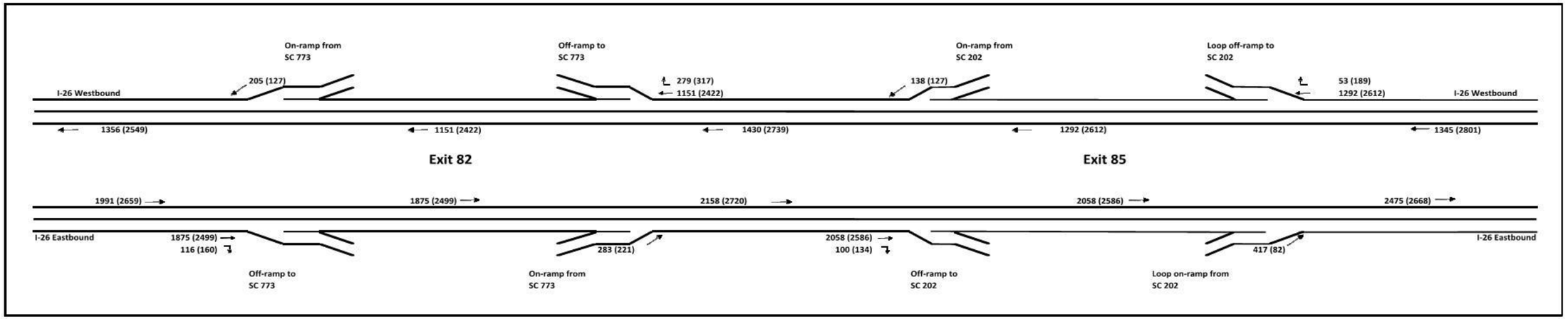
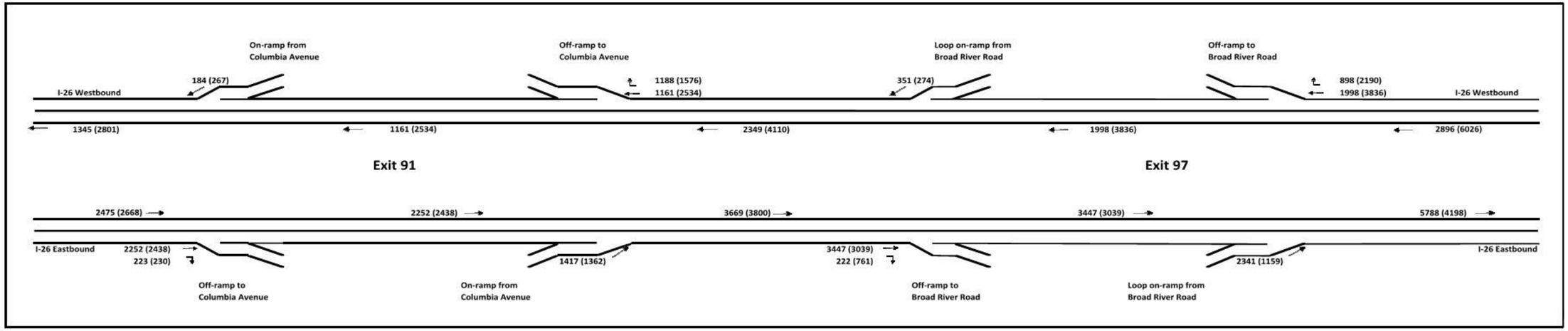
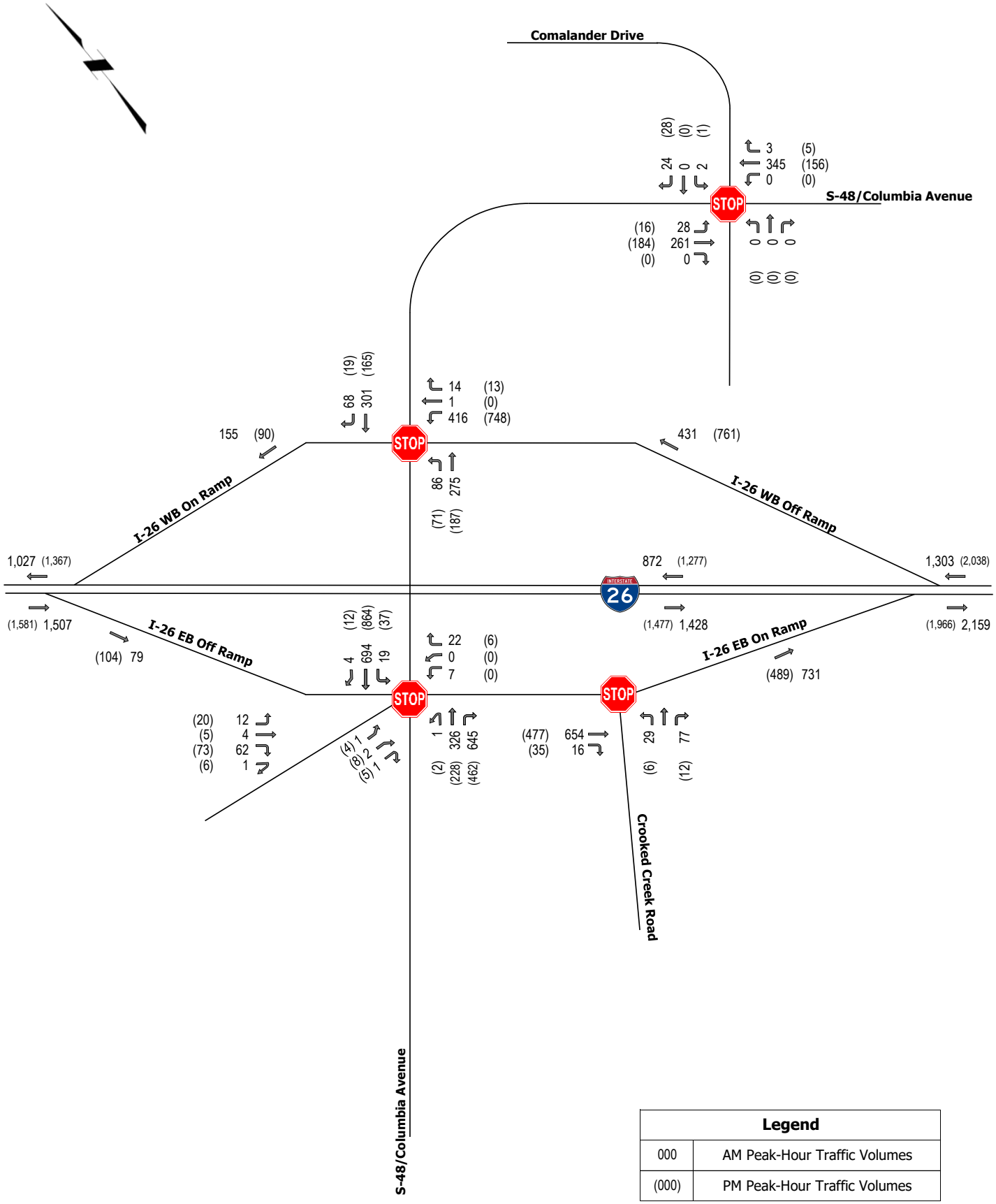
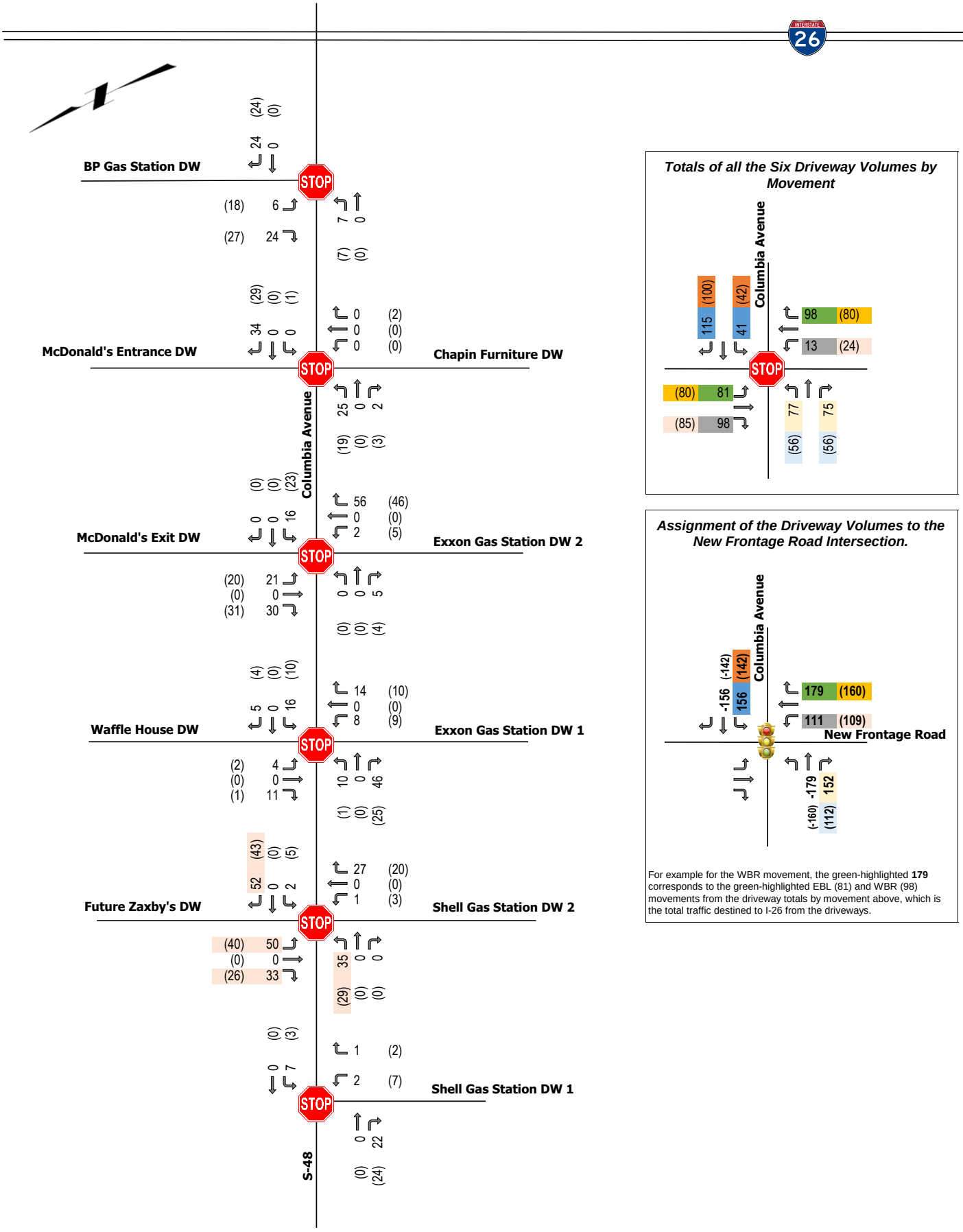


Figure 55 - 2040 Design Hour Volumes (Exits 91-97)



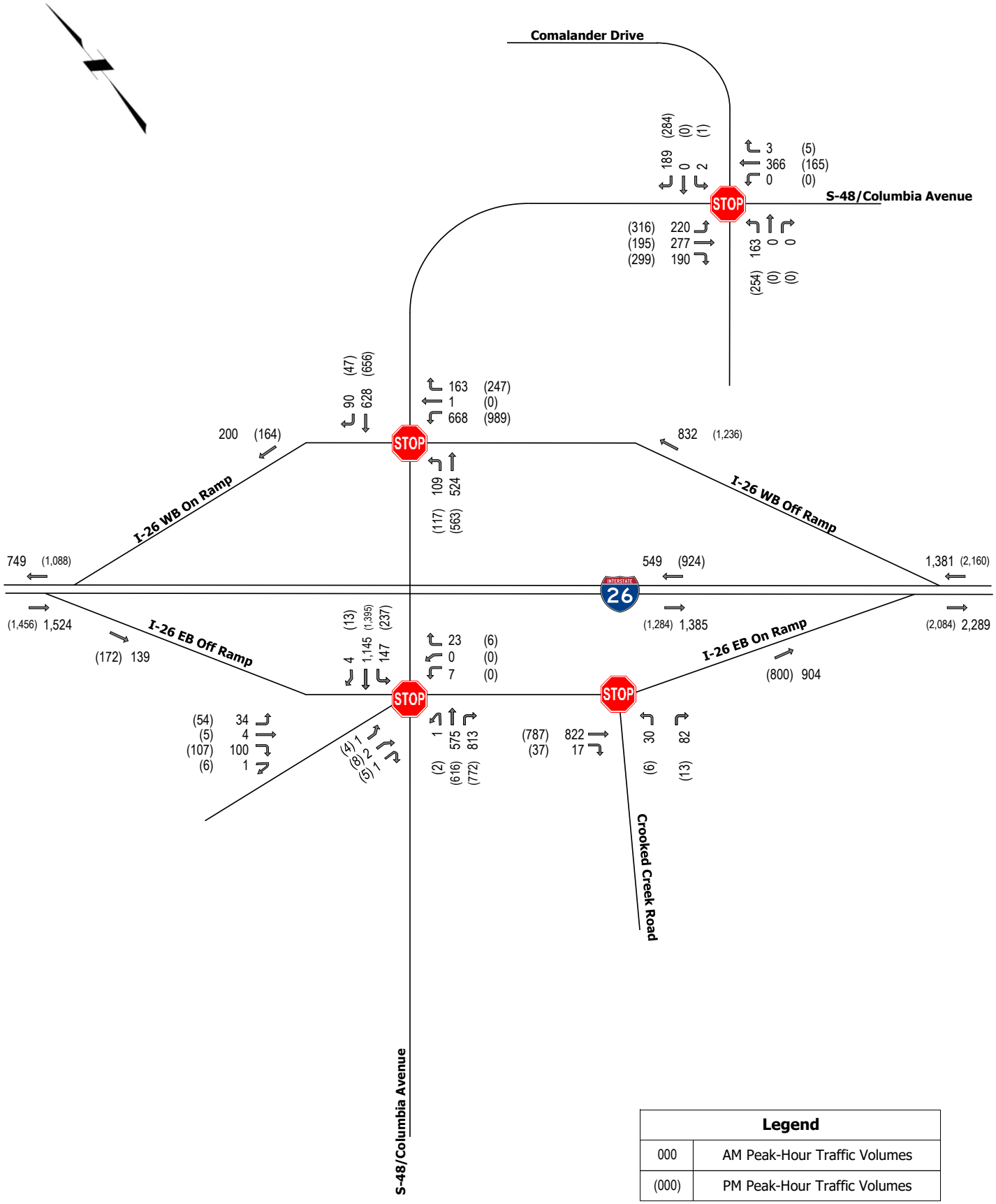

Comalander Drive
S-48/Columbia Avenue
I-26 WB On Ramp
I-26 WB Off Ramp
I-26 EB Off Ramp
I-26 EB On Ramp
Crooked Creek Road
S-48/Columbia Avenue
STOP
INTERSTATE 26
Legend
000 AM Peak-Hour Traffic Volumes
(000) PM Peak-Hour Traffic Volumes

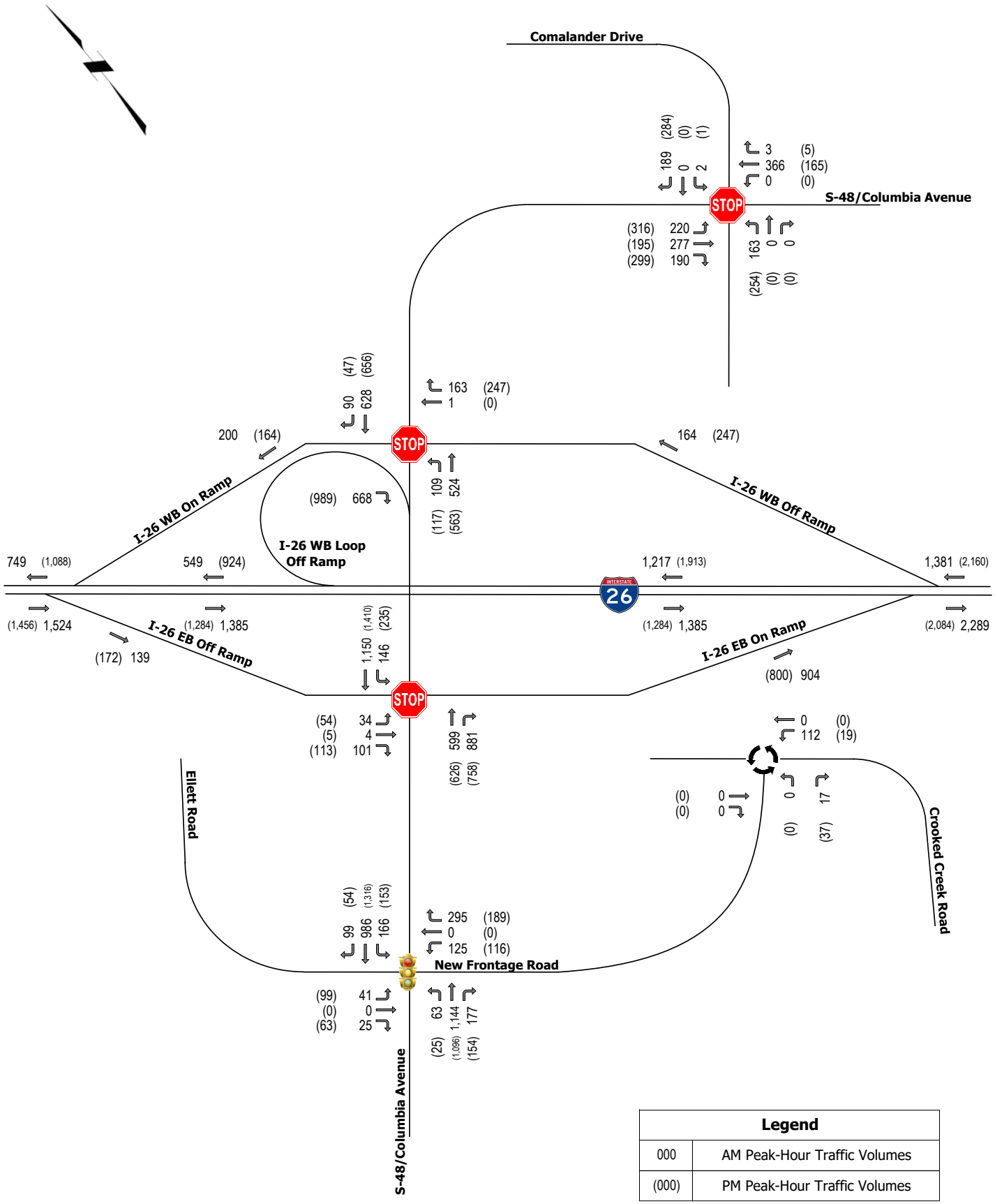


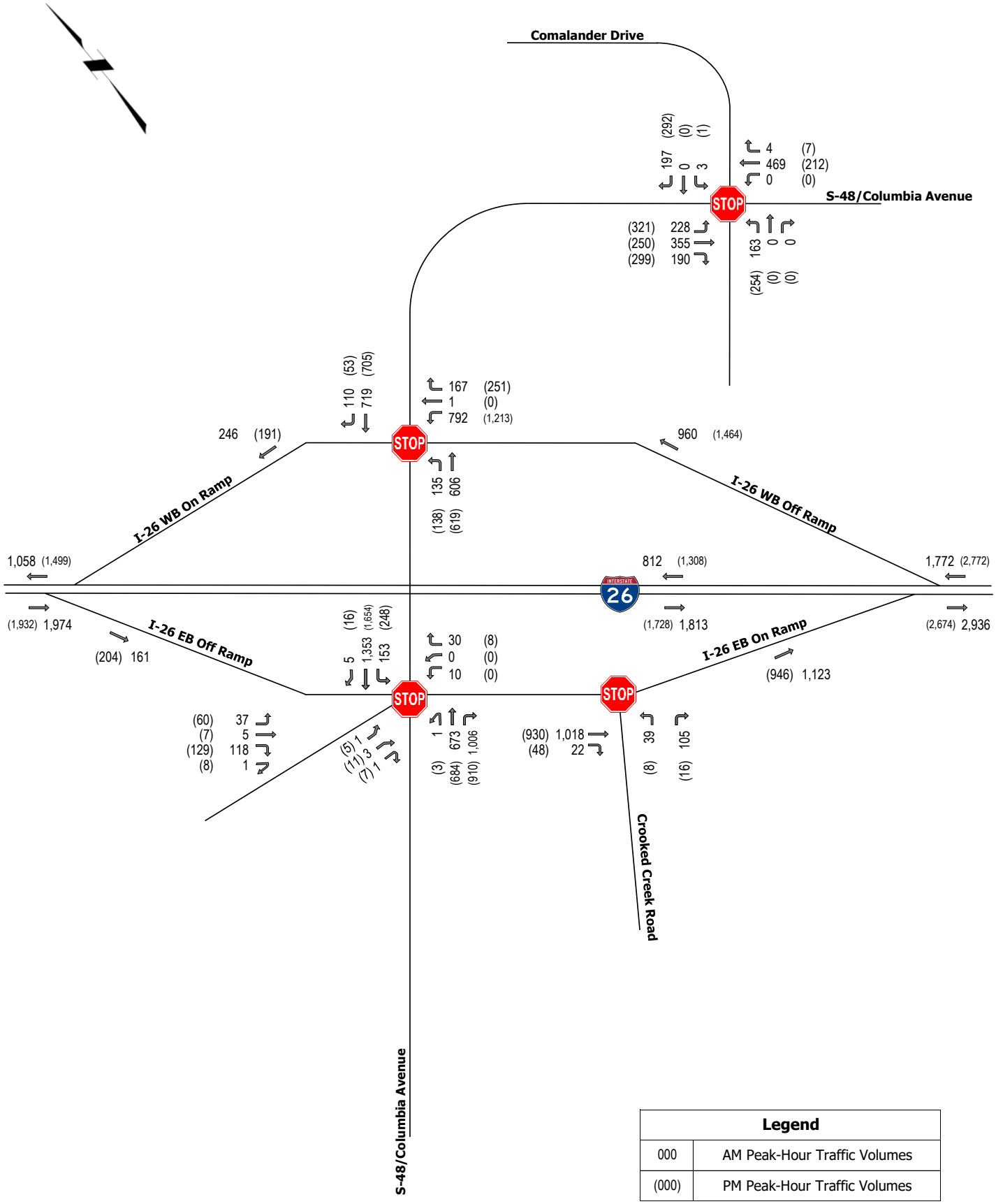
Totals of all the Six Driveway Volumes by Movement

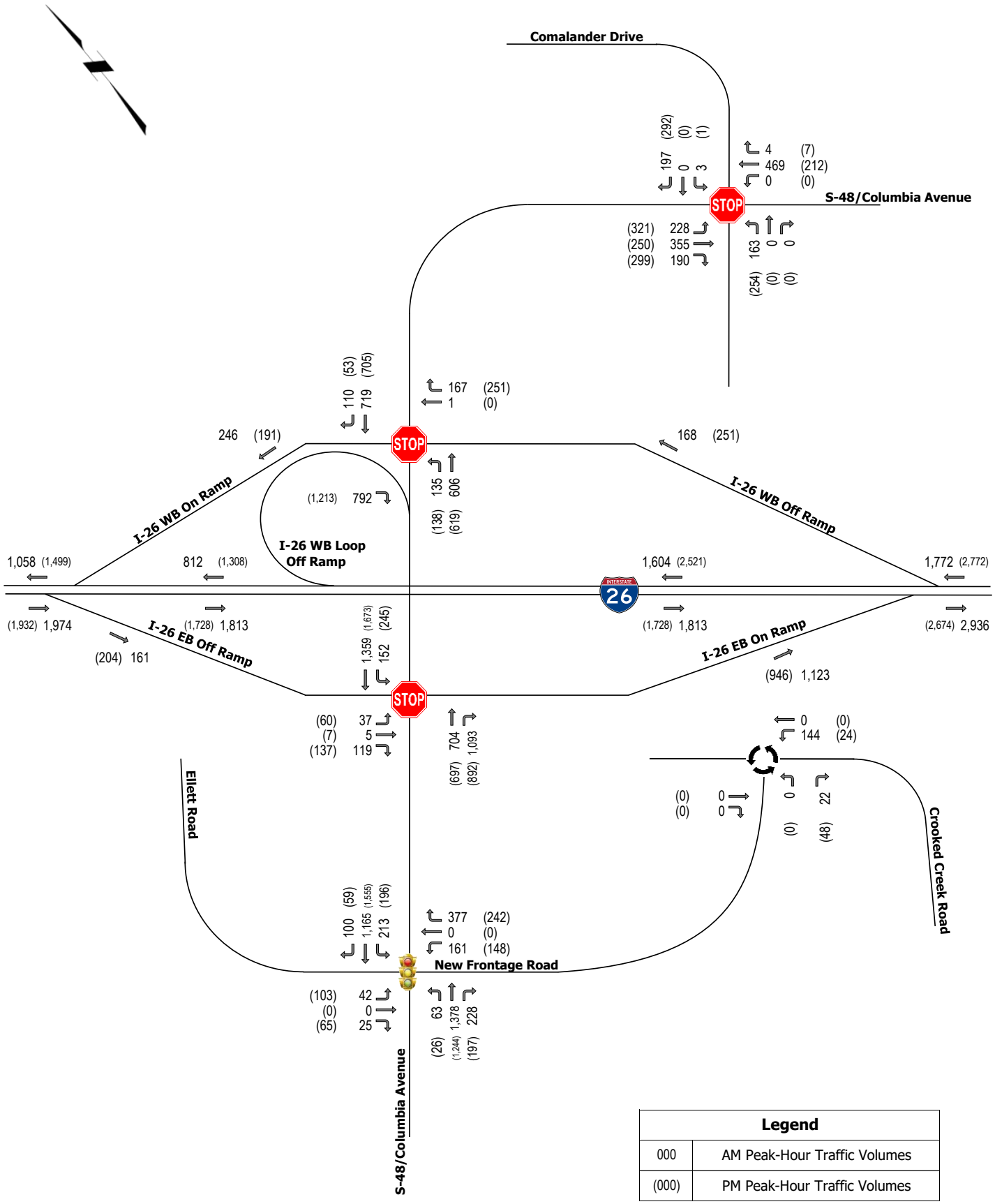
Assignment of the Driveway Volumes to the New Frontage Road Intersection.

For example for the WBR movement, the green-highlighted **179** corresponds to the green-highlighted EBL (81) and WBR (98) movements from the driveway totals by movement above, which is the total traffic destined to I-26 from the driveways.


Comalander Drive
S-48/Columbia Avenue
I-26 WB On Ramp
I-26 WB Off Ramp
I-26 EB Off Ramp
I-26 EB On Ramp
S-48/Columbia Avenue
Crooked Creek Road
INTERSTATE
26
STOP
Legend
000 AM Peak-Hour Traffic Volumes
(000) PM Peak-Hour Traffic Volumes


Comalander Drive
S-48/Columbia Avenue
I-26 WB On Ramp
I-26 WB Loop Off Ramp
I-26 WB Off Ramp
I-26 EB Off Ramp
I-26 EB On Ramp
Ellett Road
Crooked Creek Road
New Frontage Road
S-48/Columbia Avenue
STOP
INTERSTATE 26
Legend
000 AM Peak-Hour Traffic Volumes
(000) PM Peak-Hour Traffic Volumes


Comalander Drive
S-48/Columbia Avenue
I-26 WB On Ramp
I-26 WB Off Ramp
I-26 EB Off Ramp
I-26 EB On Ramp
Crooked Creek Road
S-48/Columbia Avenue
STOP
INTERSTATE 26
Legend
000 AM Peak-Hour Traffic Volumes
(000) PM Peak-Hour Traffic Volumes


Comalander Drive
S-48/Columbia Avenue
I-26 WB On Ramp
I-26 WB Loop Off Ramp
I-26 WB Off Ramp
I-26 EB Off Ramp
I-26 EB On Ramp
INTERSTATE 26
Ellett Road
Crooked Creek Road
New Frontage Road
S-48/Columbia Avenue
STOP
Legend
000 AM Peak-Hour Traffic Volumes
(000) PM Peak-Hour Traffic Volumes

ATTACHMENT F:

STAKEHOLDER MEETING SUMMARY

I-26 Widening MM 85-MM 101 Stakeholders Meeting Summary
October 29, 2019

A stakeholders meeting was held to present the new proposed design at the Exit 91 interchange, and the impacts to adjacent properties.

Nine people attended. No conflicts or opposition was raised regarding the proposed design.

Attendees:

1. Joe Berry, attorney with Lewis Babcock, representing the Kahns, who own Rubin Family Properties (Waffle House) and Chapin Z, LLC (Zaxby's) ; JBB@lewisbabcock.com; 803-771-8000
2. David Dodd, owner of F&D Electric; fdelectricDodd@icloud.com; 803-513-2843
3. Wayne Shealy; landowner; wanyeshealy@hotmail.com; 803-397-1760
4. Jim Meehan, landowner; jmeehan@sc.rr.com; 803-932-0990
5. Dan Ward; owner; Zaxby's; danwardsr@msn.com; 864-415-5496
6. Alan Kahn; owner; Kahn Development Co.; owner of Warehouses, Inc, Zaxby's (Chapin Z, LLC) and Waffle House (Rubin Family Properties); alankahn@kahndevelopment.com
7. Keith Grimaud; President of Chapin Furniture; kgrimaud@chapinfurniture.com; 803+727-7888
8. Danny Shealy; resident and landowner; WD&L Enterprises II, LLC; shealydr@netscape.com; 803-422-6824
9. Charles Kahn; Vice President; Kahn Development Co.; Chapin Z, LLC, and Warehouses, Inc.; ckahn@mbkahn.com; 803-227-1257

ATTACHMENT G:

INTERCHANGE MODIFICATION REPORT FOR THE COLUMBIA AVENUE [S-32-48] OVER I-26 INTERCHANGE IMPROVEMENT PROJECT

INTERCHANGE MODIFICATION REPORT

for the

COLUMBIA AVENUE (S-32-48) OVER I-26 INTERCHANGE IMPROVEMENT PROJECT

Located in
Lexington County, South Carolina

Prepared by
Ramey Kemp & Associates, Inc.

June 2020
RKA Project #20045

INTERCHANGE MODIFICATION REPORT

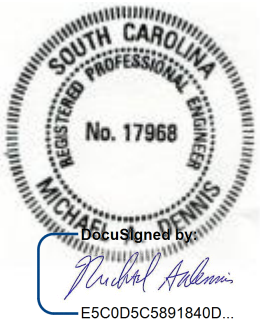
for the

COLUMBIA AVENUE (S-32-48) OVER I-26 INTERCHANGE IMPROVEMENT PROJECT

Located in
Lexington County, South Carolina

Prepared by
Ramey Kemp & Associates, Inc.
1411 Gervais Street, Suite 150
Columbia, South Carolina 29201

June 2020
RKA Project #20045



This document has been digitally signed and sealed by Michael A. Dennis, South Carolina Professional Engineer Number 17968, on June 5, 2020. This electronic document is 997 pages in length.

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Printed copies of this document are not considered signed and sealed.

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E) Intersection Analysis Worksheets
F) Arterial Analysis Worksheets
G) Crash Analysis Worksheets
H) Conceptual Signing Plan

EXECUTIVE SUMMARY

The purpose of this report is to document an Interchange Modification Report (IMR) for the proposed improvements for the I-26 & Columbia Avenue (S-32-48) interchange in Lexington County, South Carolina in accordance with Federal Highway Administration (FHWA) and SCDOT guidelines. The proposed interchange improvements to the I-26 & Columbia Avenue interchange include relocation of the interchange approximately 0.13-mile northwest of the existing interchange. The relocated interchange includes a new bridge with two southbound (SB) thru lanes, a SB left turn lane for access to eastbound I-26, one northbound (NB) lane, bike lanes in both directions, and sidewalks on either side of the bridge. The new interchange will be a parclo design with a loop in the northwestern quadrant.

The purpose of the project is to improve operational efficiency and safety of the existing interchange and to accommodate future volumes. The current interchange design is approaching capacity as a two-lane bridge along with no turn lanes to / from Columbia Avenue (S-48) and is functionally obsolete. Operation is expected to worsen with more daily traffic volumes based on past census data indicating the population has been increasing by approximately twenty (20) percent per decade since 1990. With this anticipated growth along with the recently approved Chapin Technology Park and a planned commercial development north of the interchange, modifications to the existing diamond interchange are needed. The proposed improvements to the interchange will address the existing operational and safety deficiencies and accommodate projected future traffic volumes. This report summarizes the results of the capacity analyses, crash analyses, and responses to FHWA's two policy requirements for an Interstate System Access Change Request.

SCDOT prepared an *Interchange Modification Report* in December 2016 for the I-26 & Columbia Avenue (S-32-48) interchange improvements, which was utilized as a base for the IMR.

The analysis of the 2044 Build condition of the proposed interchange improvements indicates that the project would not have any significant negative impact on the safety and the operation of the facilities within the project area. The analysis shows that the I-26 mainline will not degrade from projected 2044 No-Build conditions and that I-26 & Columbia Avenue interchange ramp merge and diverge areas are projected to operate at LOS D or better during the 2044 AM and PM peak periods.

The results of the arterial analyses indicate that Columbia Avenue will operate at an overall LOS D or better conditions with consideration of the proposed interchange improvements for 2044 Build conditions.

A safety evaluation and crash modification factor (CMF) analysis indicate that with consideration of the proposed improvements, the number of existing crashes along Columbia Avenue between the Bojangles driveway intersection and the I-26 EB Ramps intersection will be reduced by approximately 78% (29 crashes) as compared to the No-Build scenario. The number of existing crashes at the vicinity of the Columbia Avenue & I-26 interchange will be reduced by approximately 62% (106 crashes) as compared to the No-Build scenario.

1. INTRODUCTION

The purpose of this report is to document an IMR for the proposed improvements for the I-26 & Columbia Avenue (S-32-48) interchange in Lexington County, South Carolina in accordance with FHWA and SCDOT guidelines. This report summarizes the results of the capacity analyses, crash analyses, and responses to FHWA's two policy requirements for an Interstate System Access Change Request.

1.1. Project Background

The I-26 & Columbia Avenue interchange is located at Exit 91 along the interstate and is currently a diamond configuration. Exit 97 (US 176/Broad River Road) is located approximately six miles to the east of Columbia Avenue and Exit 85 (SC 202/Pomaria Street) is located approximately six miles to the west of Columbia Avenue. Due to the extreme distance between the Exit 91 interchange and the two adjacent interchanges (approximately 6 miles), they would have no influence on the traffic flow at the subject interchange and are therefore not included in this report.

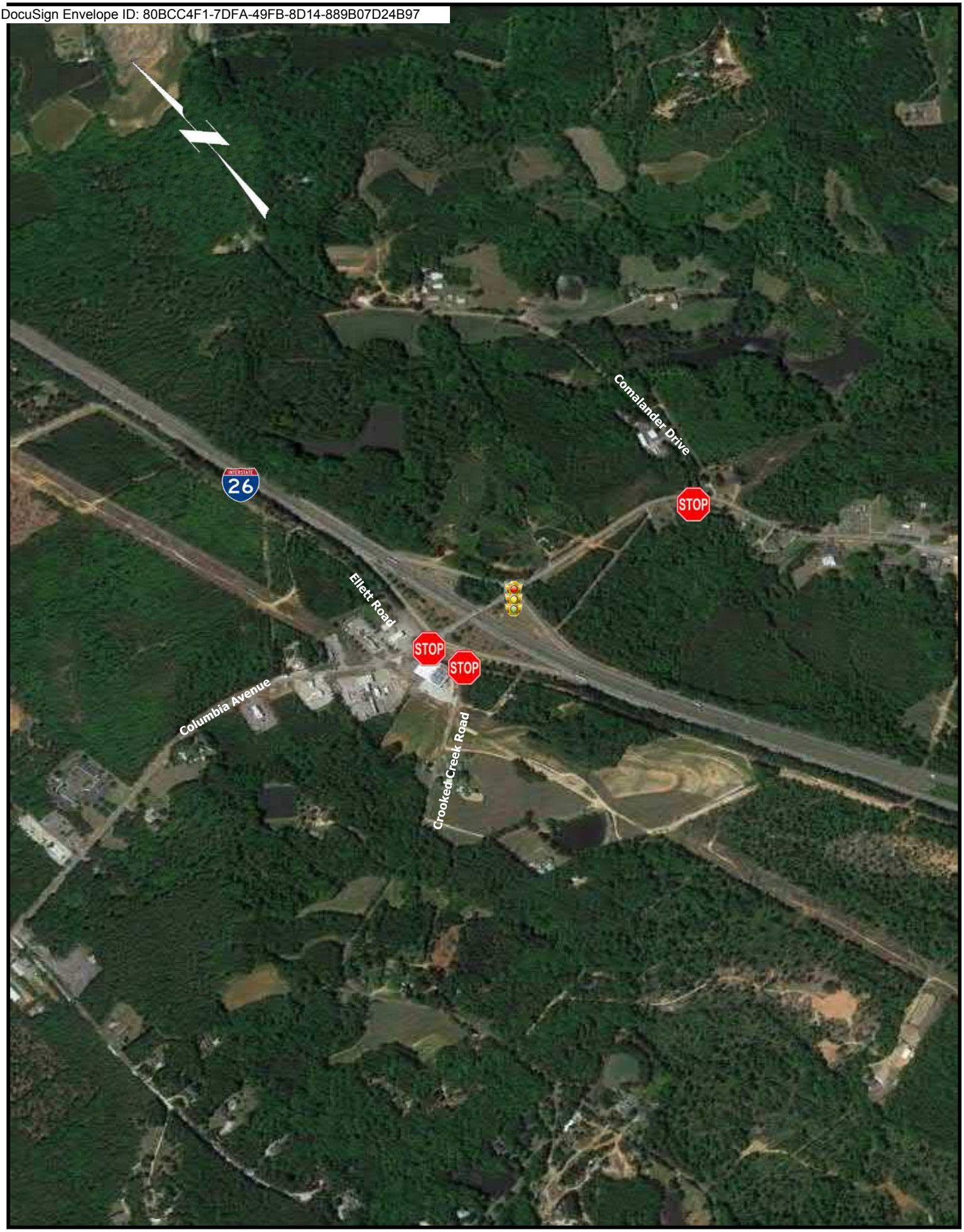
There is currently one exit ramp for each direction of I-26 to access Columbia Avenue. The I-26 WB exit ramp connection to Columbia Avenue occurs at a signalized intersection, which provides access to both Columbia Avenue northbound and southbound. The I-26 EB exit ramp connection to Columbia Avenue occurs at a stop-controlled intersection, which provides access to both Columbia Avenue northbound and southbound. There is currently one entrance ramp for access to each direction of I-26 which provides access to both Columbia Avenue northbound and southbound. Both entrance ramps are directional on-ramps which carry traffic from both northbound and southbound directions of Columbia Avenue. The respective righthand movement to the EB directional ramp is free-flow and the left-turn movement to the ramp yields to the free-flow Columbia Avenue traffic. At the I-26 westbound directional on-ramp, left-turn and right turn traffic movements from Columbia Avenue are controlled by the traffic signal at the ramp. The EB on-ramp is bi-directional and serves as access to Crooked Creek Road, which intersects the ramp approximately 150 feet east of Columbia Avenue.

The proposed interchange improvements to the I-26 & Columbia Avenue interchange include relocation of the interchange approximately 0.13-mile northwest of the existing interchange. The relocated interchange includes a new bridge with two southbound (SB) thru lanes, a SB left turn lane for access to eastbound I-26, one northbound (NB) lane, bike lanes in both directions, and sidewalks on either side of the bridge. The new interchange will be a parclo design with a loop in the northwestern quadrant.

Figure 1 illustrates the location of the study I-26 & Columbia Avenue interchange.

1.2. Previous Interchange Modification Report

SCDOT prepared an *Interchange Modification Report* in December 2016 for the I-26 & Columbia Avenue (S-32-48) interchange improvements, which was utilized as a base for the IMR and is provided in Appendix A. The December 2016 IMR requires an update due to design changes. The I-26 mainline volumes east of Columbia Avenue were used as a base for developing the updated I-26 volumes.



1.3. Study Area & Analysis Time Periods

The IMR evaluates capacity analyses and crash analyses of the proposed I-26 & Columbia Avenue (S-32-48) interchange improvements at the following intersections.

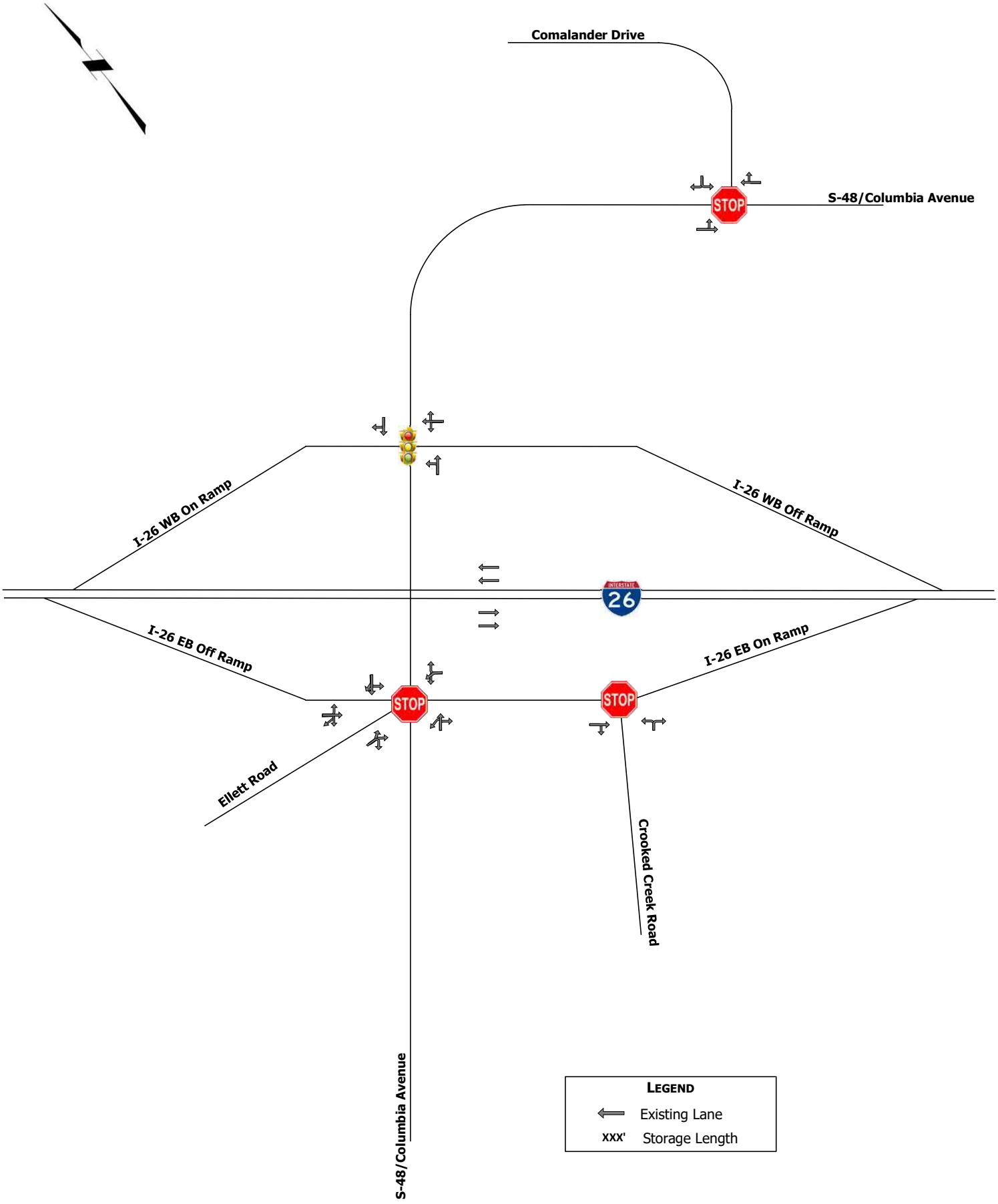
1) New Columbia Avenue (S-32-48) & Relocated Ellett Drive/Old Columbia Avenue
2) Columbia Avenue (S-32-48) & I-26 Westbound Ramps
3) Columbia Avenue (S-32-48) & I-26 Eastbound Ramps
4) Columbia Avenue (S-32-48) & Chapin Commerce Village Driveways
5) New Columbia Avenue (S-32-48) & Relocated Comalander Drive/Old Columbia Avenue

The IMR analyses consider 2020 existing traffic conditions; projected 2024 opening-year traffic conditions; and 2044 horizon-year traffic conditions as the study years. The weekday AM peak period and PM peak period were considered as the study evaluation time periods for each of the study years.

Existing roadway conditions are summarized in Table 1 and Figure 2 illustrates the existing lane geometry, traffic control, and turn lane lengths.

Table 1 – Existing Roadway Conditions

Facility Name	SC Route #	Cross Section	Classification	Speed Limit	2018 AADT	Maintained By
Interstate 26	I-26	4-lane divided	Interstate	70 MPH	53,200	SCDOT
Columbia Avenue	S-48	2-lane undivided	Minor Arterial	35 MPH	14,900	SCDOT
Ellett Drive	S-1877	2-lane undivided	Local	35 MPH	NA	SCDOT
Comalander Drive	S-689	2-lane undivided	Local	50 MPH	NA	SCDOT
Crooked Creek Road	S-232	2-lane undivided	Local	45 MPH	NA	SCDOT



1.4. Committed Improvements

I-26 is currently under a design build contract for widening to three lanes in both directions between mile markers 85 and 101, including the interchange reconstruction of Columbia Avenue for which this IMR is being prepared. For the purposes of this analysis, this improvement was considered to be in place for 2024 opening-year and 2044 horizon-year conditions.

1.5. Statement of Need

The purpose of the IMR is to evaluate the traffic impacts of the proposed improvements to the I-26 & Columbia Avenue (S-32-48) interchange. Improvements to the interchange are necessary due to the operational and safety deficiencies documented in the *SCDOT* prepared *Interchange Modification Report* of December 2016 and the historical and projected growth of Lexington County around the interchange. In the December 2016 IMR, SCDOT used 1.25% growth for the Columbia Avenue corridor. When preparing this updated IMR, the SCDOT Planning Office was consulted and recommended using 1.5% annual growth for the corridor when determining the 2024 and 2044 projections. The previous IMR used 2% growth on the I-26 corridor and SCDOT determined this rate was still valid for this update. The proposed improvements to the interchange will address the existing operational and safety deficiencies and accommodate projected future traffic volumes.

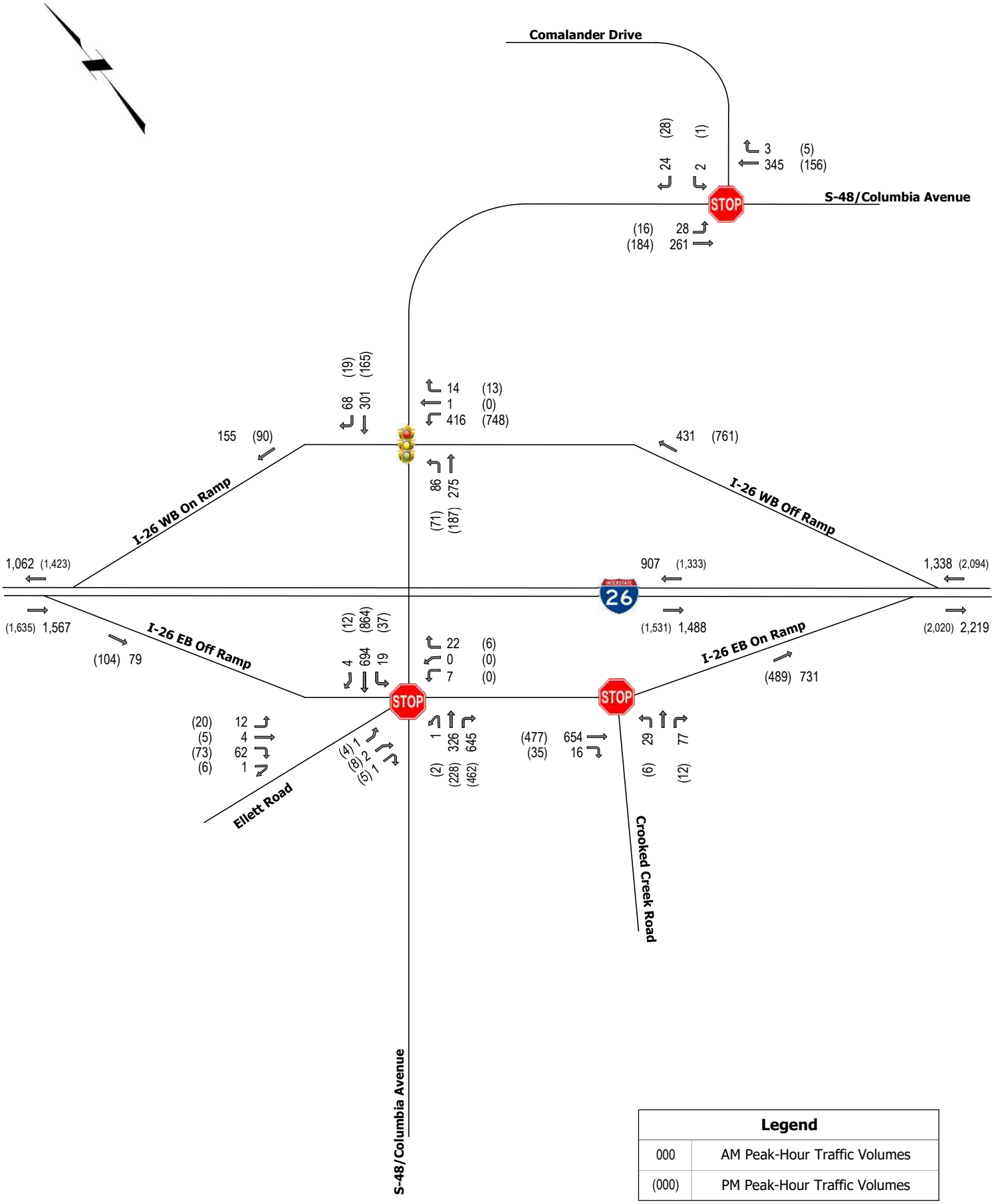
2. TRAFFIC VOLUME DEVELOPMENT

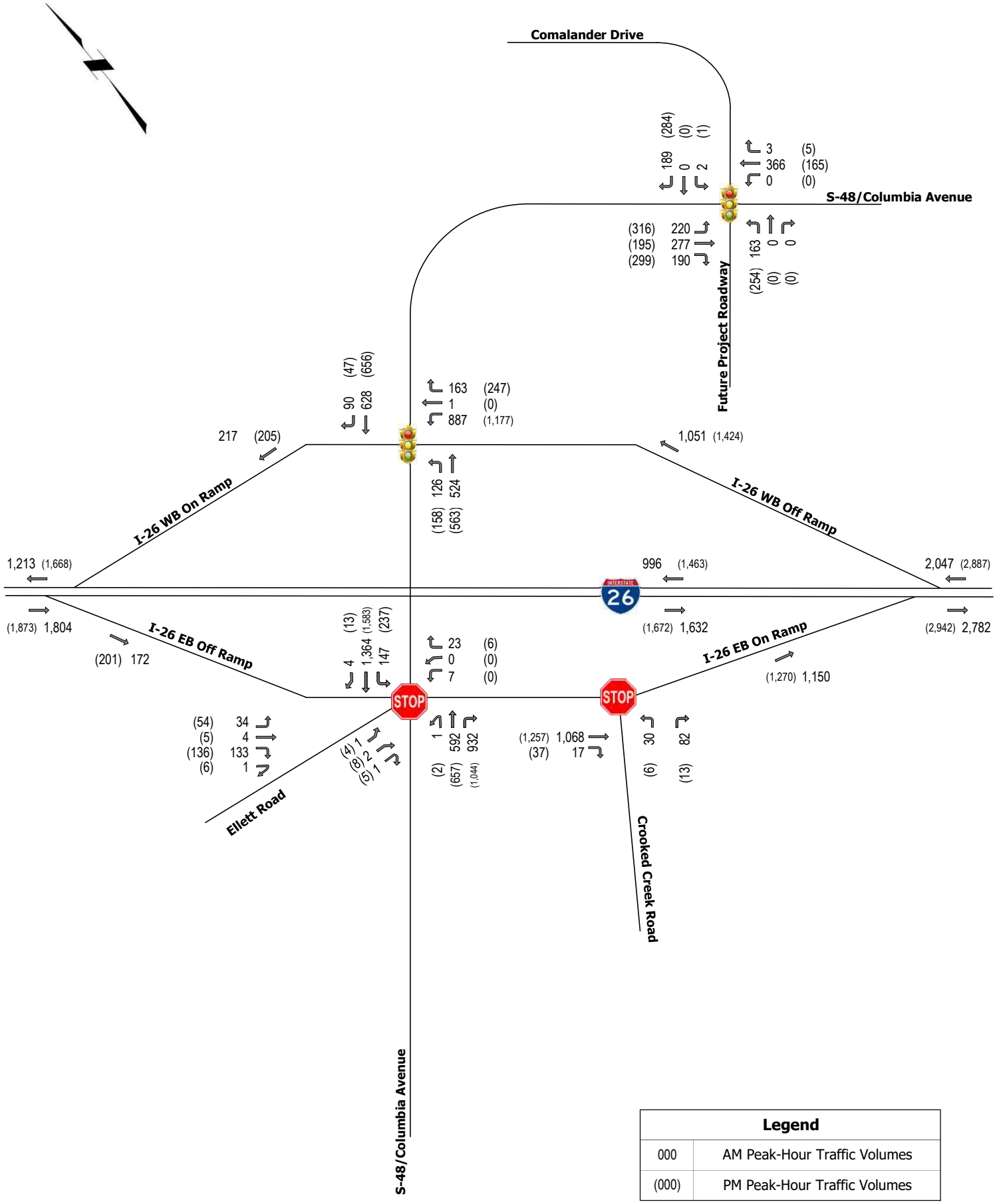
For each of the study years, existing and projected traffic volumes were developed for the weekday AM peak period and PM peak period.

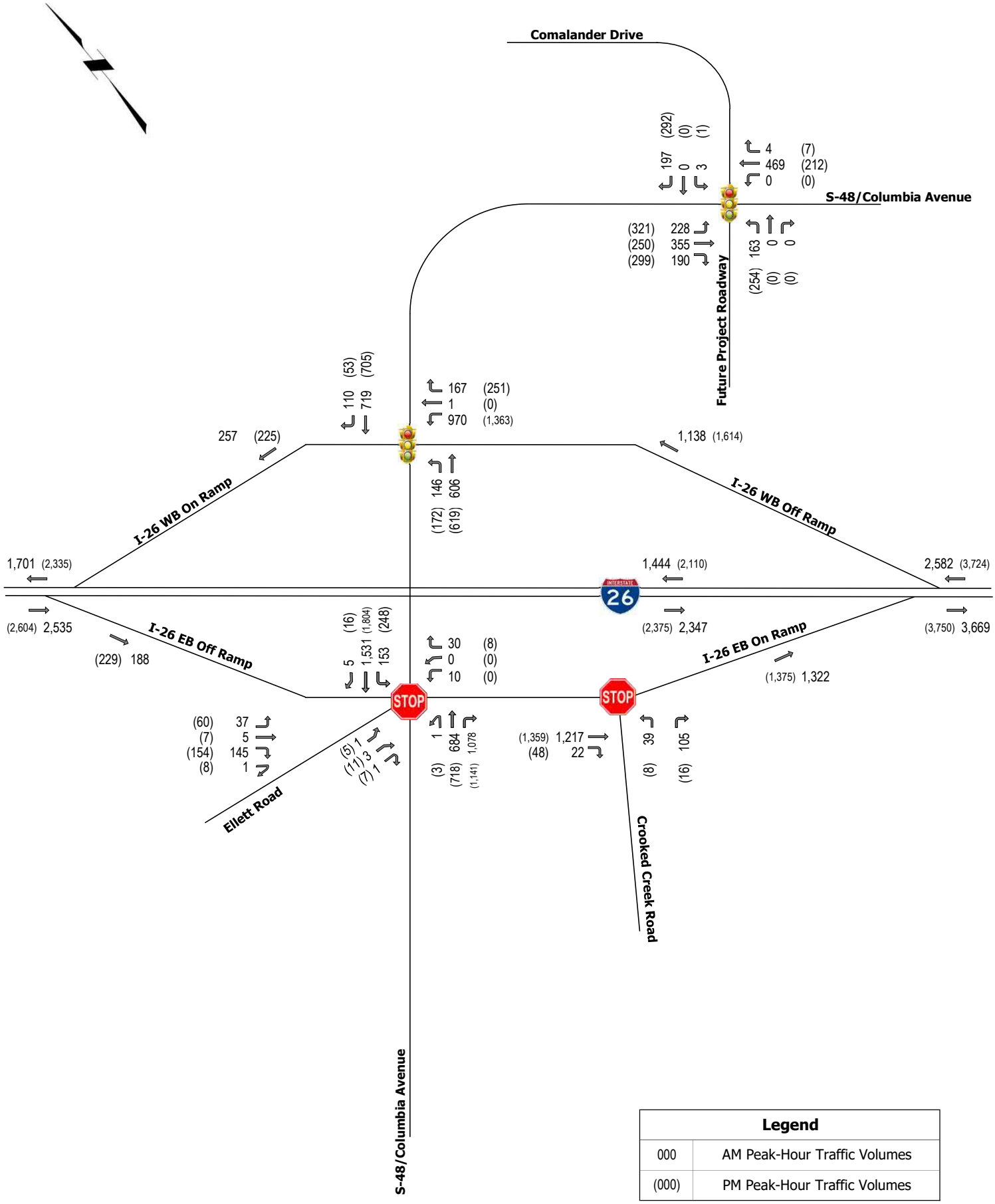
2020 existing traffic volumes were obtained from traffics counts taken in January of 2020 for use in the analyses. The 2020 I-26 mainline volumes were developed from the 2014 AECOM counts and grown by an annual 2% growth rate. The 2020 traffic volumes are illustrated in Figure 3 and the raw traffic count data is provided in Appendix B.

2024 opening-year traffic volumes were developed by applying the annual background growth rate of 1.5% to the 2020 existing traffic volumes along Columbia Avenue and 2.0%growth rate to the I-26 mainline. The 2024 No-Build traffic volumes are illustrated in Figure 4 **and documented in Appendix C**.

2044 horizon-year traffic volumes were obtained by applying the documented annual background growth rate of 1.5%to Columbia Avenue and 2.0% to I-26 for use in the analyses. 2044 No-Build traffic volumes are illustrated in Figure 5.







2.1. Build Traffic Diversion

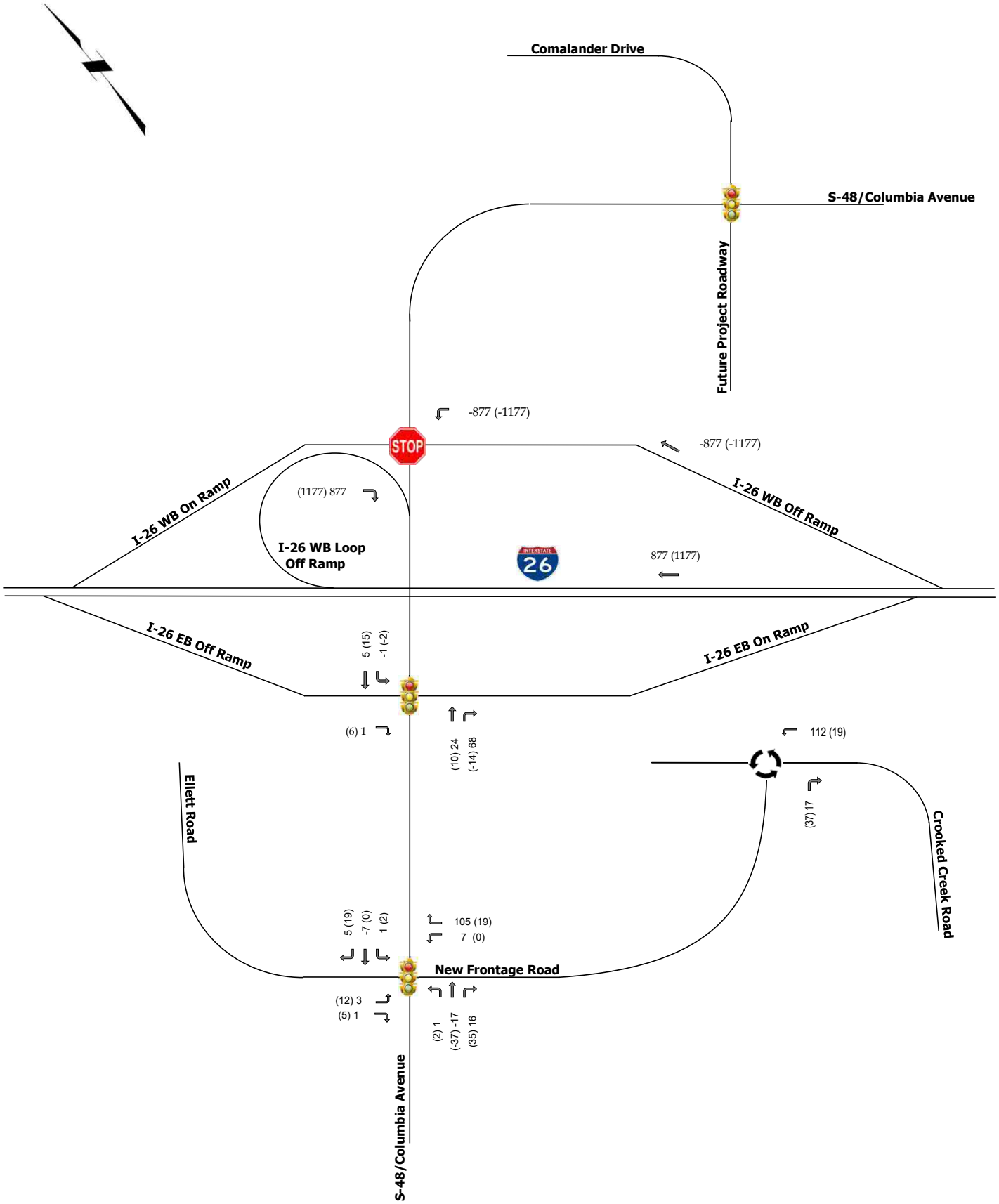
The proposed interchange improvements to the I-26 & Columbia Avenue interchange includes relocation of the interchange approximately 0.13-mile northwest of the existing interchange. The proposed improvements incorporate a westbound loop off-ramp which will divert southbound trips along Columbia Ave to the new loop on I-26. The proposed relocation of the interchange will also result in converting the existing Columbia Avenue to a frontage road removing many current conflict points from main line through movement. This will create a new intersection that requires the projected 2024 No-Build and 2044 No-Build traffic volumes to be diverted onto the new route. As a result of the New Frontage Road, the Crooked Creek Road intersection will be converted to a roundabout at the northern end of the Old Columbia Avenue/New Frontage Road. Table 2 summarizes the proposed new roadway/intersection improvements and the corresponding route for the traffic diversions.

Table 2 – Diverted Traffic Summary

Roadway Facility	Proposed Improvement	Diverted Traffic Summary
Crooked Creek Road	Relocated into new traffic circle.	All traffic to/from existing Crooked Creek Road assigned to southern piece of old Columbia Avenue and to the new Columbia Avenue/Old Columbia Avenue intersection
Comalander Drive	Relocated 200' northwest of existing intersection along Columbia Avenue	All traffic to/from existing Comalander Drive assigned to new intersection.
Ellett Road	Relocated 1000' southwest of existing intersection along Columbia Avenue.	All traffic to/from existing Ellett Road assigned to new intersection.
Driveways along Old Columbia Avenue	Remains on Old Columbia Avenue	Refer to Figure 1C in Appendix C for a detailed illustration
I-26 WB Off Ramps	Install new I-26 WB Off Loop to accommodate traffic bound to travel south on Columbia Avenue	All left-turning traffic from the exiting I-26 WB Off Ramp assigned to new Off Loop

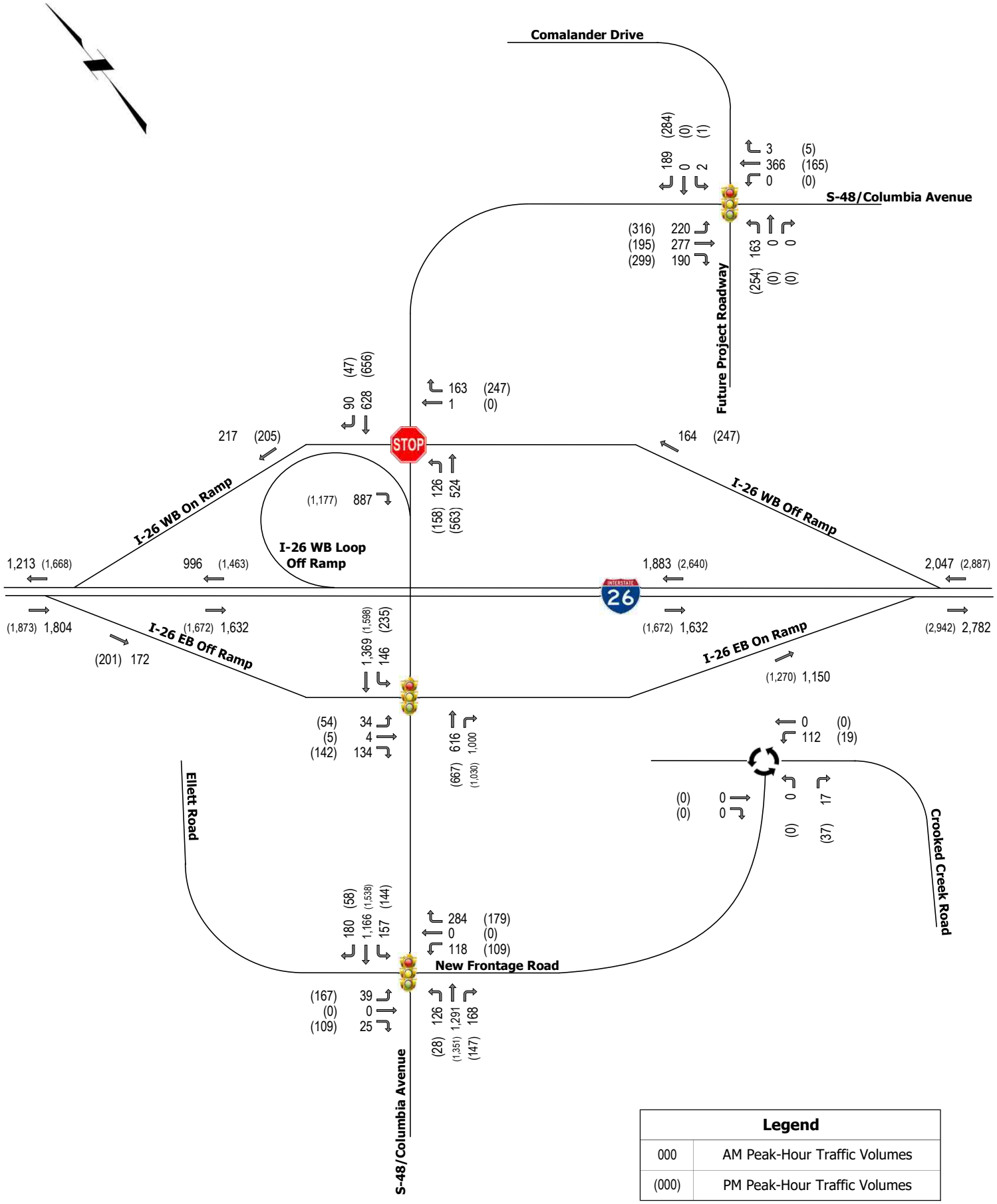
The diverted traffic volumes and resultant build traffic volumes for 2024 opening-year conditions are illustrated in Figure 6 and Figure 7, respectively.

The diverted traffic volumes and resultant build traffic volumes for 2044 horizon-year conditions are illustrated in Figure 8 and Figure 9, respectively.

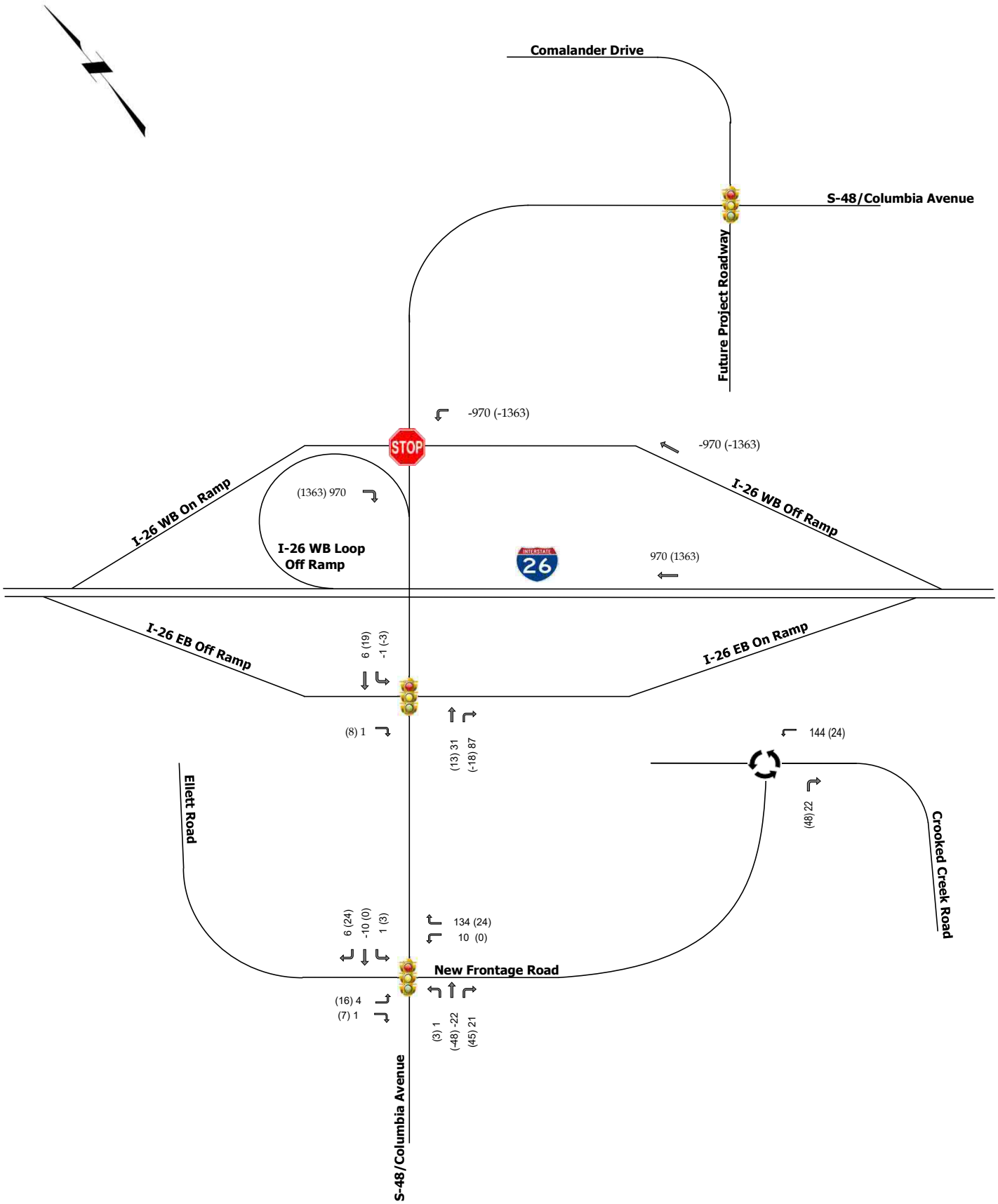


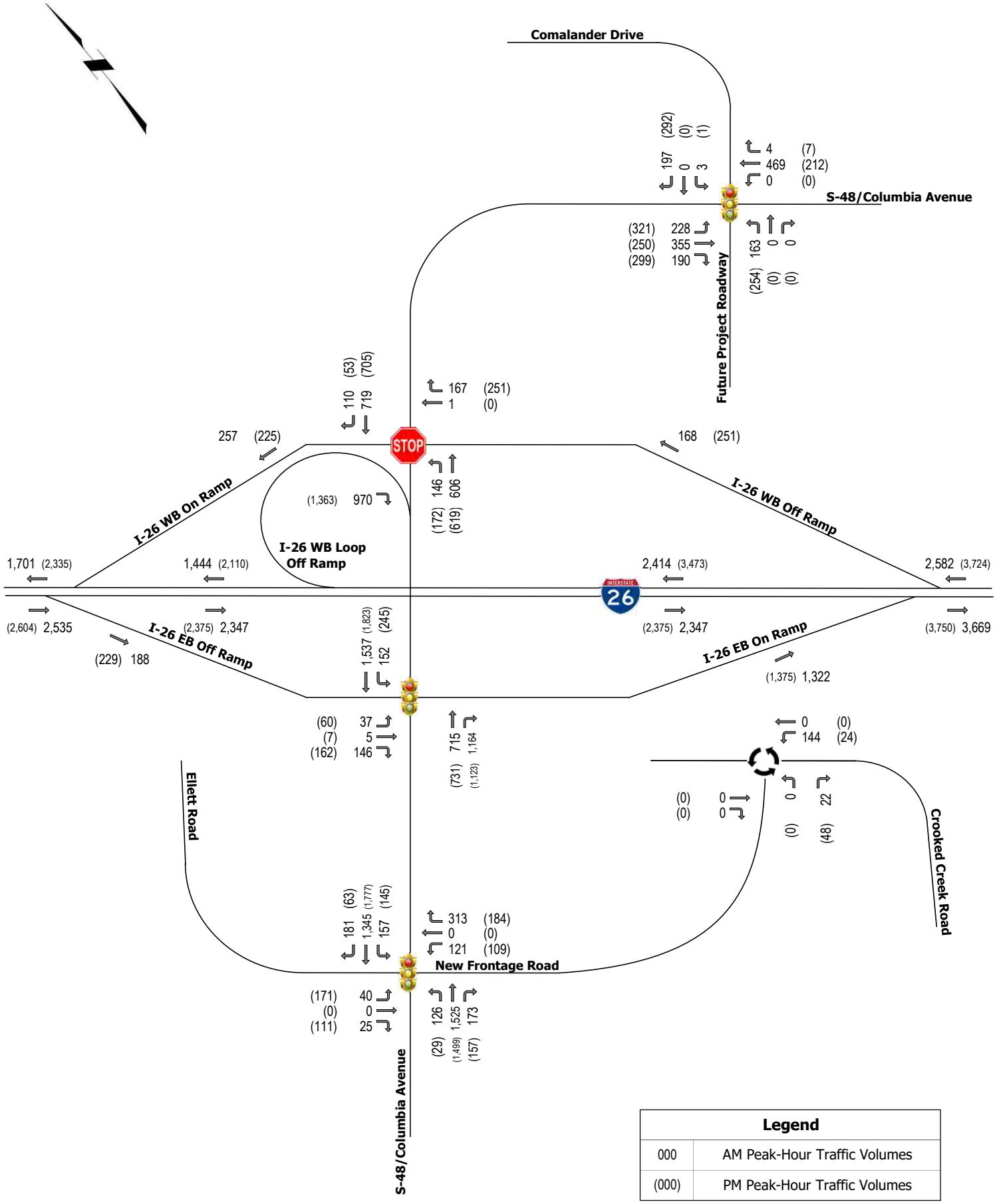
I-26 at S-48/Columbia Avenue - Interchange Modification Report
Figure 6 - 2024 Diverted Peak-Hour Traffic Volumes

Moving forward.
RKA
RAMEY KEMP ASSOCIATES



Legend	
000	AM Peak-Hour Traffic Volumes
(000)	PM Peak-Hour Traffic Volumes





Legend	
000	AM Peak-Hour Traffic Volumes
(000)	PM Peak-Hour Traffic Volumes

3. TRAFFIC & CRASH ANALYSES

The IMR considers the following analysis evaluations for determining the impact of the proposed I-26 & Columbia Avenue interchange improvements.

1) Freeway facility analyses were conducted for the I-26 mainline; the on-ramp merges to I-26 from Columbia Avenue; and the off-ramp diverges from I-26 to Columbia Avenue using the McTrans *Highway Capacity Software*, Version 7.8.
2) Intersection analyses for the signalized and unsignalized intersections along Columbia Avenue were conducted using the Transportation Research Board's *Highway Capacity Manual 6th edition* methodologies of the *Synchro*, Version 10 software.
3) Intersection analyses for the new Frontage Road & Crooked Creek Road roundabout was conducted using *SIDRA*, version 7.0, roundabout analysis software.
4) The Columbia Avenue arterial crash analysis was conducted using *HSM* Crash Modification Factors (CMFs).

3.1. Freeway Facility Analyses

Using projected 2024 opening-year and 2044 horizon-year peak-hour traffic volumes, freeway facility analyses were conducted for the I-26 & Columbia Avenue interchange.

Level of service (LOS) grades range from LOS A to LOS F, which are directly related to traffic density of freeway facilities. LOS A operations typically represent ideal, free-flow conditions where vehicles experience low densities and LOS F operations typically represent poor, forced-flow (bumper-to-bumper) conditions with high densities and are generally considered undesirable. Table 3 summarizes the HCM 2010 density thresholds associated with each LOS grade for freeway facilities.

Table 3 - *HCM 2010* LOS Criteria for Freeway Facilities

Density (Passenger Cars/Mile/Lane)		
LOS	**Ramp Merge & Diverge Areas**	**Freeway Segments**
A	≤ 10	≤ 11
B	> 10 and ≤ 20	> 11 and ≤ 18
C	> 20 and ≤ 28	> 18 and ≤ 26
D	> 28 and ≤ 35	> 26 and ≤ 35
E	> 35	> 35 and ≤ 45
F	Demand Exceeds Capacity	> 45

As part of the freeway facility analysis, a peak hour facto (PHF) of 0.95 was assumed for all scenarios. The existing SCDOT heavy vehicle percentage of 20% was utilized for the mainline in

all scenarios and the existing heavy vehicle percentages on the ramps were utilized in all scenarios, with a minimum percentage of 2% considered.

3.1.1. Freeway Facilities – 2020 Existing-Year Conditions

The results of the freeway facility analyses for the 2020 Existing conditions are summarized in Table 4 for the AM peak-hour and Table 5 for the PM peak-hour and illustrated in Figure 10. The results of the 2020 Existing freeway facility analyses indicate that the study I-26 freeway facilities are projected to operate with acceptable LOS conditions.

Table 4 – Freeway Facility LOS Analysis Summary (2020 Existing AM Peak-Hour)

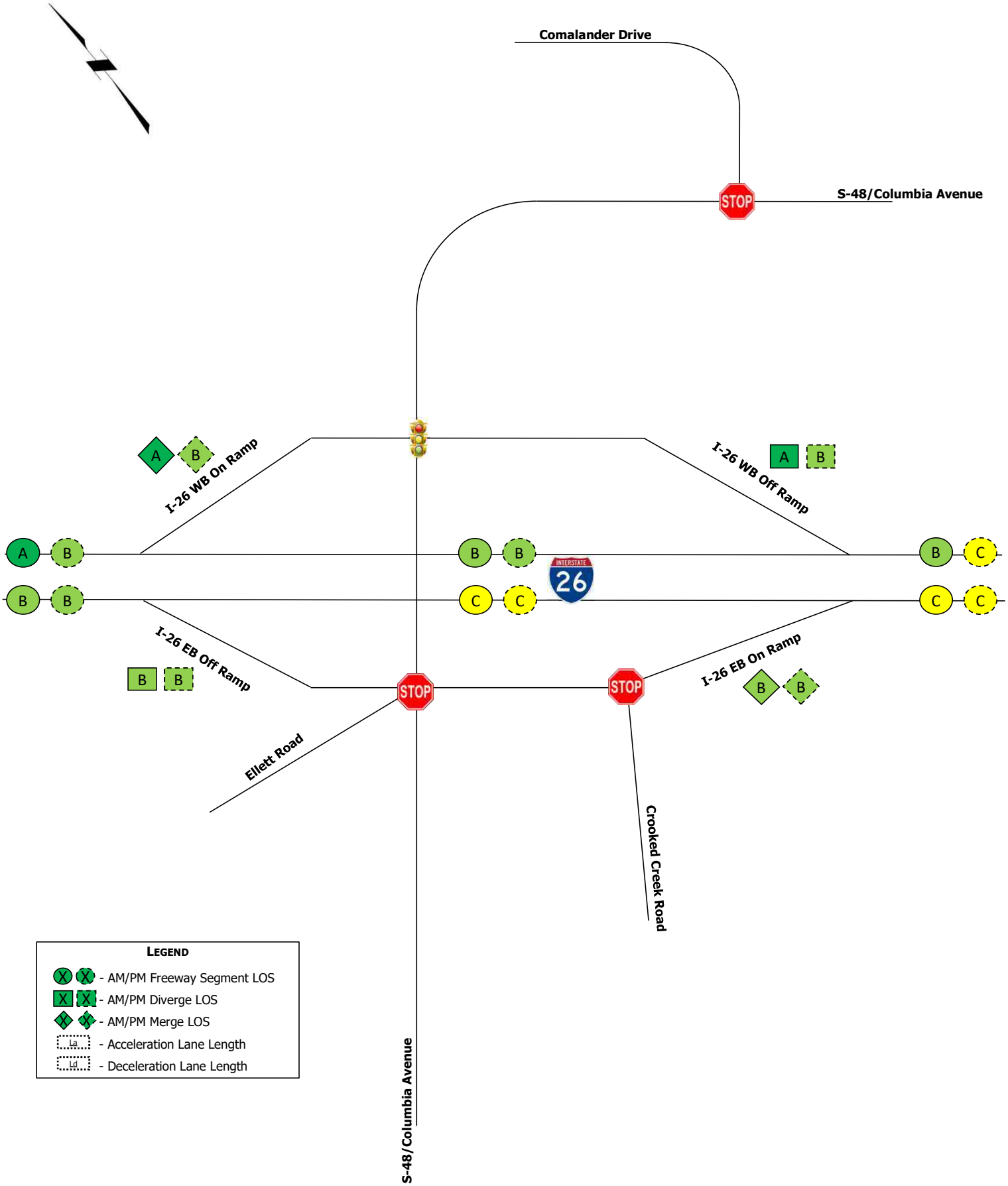
I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		1,567	16.1	FS	B		A	FS	10.9	1,062	
EB Off Ramp	79	1,488	14.3	D	B	979					
South of Columbia Ave[a]		1,488	18.6	FS	C						
EB On Ramp	731	1,488	19.1	M	B	1,500					
WB On Ramp						1,227	A	M	9.6	907	155
North of Columbia Ave[b]							B	FS	11.3	907	
WB Off Ramp						1,176	A	D	5.2	907	431
Between Exits 91 & 97		2,219	24.2	FS	C		B	FS	13.8	1,338	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB On Ramp.

Table 5 – Freeway Facility LOS Analysis Summary (2020 Existing PM Peak-Hour)

I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		1,635	16.9	FS	B		B	FS	14.6	1,423	
EB Off Ramp	104	1,531	14.9	D	B	979					
South of Columbia Ave[a]		1,531	19.1	FS	C						
EB On Ramp	489	1,531	17.7	M	B	1,500					
WB On Ramp						1,227	B	M	13.9	1,333	90
North of Columbia Ave[b]							B	FS	16.6	1,333	
WB Off Ramp						1,176	B	D	10.6	1,333	761
Between Exits 91 & 97		2,020	21.4	FS	C		C	FS	22.5	2,094	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB On Ramp.



3.1.2. Freeway Facilities – 2024 Opening-Year Conditions

The results of the freeway facility analyses for the 2024 No-Build conditions are summarized in Table 6 for the AM peak-hour and Table 7 for the PM peak-hour and illustrated in Figure 11. The 2024 No-Build conditions assume the existing two lanes along I-26 in both directions. The results of the 2024 No-Build freeway facility analyses indicate that the study I-26 freeway facilities are projected to operate with acceptable LOS conditions with two exceptions. Both eastbound and westbound directions of the freeway segments between Exit 91 and Exit 97 during the PM Peak-Hour are projected to operate with unacceptable LOS conditions.

Table 6 – Freeway Facility LOS Analysis Summary (2024 No-Build AM Peak-Hour)

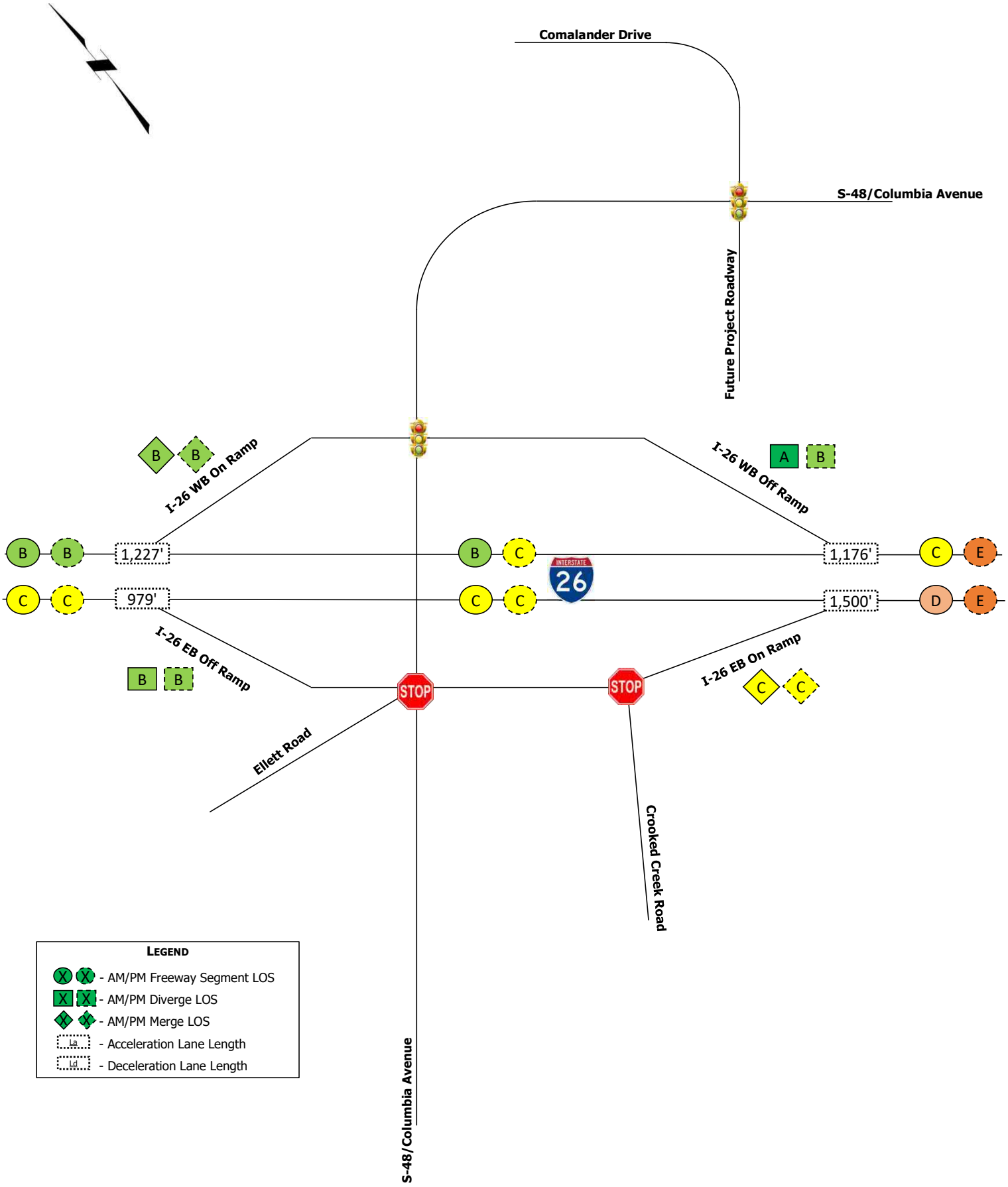
I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		1,804	18.8	FS	C		B	FS	12.5	1,213	
EB Off Ramp	172	1,632	16.1	D	B	979					
South of Columbia Ave[a]		1,632	20.4	FS	C						
EB On Ramp	1,150	1,632	24.1	M	C	1,500					
WB On Ramp						1,227	B	M	11.1	996	217
North of Columbia Ave[b]							B	FS	12.4	996	
WB Off Ramp						1,176	A	D	6.3	996	1,051
Between Exits 91 & 97		2,782	34.5	FS	D		C	FS	21.8	2,047	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB On Ramp.

Table 7 – Freeway Facility LOS Analysis Summary (2024 No-Build PM Peak-Hour)

I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		1,873	19.6	FS	C		B	FS	17.2	1,668	
EB Off Ramp	201	1,672	16.6	D	B	979					
South of Columbia Ave[a]		1,672	20.9	FS	C						
EB On Ramp	1,270	1,672	25.6	M	C	1,500					
WB On Ramp						1,227	B	M	16.4	1,463	205
North of Columbia Ave[b]							C	FS	18.3	1,463	
WB Off Ramp						1,176	B	D	12.2	1,463	1,424
Between Exits 91 & 97		2,942	38.5	FS	E		E	FS	37.1	2,887	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB On Ramp.



The results of the freeway facility analyses for the 2024 Build conditions are summarized in Table 8 for the AM peak-hour and Table 9 for the PM peak-hour and illustrated in Figure 12. The 2024 Build conditions assume widening of I-26 to three lanes for both eastbound and westbound. The results of the 2024 Build freeway facility analyses indicate that the study I-26 freeway facilities are projected to operate with acceptable LOS conditions.

Table 8 – Freeway Facility LOS Analysis Summary (2024 Build AM Peak-Hour)

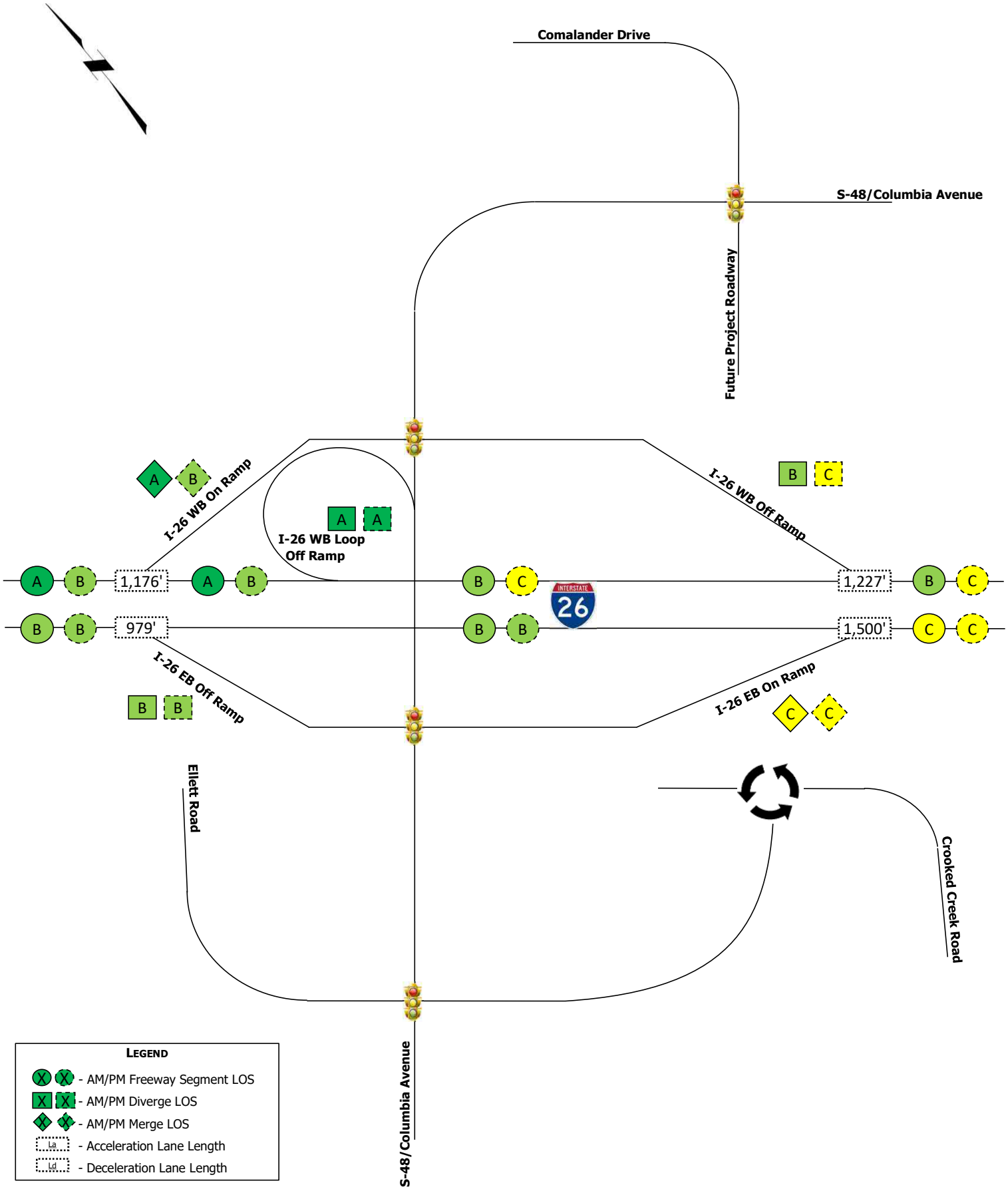
I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		1,804	12.4	FS	B		A	FS	8.3	1,213	
EB Off Ramp	172	1,632	10.9	D	B	910					
South of Columbia Ave[a]		1,632	12.0	FS	B						
EB On Ramp	1,150	1,632	20.6	M	C	873					
WB On Ramp						1,102	A	M	7.4	996	217
North of Columbia Ave[b] Loop							A	FS	8.3	996	
WB Loop Ramp						1,500	A	D	2.1	996	887
North of Columbia Ave[c]							B	FS	15.7	1,883	
WB Off Ramp						217	B	D	19.3	1,883	164
Between Exits 91 & 97		2,782	19.4	FS	C		B	FS	14.1	2,047	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Loop Ramp and the I-26 WB On Ramp.
[c] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB Loop Ramp.

Table 9 – Freeway Facility LOS Analysis Summary (2024 Build PM Peak-Hour)

I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		1,873	12.8	FS	B		B	FS	11.4	1,668	
EB Off Ramp	201	1,672	11.3	D	B	910					
South of Columbia Ave[a]		1,672	12.3	FS	B						
EB On Ramp	1,270	1,672	21.9	M	C	873					
WB On Ramp						1,102	B	M	10.5	1,463	205
North of Columbia Ave[b] Loop							B	FS	12.2	1,463	
WB Loop Ramp						1,500	A	D	6.7	1,463	1,177
North of Columbia Ave[c]							C	FS	22.0	2,640	
WB Off Ramp						217	C	D	26.3	2,640	247
Between Exits 91 & 97		2,942	20.7	FS	C		C	FS	20.3	2,887	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Loop Ramp and the I-26 WB On Ramp.
[c] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB Loop Ramp.



3.1.3. Freeway Facilities – 2044 Horizon-Year Conditions

The results of the freeway facility analyses for the 2044 No-Build conditions are summarized in Table 10 for the AM peak-hour and Table 11 for the PM peak-hour and illustrated in Figure 13. The 2044 No-Build conditions assume the existing two lanes along I-26 in both directions. The results of the 2044 No-Build freeway facility analyses indicate that the study I-26 freeway facilities are projected to operate with acceptable LOS conditions with three exceptions. The I-26 eastbound on ramp merge condition during the AM and PM peak-hour, the I-26 eastbound freeway segment between exit 91 (S-48) and exit 97 (US 176) in the AM and PM peak-hour, and the I-26 westbound freeway segment between exit 91 (S-48) and exit 97 (US 176) in the PM peak-hour are projected to operate at LOS F conditions for 2044 No-Build conditions.

Table 10 – Freeway Facility LOS Analysis Summary (2044 No-Build AM Peak-Hour)

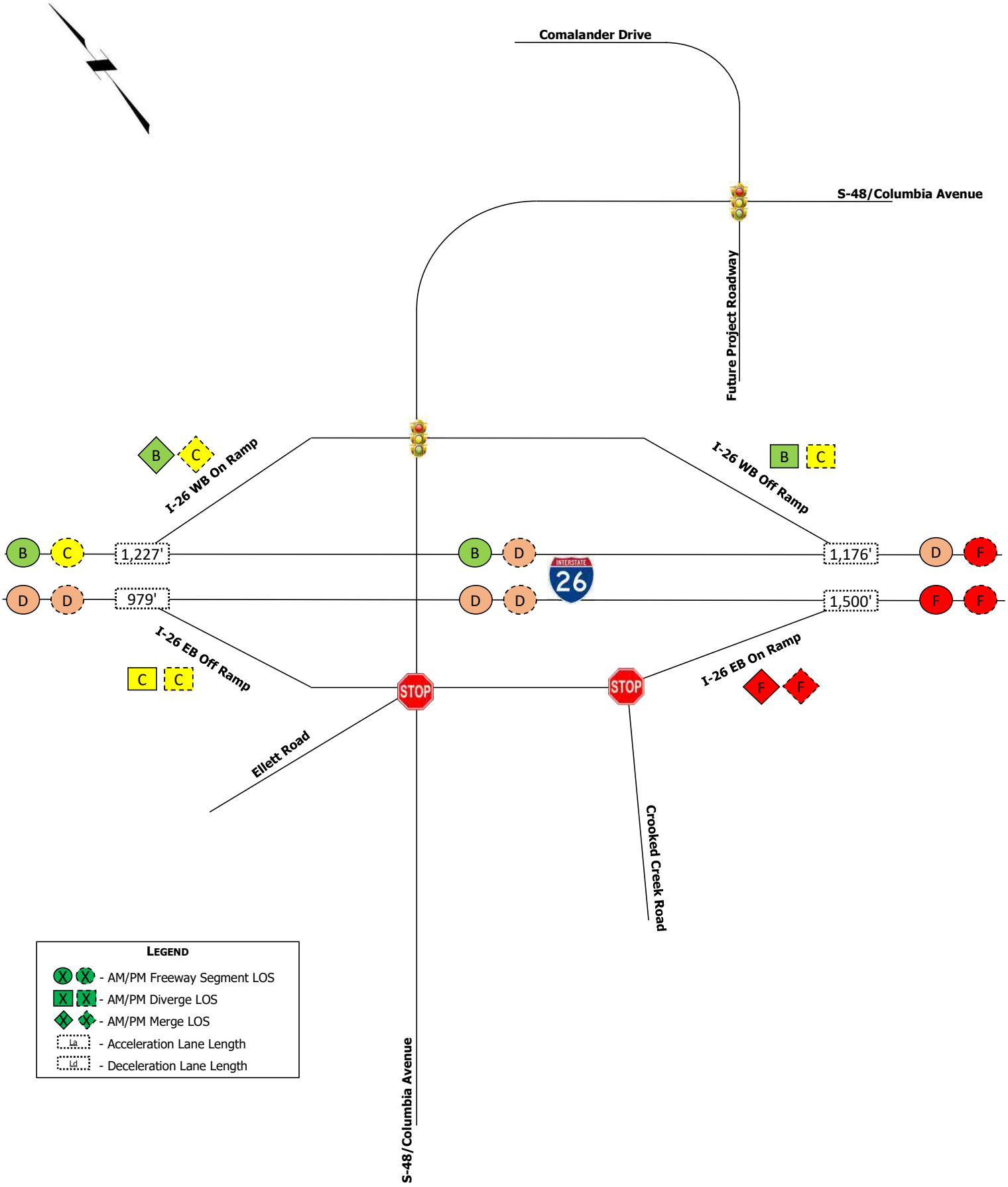
I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		2,535	29.4	FS	D		B	FS	17.6	1,701	
EB Off Ramp	188	2,347	25.2	D	C	979					
South of Columbia Ave[a]		2,347	29.7	FS	D						
EB On Ramp	1,322	2,347	33.8	M	F	1,500					
WB On Ramp						1,227	B	M	16.6	1,444	257
North of Columbia Ave[b]							B	FS	18.0	1,444	
WB Off Ramp						1,176	B	D	12.0	1,444	1,138
Between Exits 91 & 97		3,669	+	FS	F		D	FS	30.4	2,582	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB On Ramp.
+ This result indicates the HCS 7 results were in excess of 45.0 pc/mi/ln

Table 11 – Freeway Facility LOS Analysis Summary (2044 No-Build PM Peak-Hour)

I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		2,604	30.8	FS	D		C	FS	26.0	2,335	
EB Off Ramp	229	2,375	25.5	D	C	979					
South of Columbia Ave[a]		2,375	30.2	FS	D						
EB On Ramp	1,375	2,375	34.5	M	F	1,500					
WB On Ramp						1,227	C	M	24.0	2,110	225
North of Columbia Ave[b]							D	FS	26.4	2,110	
WB Off Ramp						1,176	C	D	20.4	2,110	1,614
Between Exits 91 & 97		3,750	+	FS	F		F	FS	+	3,724	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB On Ramp.
+ This result indicates the HCS 7 results were in excess of 45.0 pc/mi/ln


Comalander Drive
S-48/Columbia Avenue
Future Project Roadway
I-26 WB On Ramp
I-26 WB Off Ramp
B C
B C
B C 1,227'
B D
1,176' D F
D D 979'
D D
1,500' F F
INTERSTATE 26
I-26 EB Off Ramp
C C
STOP
STOP
I-26 EB On Ramp
F F
Ellett Road
Crooked Creek Road
S-48/Columbia Avenue
LEGEND
- AM/PM Freeway Segment LOS
- AM/PM Diverge LOS
- AM/PM Merge LOS
La - Acceleration Lane Length
Ld - Deceleration Lane Length

The results of the freeway facility analyses for the 2044 Build conditions are summarized in Table 12 for the AM peak-hour and Table 13 for the PM peak-hour and illustrated in Figure 14. The 2044 Build conditions assume widening of I-26 to three lanes for both eastbound and westbound. The results of the 2044 Build freeway facility analyses indicate that the study I-26 freeway facilities are projected to operate with acceptable LOS conditions.

Worksheets documenting the freeway facility analyses are provided in Appendix D.

Table 12 – Freeway Facility LOS Analysis Summary (2044 Build AM Peak-Hour)

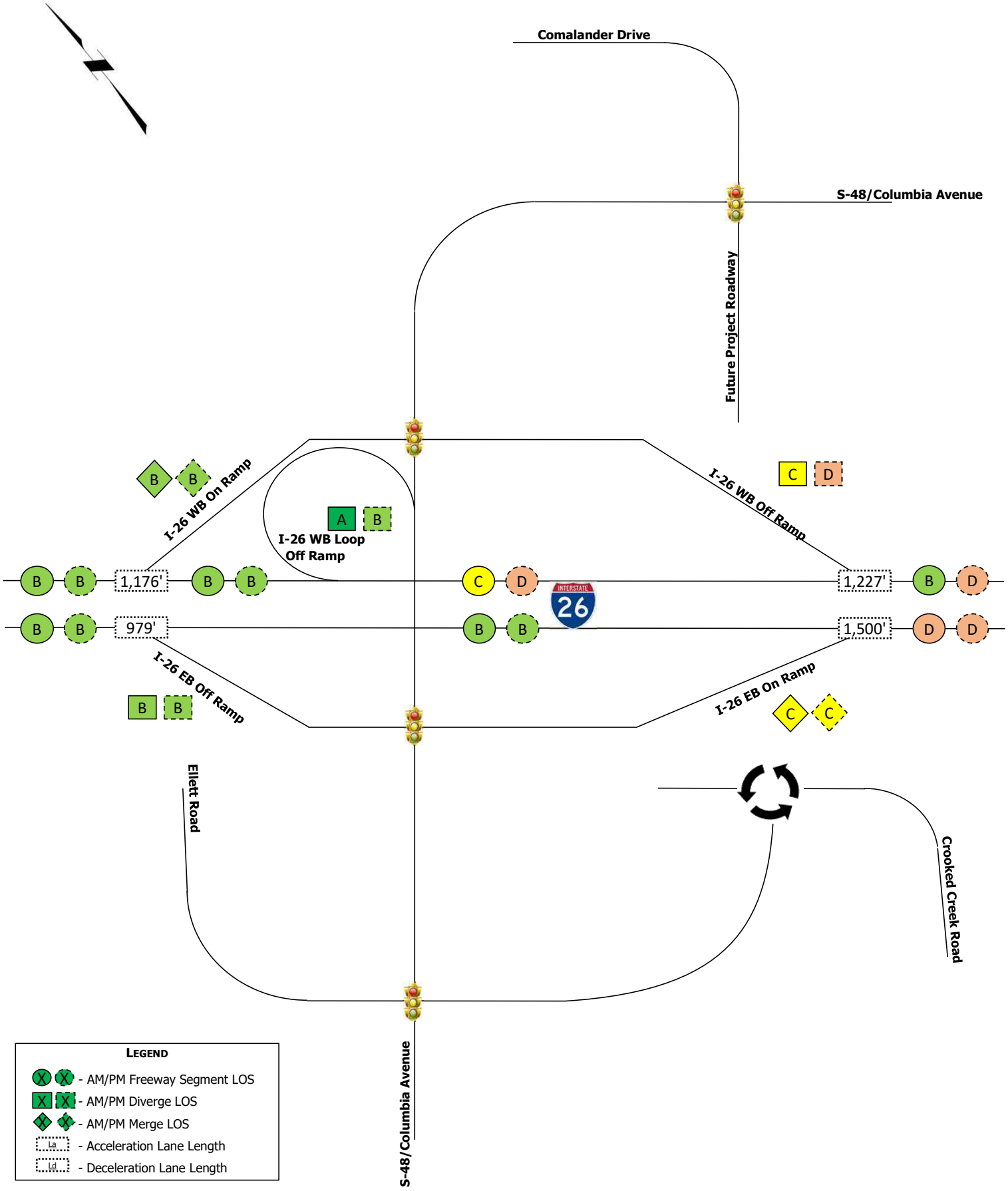
I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		2,535	17.5	FS	B		B	FS	11.7	1,701	
EB Off Ramp	188	2,347	16.5	D	B	910					
South of Columbia Ave[a]		2,347	17.3	FS	B						
EB On Ramp	1,322	2,347	26.9	M	C	873					
WB On Ramp						1,102	B	M	10.9	1,444	257
North of Columbia Ave[b] Loop							B	FS	12.0	1,444	
WB Loop Ramp						1,500	A	D	6.1	1,444	970
North of Columbia Ave[c]							C	FS	20.1	2,414	
WB Off Ramp						217	C	D	23.9	2,414	168
Between Exits 91 & 97		3,669	27.9	FS	D		B	FS	17.8	2,582	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Loop Ramp and the I-26 WB On Ramp.
[c] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB Loop Ramp.

Table 13 – Freeway Facility LOS Analysis Summary (2044 Build PM Peak-Hour)

I-26 Section	Eastbound					Accl./ Decl. Lane Length (ft)	Westbound				
	Ramp Volume (veh/hr)	Mainline Volume (veh/hr)	Density (pc/mi/ln)	Type	LOS		LOS	Type	Density (pc/mi/ln)	Mainline Volume (veh/hr)	Ramp Volume (veh/hr)
Between Exits 85 & 91		2,604	18.0	FS	B		B	FS	16.0	2,335	
EB Off Ramp	229	2,375	16.7	D	B	910					
South of Columbia Ave[a]		2,375	17.5	FS	B						
EB On Ramp	1,375	2,375	27.6	M	C	873					
WB On Ramp						1,102	B	M	15.2	2,110	225
North of Columbia Ave[b] Loop							B	FS	17.6	2,110	
WB Loop Ramp						1,500	B	D	12.1	2,110	1,363
North of Columbia Ave[c]							D	FS	29.2	3,473	
WB Off Ramp						217	D	D	33.6	3,473	251
Between Exits 91 & 97		3,750	28.8	FS	D		D	FS	28.5	3,724	

[a] This section represents the eastbound freeway segment between the I-26 EB Off Ramp and the I-26 EB On Ramp.
[b] This section represents the westbound freeway segment between the I-26 WB Loop Ramp and the I-26 WB On Ramp.
[c] This section represents the westbound freeway segment between the I-26 WB Off Ramp and the I-26 WB Loop Ramp.



3.2. Intersection Analyses

Using the existing 2020, projected 2024 opening-year and 2044 horizon-year peak-hour traffic volumes, intersection analyses were conducted for the signalized and unsignalized intersections along Columbia Avenue in the project study area.

Intersection level of service (LOS) grades range from LOS A to LOS F, which are directly related to the level of control delay at the intersection and characterize the operational conditions of the intersection traffic flow. LOS A operations typically represent ideal, free-flow conditions where vehicles experience little to no delays, and LOS F operations typically represent poor, forced-flow (bumper-to-bumper) conditions with high vehicular delays, and are generally considered undesirable. Table 14 summarizes the *HCM 6th edition* control delay thresholds associated with each LOS grade for unsignalized and signalized intersections.

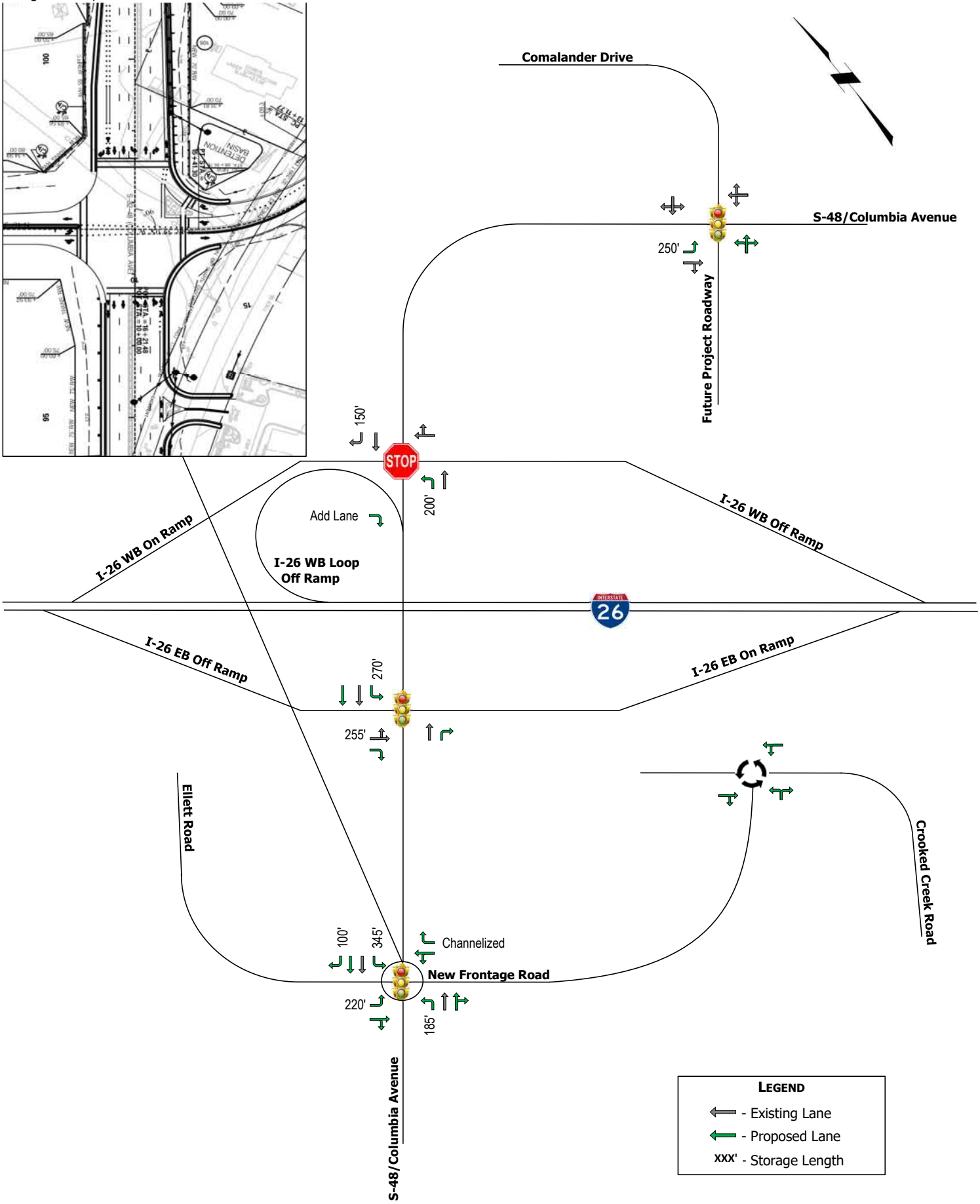
Table 14 - *HCM 6th Edition* LOS Criteria for Unsignalized & Signalized Intersections

Unsignalized Intersections	
LOS	**Control Delay per Vehicle (seconds)**
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Signalized Intersections	
LOS	**Control Delay per Vehicle (seconds)**
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

As part of the intersection analysis, SCDOT's default *Synchro* parameters were utilized. A PHF of 0.90 was assumed for the future-year 2024 and 2044 scenarios. Existing heavy vehicle percentages were utilized for the future-year 2024 and 2044 scenarios, with a minimum percentage of 2% considered.

The proposed lane geometry for the build conditions along Columbia Avenue is illustrated in Figure 15.



3.2.1. Intersections – 2024 Opening-Year Conditions

The results of the 2020 intersection analyses are included for comparison to the 2024 intersection analyses summarized in Table 15 for LOS and Table 16 for the queue results. Table 17 provide the results for the unsignalized intersections. The results of the intersection analyses are illustrated in Figure 16 for the existing 2020 conditions, Figure 17 for 2024 No-Build conditions, and Figure 18 for 2024 Build conditions.

Table 15 – 2024 Signalized Intersection Analysis Results

Intersection	Approach	LOS/Delay (seconds)					
		2020 Existing Conditions		2024 No-Build Conditions		2024 Build Conditions	
		AM	PM	AM	PM	AM	PM
Columbia Avenue & Ellet Road/Crooked Creek Road	EB	-	-	-	-	D/38.9	D/38.1
	WB	-	-	-	-	D/45.5	D/46.9
	NB	-	-	-	-	B/16.8	C/22.3
	SB	-	-	-	-	B/11.5	B/16.9
	Overall	-	-	-	-	**B/15.9**	**C/21.7**
Columbia Avenue & I-26 Eastbound Ramps	EB	Unsignalized Intersection		Unsignalized Intersection		D/48.3	D/47.7
	NB					B/10.9	B/13.2
	SB					A/6.2	A/7.8
	Overall					**B/10.6**	**B/12.1**
Columbia Avenue & I-26 Westbound Ramps	WB	F/1201.8	D/42.3	F/3327.4	F/566.2	Unsignalized Intersection	
	NB	C/25.6	C/21.9	F/649.1	F/761.6		
	SB	B/17.5	B/19.6	C/34.4	D/36.8		
	Overall	**F/459.4**	**C/34.4**	**F/1635.1**	**F/485.3**		
Columbia Avenue & Comalander Drive	EB	Unsignalized Intersection		C/32.8	F/118.0	A/8.9	B/16.1
	WB			A/7.3	B/13.1	B/17.6	C/27.7
	NB			D/51.4	E/79.2	C/21.3	C/21.0
	SB			D/37.0	C/33.5	C/20.3	B/16.3
	Overall			**C/28.8**	**F/83.9**	**B/14.1**	**B/18.3**

Table 16 – 2024 Signalized Intersection Analysis Queue Results

Intersection	Lane(s)	Queue Length (Feet)					
		2020 Existing Conditions		2024 No-Build Conditions		2024 Build Conditions	
		AM	PM	AM	PM	AM	PM
Columbia Avenue & Ellet Road/Crooked Creek Road	EBL	-	-	-	-	57	#234
	WBR	-	-	-	-	239	140
	NBL	-	-	-	-	41	13
	SBL	-	-	-	-	#152	m#139
	SBR	-	-	-	-	11	m0
Columbia Avenue & I-26 Eastbound Ramps	EBR	Unsignalized Intersection		Unsignalized Intersection		88	96
	NBT					m264	m434
	SBL					45	74
Columbia Avenue & I-26 Westbound Ramps	WB	350	#649	#1,921	#2,633	Unsignalized Intersection	
	NB	254	189	#1,077	#1,289		
	SB	212	126	786	767		
Columbia Avenue & Comalander Drive	EBL	Unsignalized Intersection		#696	#1,050	121	226
	WB			149	108	322	178
	NB			#253	#406	166	#261
	SB			60	62	51	50

The "m" footnote indicates that volume for the queue is metered by an upstream signal
The "#" footnote indicated that volume for the cycle exceeds capacity

The results of the signalized intersection analysis indicate that all the study signalized intersections are projected to operate with acceptable LOS conditions with construction of the project.

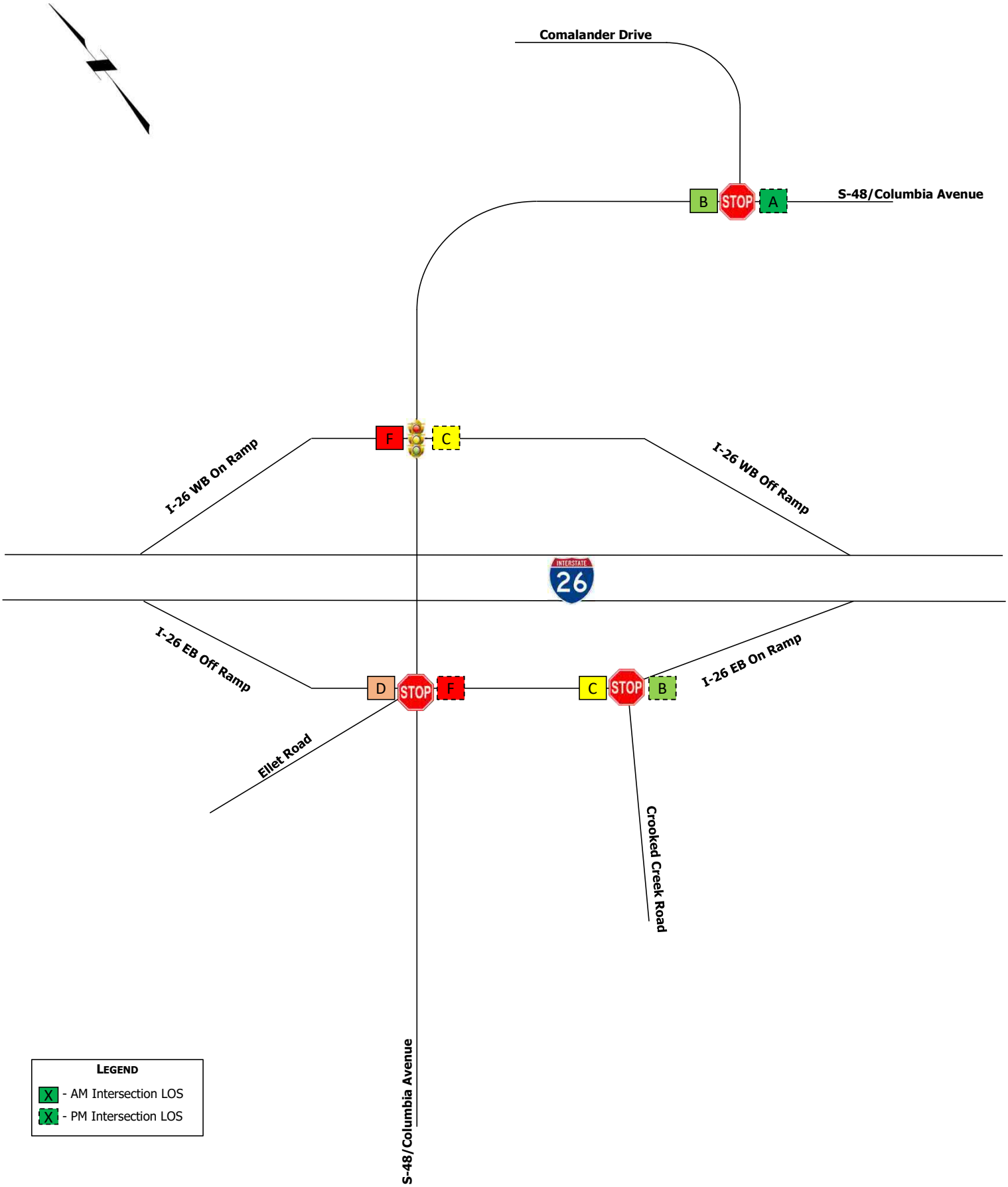
Table 17 – 2024 Unsignalized Intersection Analysis Results

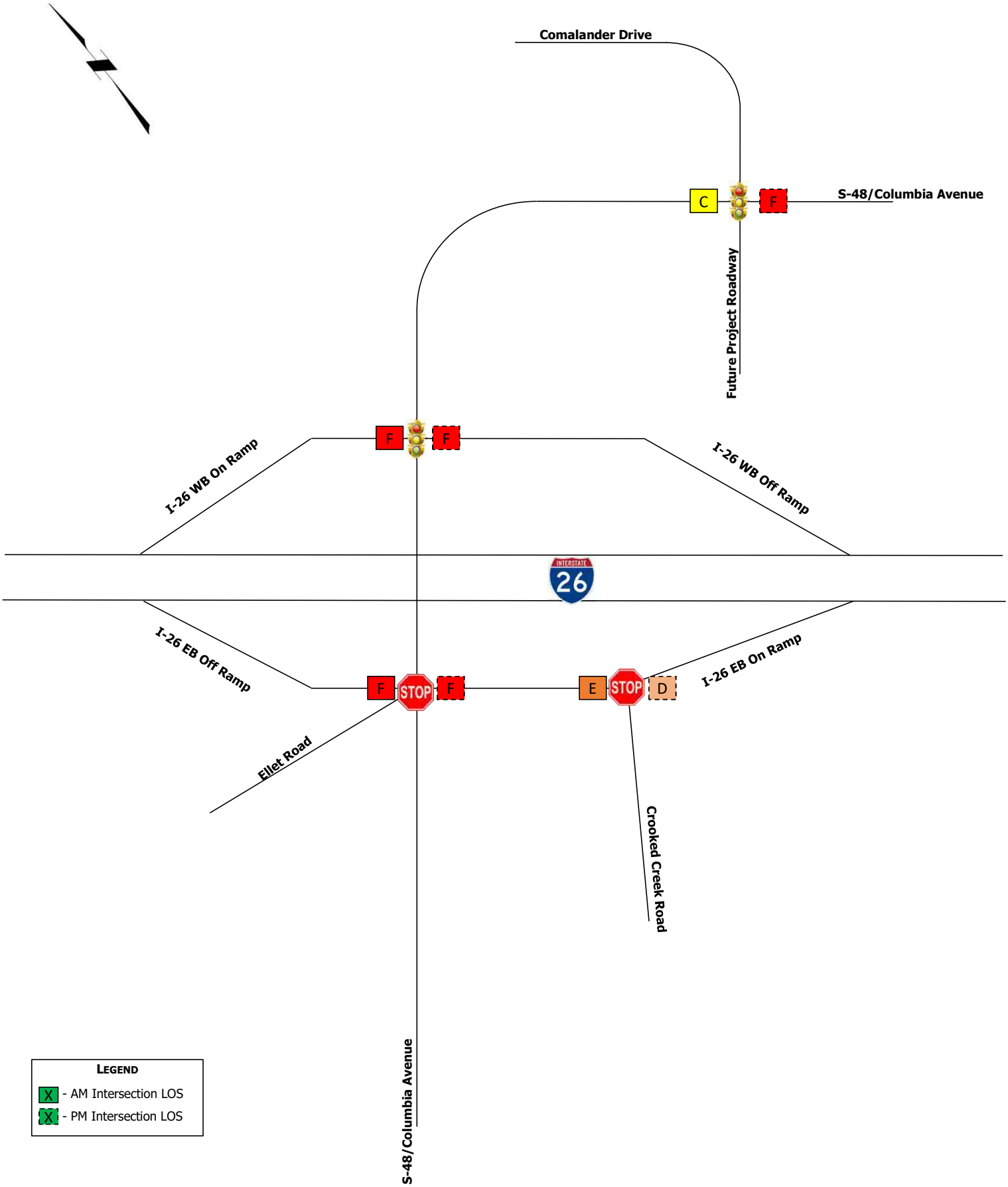
Intersection	Approach	LOS/Delay (seconds)					
		2020 Existing Conditions		2024 No-Build Conditions		2024 Build Conditions	
		AM	PM	AM	PM	AM	PM
Columbia Avenue & I-26 Eastbound Ramps/Ellet Road[a]	EB	D	F	F	F	Signalized Intersection	
	WB						
	NB						
	NEB						
	SB						
Columbia Avenue & I-26 Westbound Ramps	WB	Signalized Intersection		Signalized Intersection		C/16.6	C/21.7
	NB					A/2.0	A/2.3
	SB					A/0.0	A/0.0
Columbia Avenue & Comalander Drive	EB	A/0.8	A/0.6	Signalized Intersection		Signalized Intersection	
	WB	A/0.0	A/0.0				
	SB	B/12.4	A/9.9				
Crooked Creek Road & I-26 EB On-Ramp	EB	A/0.0	A/0.0	A/0.0	A/0.0	-	
	NB	C/17.8	B/12.1	E/41.8	D/29.4		
New Frontage Road & Crooked Creek Road[b]	EB	-		-		A/3.0	A/2.7
	WB					A/3.4	A/2.8
	NB					A/2.8	A/2.9
	Overall					**A/3.3**	**A/2.9**

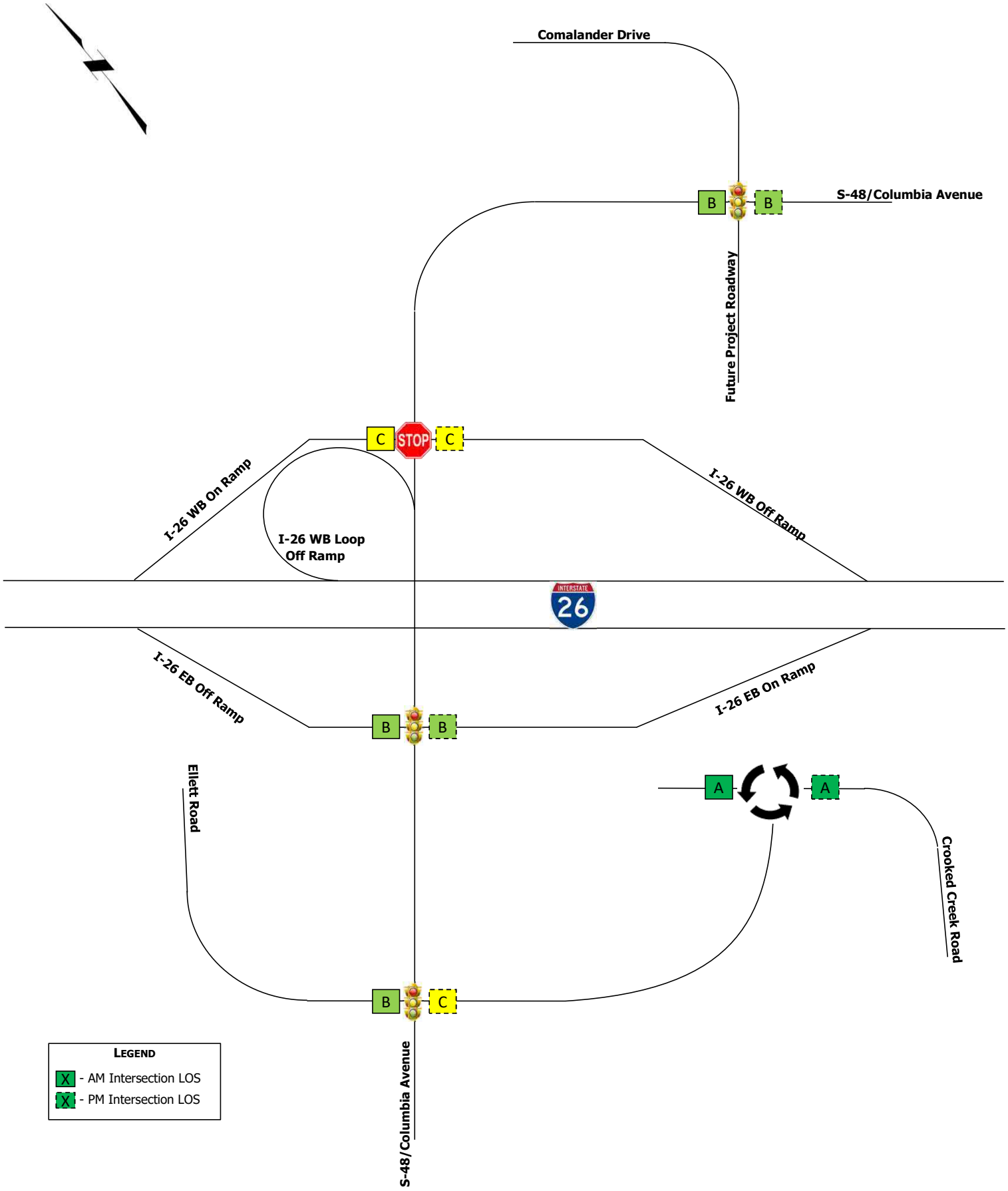
[a]ICU results were used due to intersection geometrics limit on HCM 6th Edition

[b]Roundabout Intersection analysis was conducted using *SIDRA*

The results of the unsignalized intersection analysis indicate that all the study unsignalized intersections are projected to operate with acceptable LOS conditions with construction of the project.




Comalander Drive
C
F
S-48/Columbia Avenue
Future Project Roadway
F
F
I-26 WB On Ramp
I-26 WB Off Ramp
INTERSTATE
26
I-26 EB Off Ramp
F
STOP
F
E
STOP
D
I-26 EB On Ramp
Ellet Road
Crooked Creek Road
S-48/Columbia Avenue
LEGEND
X - AM Intersection LOS
X - PM Intersection LOS



3.2.2. Intersections – 2044 Horizon-Year Conditions

The results of the 2044 intersection analyses are summarized in Table 18 and Table 19 for the signalized intersections and Table 20 for the unsignalized intersections. The results of the intersection analyses are illustrated in Figure 19 for 2044 No-Build conditions and Figure 20 for 2044 Build conditions.

Table 18 – 2044 Signalized Intersection Analysis Results

Intersection	Approach	LOS/Delay (seconds)					
		2020 Existing Conditions		2044 No-Build Conditions		2044 Build Conditions	
		AM	PM	AM	PM	AM	PM
Columbia Avenue & Ellet Road/Crooked Creek Road	EB	-	-	-	-	D/38.6	D/40.5
	WB	-	-	-	-	D/45.2	D/53.8
	NB	-	-	-	-	C/24.1	C/24.1
	SB	-	-	-	-	B/14.0	B/18.9
	Overall	-	-	-	-	**C/20.4**	**C/23.5**
Columbia Avenue & I-26 Eastbound Ramps	EB	Unsignalized Intersection		Unsignalized Intersection		D/47.4	D/48.7
	NB					B/12.5	B/15.4
	SB					A/7.7	B/10.8
	Overall					**B/11.9**	**B/14.8**
Columbia Avenue & I-26 Westbound Ramps	WB	F/1201.8	D/42.3	F/3539.3	F/629.0	Unsignalized Intersection	
	NB	C/25.6	C/21.9	F/5437.7	F/2343.2		
	SB	B/17.5	B/19.6	E/62.0	D/51.6		
	Overall	**F/459.4**	**C/34.4**	**F/3019.6**	**F/918.8**		
Columbia Avenue & Comalander Drive	EB	Unsignalized Intersection		F/130.6	F/140.3	B/10.7	B/18.6
	WB			B/10.7	B/10.3	B/19.9	C/30.3
	NB			E/57.9	F/113.8	C/27.2	C/23.7
	SB			D/43.0	C/33.0	C/24.5	B/17.7
	Overall			**E/77.1**	**F/99.5**	**B/16.8**	**C/20.8**

Table 19 – 2044 Signalized Intersection Analysis Queue Results

Intersection	Lane(s)	Queue Length (Feet)					
		2020 Existing Conditions		2044 No-Build Conditions		2044 Build Conditions	
		AM	PM	AM	PM	AM	PM
Columbia Avenue & Ellet Road/Crooked Creek Road	EBL	-	-	-	-	56	#256
	WBR	-	-	-	-	264	150
	NBL	-	-	-	-	73	13
	SBL	-	-	-	-	m#155	m105
	SBR	-	-	-	-	9	m1
Columbia Avenue & I-26 Eastbound Ramps	EBR	Unsignalized Intersection		Unsignalized Intersection		99	112
	NBT					m354	m431
	SBL					47	146
Columbia Avenue & I-26 Westbound Ramps	WB	350	#649	#2,160	#3,065	Unsignalized Intersection	
	NB	254	189	#1,704	#1,761		
	SB	212	126	#1,125	#994		
Columbia Avenue & Comalander Drive	EBL	Unsignalized Intersection		#1140	#986	137	225
	WB			287	110	460	227
	NB			#280	#387	210	#285
	SB			65	63	59	51

The "m" footnote indicates that volume for the queue is metered by an upstream signal
The "#" footnote indicated that volume for the cycle exceeds capacit

The results of the signalized intersection analysis indicate that all the study signalized intersections are projected to operate with acceptable LOS conditions with construction of the project.

Table 20 – 2044 Unsignalized Intersection Analysis Results

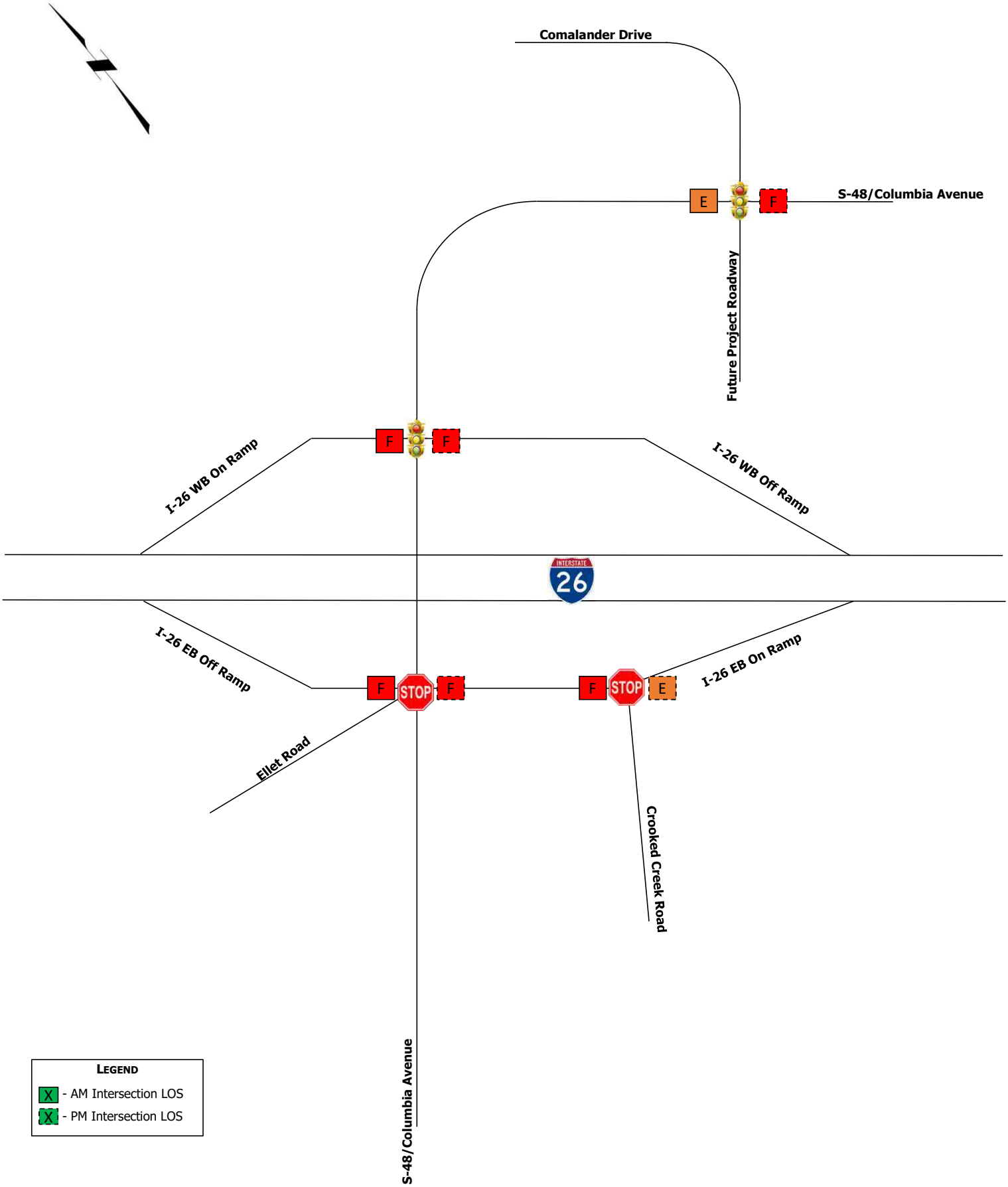
Intersection	Approach	LOS/Delay (seconds)					
		2020 Existing Conditions		2044 No-Build Conditions		2044 Build Conditions	
		AM	PM	AM	PM	AM	PM
Columbia Avenue & I-26 Eastbound Ramps/Ellet Road[a]	EB	D	F	F	F	Signalized Intersection	
	WB						
	NB						
	NEB						
	SB						
Columbia Avenue & I-26 Westbound Ramps	WB	Signalized Intersection		Signalized Intersection		C/19.4	D/25.6
	NB					A/2.2	A/2.4
	SB					A/0.0	A/0.0
Columbia Avenue & Comalander Drive	EB	A/0.8	A/0.6	Signalized Intersection		Signalized Intersection	
	WB	A/0.0	A/0.0				
	SB	B/12.4	A/9.9				
Crooked Creek Road & I-26 EB On-Ramp[a]	EB	A/0.0	A/0.0	A/0.0	A/0.0	-	
	NB	C/17.8	B/12.1	F/128.1	E/37.9		
New Frontage Road & Crooked Creek Road[b]	EB	-		-		A/3.1	A/2.7
	WB					A/3.6	A/2.8
	NB					A/2.8	A/3.0
	Overall					**A/3.5**	**A/2.9**

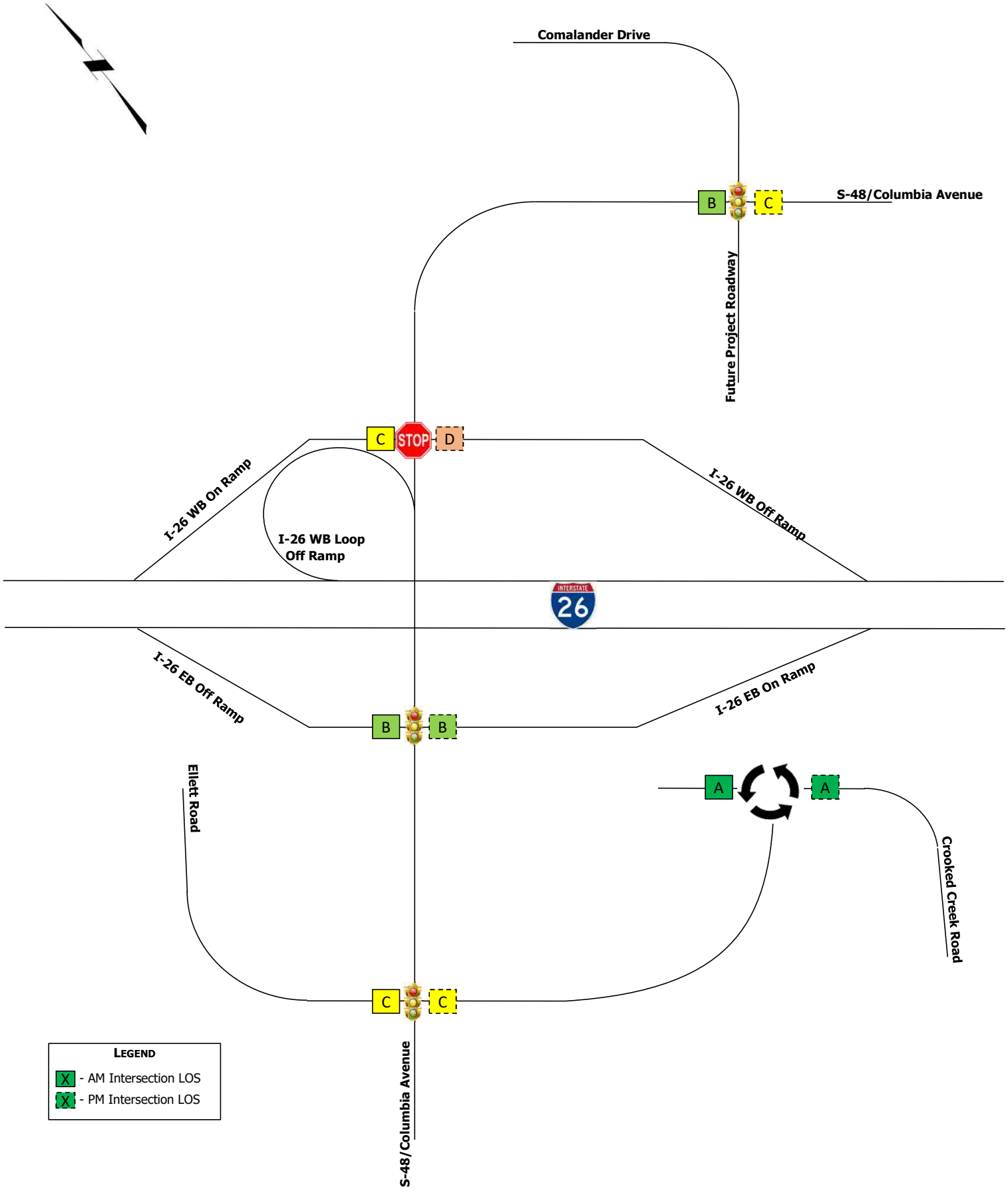
[a]ICU results were used due to intersection geometrics limit on HCM 6th Edition

[b]Roundabout Intersection analysis was conducted using *SIDRA*

The results of the unsignalized intersection analysis indicate that all the study unsignalized intersections are projected to operate with acceptable LOS conditions with construction of the project.

Worksheets documenting the intersection analyses are provided in Appendix E.





3.3. Arterial Analyses

Using the existing and projected traffic volumes, arterial analyses were conducted for the E Butler Road corridor considering 2020 existing conditions, 2024 opening-year conditions, and 2044 horizon-year conditions. This analysis was conducted using the Transportation Research Boards *Highway Capacity Manual 6th Edition (HCM 6th Edition)* methodologies of the *SimTraffic,* version 9 software.

Arterial level of service (LOS) grades range from LOS A to LOS F, which are directly related to the through-vehicle travel speed for a given direction of travel along a street facility and characterize the operational conditions of the segment traffic flow. LOS A operations typically represent ideal, free-flow conditions where vehicles experience little to no decrease in free-flow speeds, and LOS F operations typically represent poor, forced-flow (bumper-to-bumper) conditions with a significant decrease in free-flow speeds, and are generally considered undesirable. Table 21 summarizes the *HCM 6th Edition* travel speed thresholds associated with each LOS grade for base free-flow speeds of 35 Miles Per Hour (MPH).

Table 21 – *HCM 6th Edition* LOS Criteria for Travel Speeds

35 MPH	
LOS	**Travel Speeds (MPH)**
A	> 28
B	> 23
C	> 18
D	> 14
E	> 11
F	≤ 11

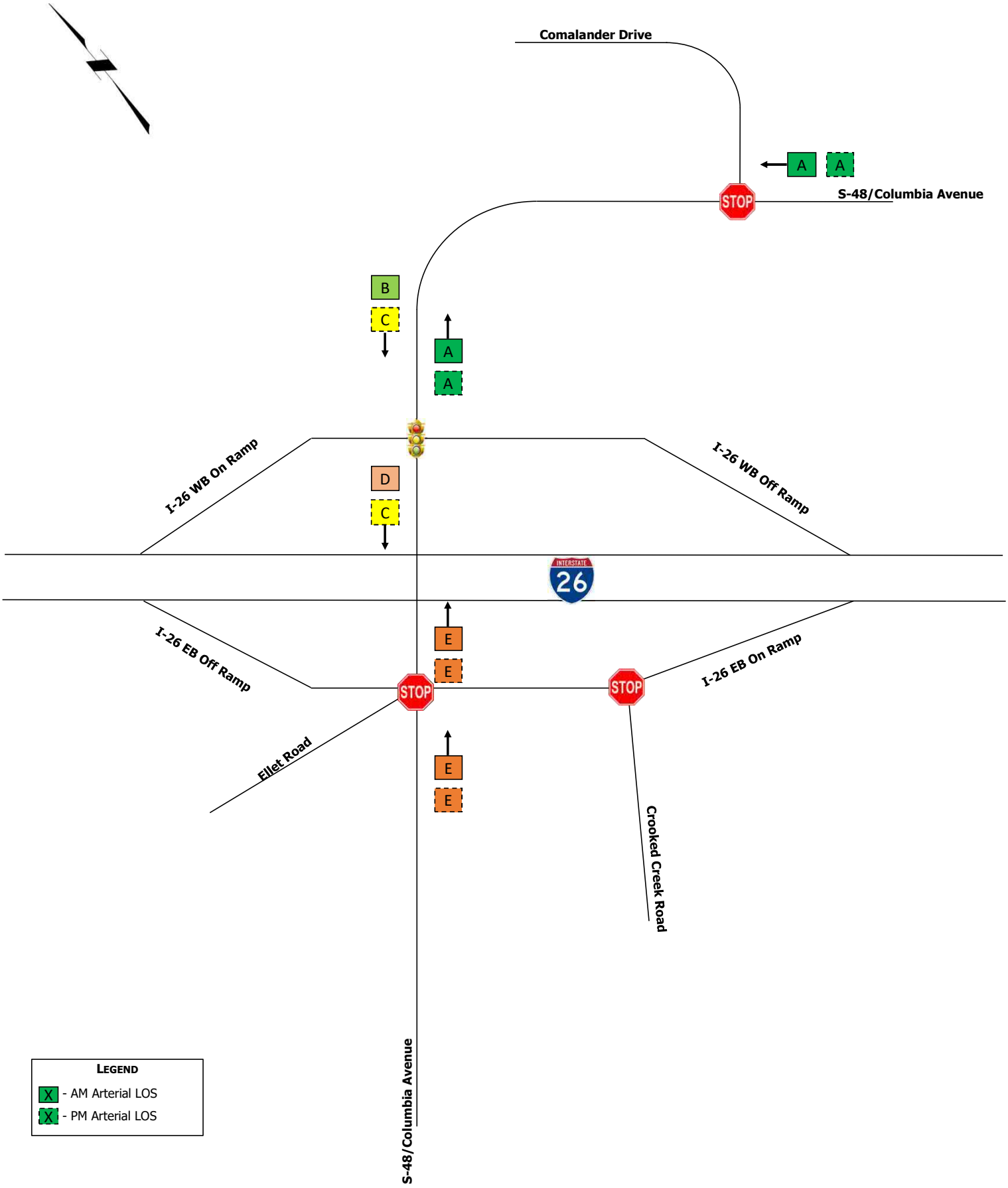
3.3.1. Arterial – 2024 Opening-Year Conditions

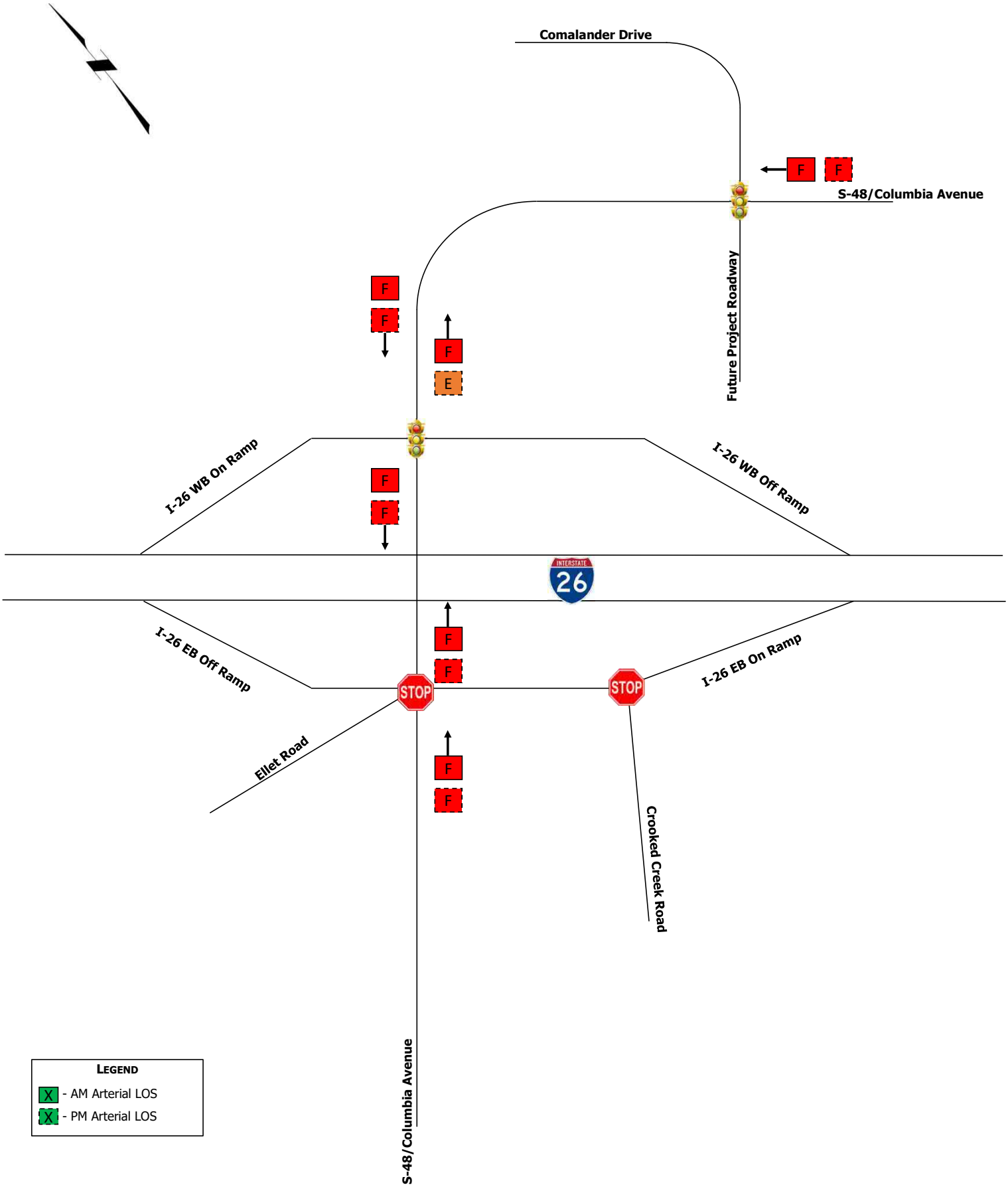
The results of the 2020 Existing arterial analyses are included for comparison to the 2024 No-Build and 2024 Build conditions summarized in Table 22. The results of the arterial analyses are illustrated in Figure 21 for 2020 Existing conditions, Figure 22 for 2024 No-Build conditions and Figure 23 for 2024 Build conditions

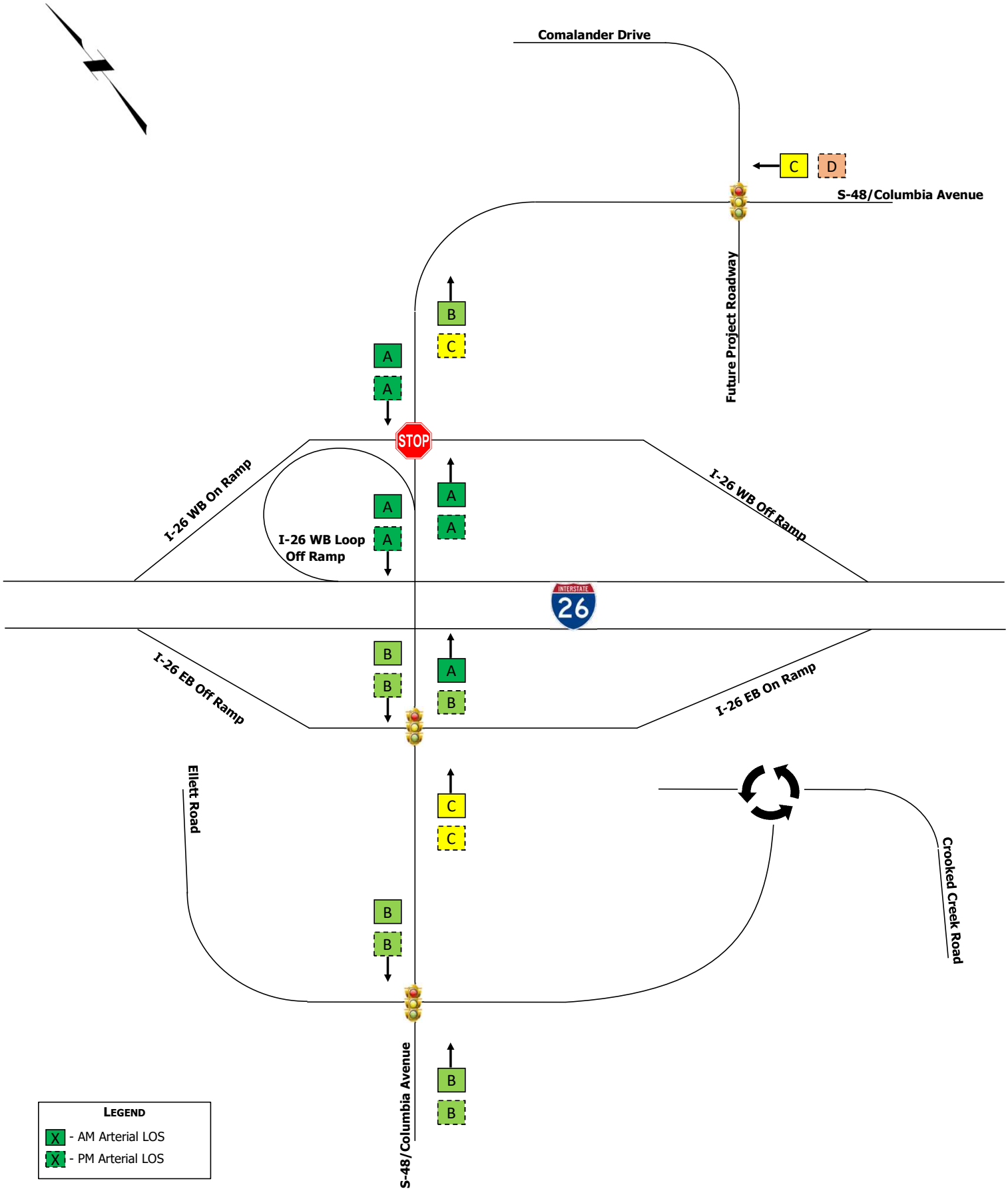
Table 22 – 2024 Arterial Analysis Results

Columbia Avenue Arterial Segment	LOS/Speed (mph)					
	2020 Existing Conditions		2024 No-Build Conditions		2024 Build Conditions	
	AM	PM	AM	PM	AM	PM
Eastbound						
Approaching Ellet Road/New Frontage Road	--	--	--	--	B/24	B/24
Ellet Road/New Frontage Road to I-26 EB Ramps	--	--	--	--	C/23	C/20
I-26 EB Ramps to I-26 WB Off Loop	E/13	E/11	F/3	F/7	A/30	B/28
I-26 WB Off Loop to I-26 WB Ramps					A/33	A/32
I-26 WB Ramps to Comalander Drive	A/31	A/31	F/3	E/12	B/26	C/22
Total Speed	***C/21***	***C/20***	***F/3***	***F/9***	***B/25***	***C/23***
Westbound						
Approaching Comalander Drive	A/35	A/35	F/0	F/0	C/20	D/16
Comalander Drive to I-26 WB Ramps	B/24	C/25	F/0	F/0	A/31	A/31
I-26 WB Ramps to I-26 WB Off Loop	D/14	C/20	F/0	F/1	A/33	A/31
I-26 WB Off Loop to I-26 EB Ramps					B/27	B/25
I-26 EB Ramps to Ellet Road/New Frontage Road	--	--	--	--	B/24	B/24
Total Speed	***C/21***	***C/23***	***F/0***	***F/0***	***B/26***	***C/23***

In comparison to the No-Build conditions, the Build LOS of the arterial are improved. The results of the arterial analyses indicate that Columbia Avenue will operate at an overall LOS C or better conditions with consideration of the proposed interchange improvements for 2024 Build conditions.







3.3.2. Arterial – 2044 Horizon-Year Conditions

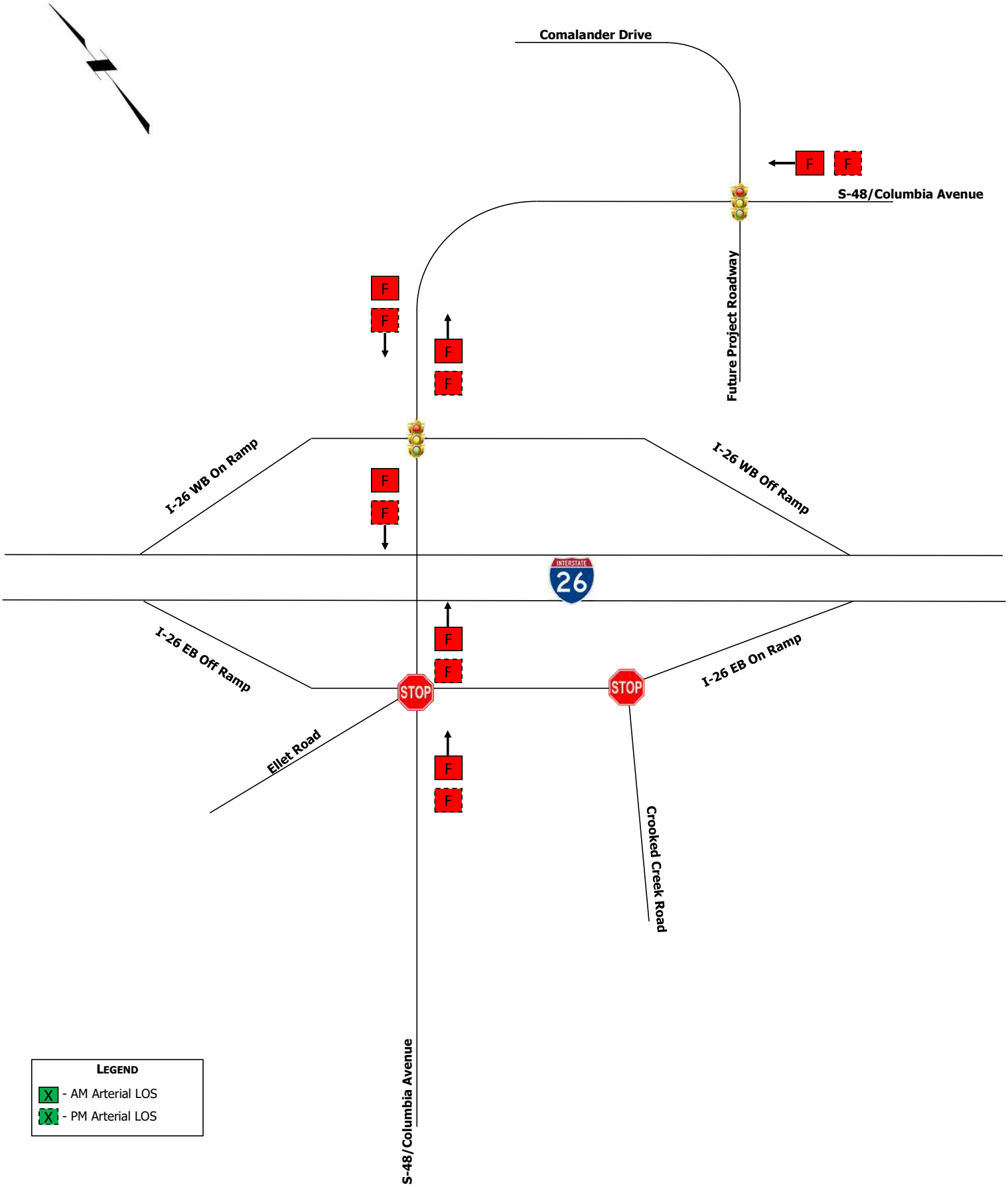
The results of the arterial analyses for 2044 No-Build and 2044 Build conditions are summarized in Table 23, which correspond with the arterial analysis results. The results of the arterial analyses are illustrated in Figure 24 for 2044 No-Build conditions and Figure 25 for 2044 Build conditions.

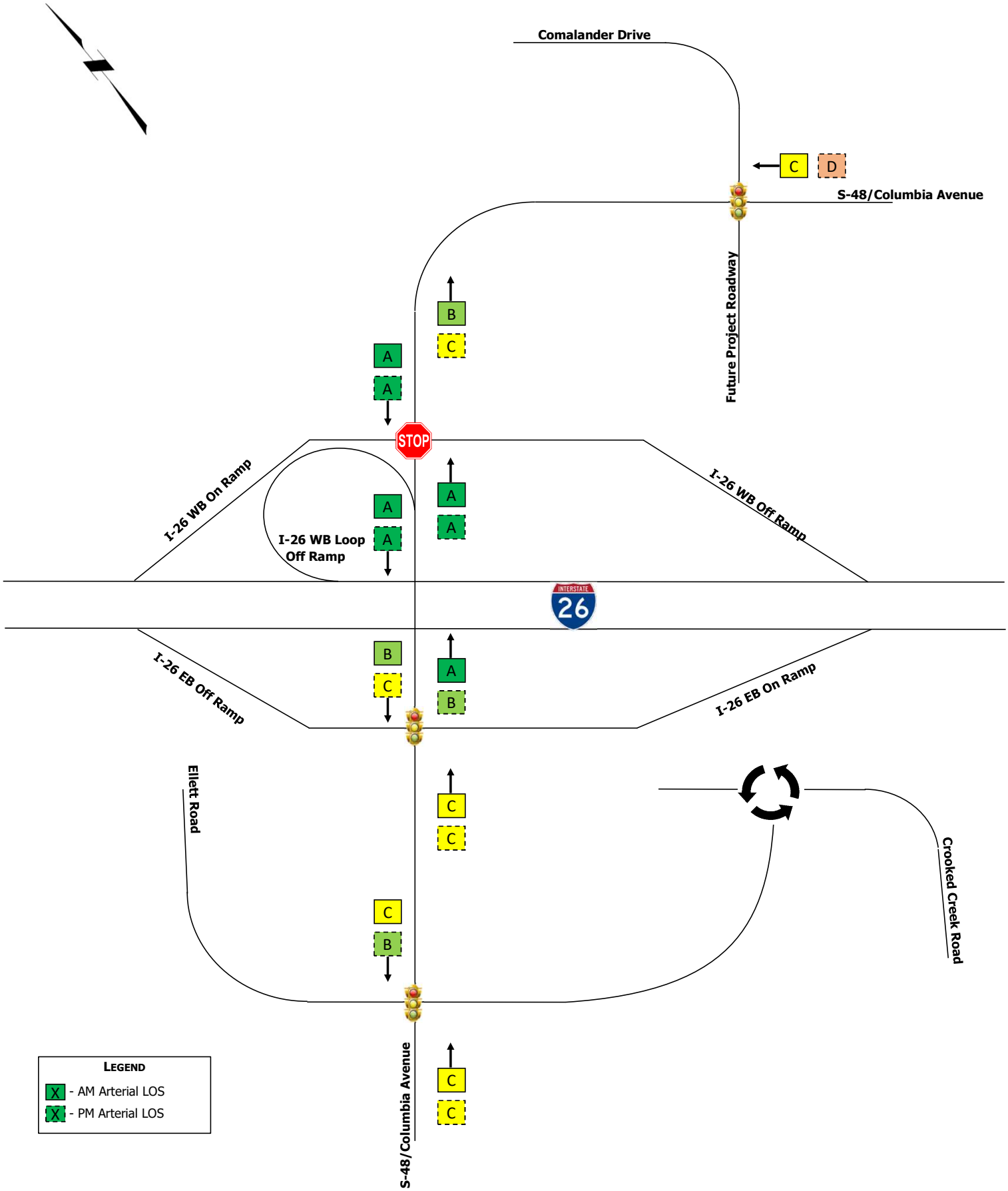
Table 23 – 2044 Arterial Analysis Results

Columbia Avenue Arterial Segment	LOS/Speed (mph)					
	2020 Existing Conditions		2044 No-Build Conditions		2044 Build Conditions	
	AM	PM	AM	PM	AM	PM
Eastbound						
Approaching Ellet Road/New Frontage Road	--	--	--	--	C/21	C/22
Ellet Road/New Frontage Road to I-26 EB Ramps	--	--	--	--	C/21	C/20
I-26 EB Ramps to I-26 WB Off Loop	E/13	E/11	F/2	F/5	A/29	B/28
I-26 WB Off Loop to I-26 WB Ramps					A/32	A/32
I-26 WB Ramps to Comalander Drive	A/31	A/31	F/10	F/6	B/25	C/22
Total Speed	***C/21***	***C/20***	***F/5***	***F/5***	***C/23***	***C/23***
Westbound						
Approaching Comalander Drive	A/35	A/35	F/2	F/0	C/19	D/18
Comalander Drive to I-26 WB Ramps	B/24	C/25	F/2	F/0	A/30	A/31
I-26 WB Ramps to I-26 WB Off Loop	D/14	C/20	F/7	F/1	A/32	A/31
I-26 WB Off Loop to I-26 EB Ramps					B/25	C/23
I-26 EB Ramps to Ellet Road/New Frontage Road	--	--	--	--	C/23	B/24
Total Speed	***C/21***	***C/23***	***F/3***	***F/0***	***B/24***	***C/23***

In comparison to the No-Build conditions, the Build LOS C of the arterial are improved. The results of the arterial analyses indicate that Columbia Avenue will operate at an overall LOS C or better conditions with consideration of the proposed interchange improvements for 2044 Build conditions.

Worksheets documenting the arterial analyses are provided in Appendix F.





3.4. Crash Analyses

Crash analyses were conducted for the I-26 & Columbia Avenue interchange and the Columbia Avenue arterial in the project study area. The interchange crash analyses consider the Columbia Avenue & I-26 interchange ramps as well as the adjacent I-26 segments. The arterial crash analyses consider the study intersections along Columbia Avenue, including ramp terminals of the interchange.

Crash data and collision diagrams were prepared using crash reports for I-26 and Columbia Avenue provided by the SCDOT Traffic Safety office covering a 5-year period from October 2014 through September 2019. Several crash "hot-spot" locations were identified while analyzing the crash data. These hot spots and the respective mitigations included in the proposed I-26 & Columbia Avenue interchange improvements are summarized in Table 24.

Table 24 – Hot Spot Mitigation Summary

Location	# Crashes	Mitigation
Diverge at I-26 Westbound Off-Ramp	31 crashes	Add exit loop from WB I-26 to SB Columbia Avenue and 1500' decel lane to split exiting traffic into NB and SB movements
0.2 mi North/South of Columbia Avenue/ I-26 Intersection	43 crashes (31 Rear-end)	Extending on and off ramps to handle exiting traffic and add exit loop on WB I-26 to divide heavy exiting traffic into NB and SB movements.

3.5. Crash Data

Five years of crash data and collision diagrams were provided by SCDOT for use in the analysis. Table 25 and Table 26 summarize the crash data categorized by the type of crash for both I-26 and Columbia Avenue (S-32-48).

Table 25 – Crashes by Type – I-26

Intersection	Fatality Crashes	Injury Crashes	PDO Crashes	Total Crashes
1 mile west of the Interchange	0	13	47	60
West of Columbia Avenue	0	1	23	24
Between I26 EB off Ramp and I26-WB Off Ramp	0	3	16	19
East of Columbia Avenue	0	5	26	31
6/10 miles East of the Interchange	4	6	28	38
Total	4	28	140	172

Table 26 – Crashes by Type – Columbia Avenue

Intersection	Fatality Crashes	Injury Crashes	PDO Crashes	Total Crashes
Columbia Avenue & Farm Boy's BBQ driveway (DW)	0	1	2	3
Columbia Avenue & Lexington Medical Center DW	0	1	6	7
Columbia Avenue & Bojangles DW	0	1	7	8
Columbia Avenue & Shell Intersection	0	1	8	9
Columbia Avenue& Chapin Furniture DW	0	2	7	9
Columbia Avenue & I-26 EB off Ramp	0	0	11	11
Columbia Avenue & I-26 WB off Ramp	0	5	9	14
Columbia Avenue & Comalander Drive	0	3	3	6
Total	0	14	53	67

The results of the crash data analysis by type of crash indicate that there were 140 Property Damage (PDO) crashes and 28 injury crashes on the section of I-26 studied. There were 4 fatal crashes recorded on I-26 in the past five years. There were 53 PDO crashes and 14 injury crashes along the section of Columbia Avenue studied. There were no fatal crashes recorded on Columbia Avenue in the past five years.

Crashes within approximately 1,500 feet either side of the westbound exit ramp account for approximately 38% of all the crashes that occurred along the section of I-26 that was studied. Likewise, over 65% of all crashes on Columbia Avenue happen between the I-26 ramps and within 0.1 of a mile on either side.

Table 27 and Table 28 illustrate the crash data categorized by the manner of collision.

Table 27 – Crashes by Manner of Collision – I-26

Intersection	Rear End	Head On	Angle	Side Swipe	No Collision	Total
1/2 mile west of the Interchange	29	0	3	9	19	60
Ramps West of Columbia Avenue	8	0	2	7	7	24
B/W I-26 EB off Ramp and I-26-WB Off Ramp	11	0	2	0	6	19
Ramps East of Columbia Avenue	12	1	5	1	12	31
0.3 miles East of the Interchange	10	1	4	9	14	38
Total	70	2	16	26	58	172

Table 28 – Crashes by Manner of Collision – Columbia Avenue

Intersection	Rear End	Head On	Angle	Side Swipe	No Collision	Total
Columbia Avenue & Farm Boy's BBQ DW	2	0	0	0	1	3
Columbia Avenue & Lexington medical center DW	7	0	0	0	0	7
Columbia Avenue & Bojangles DW	7	0	0	0	1	8
Columbia Avenue & Shell Intersection	6	0	2	0	1	9
Columbia Avenue& Chapin Furniture DW	7	0	1	0	1	9
Columbia Avenue & I-26 EB off Ramp	8	0	3	0	0	11
Columbia Avenue & I-26 WB off Ramp	10	0	3	0	1	14
Columbia Avenue & Comalander Drive	4	0	0	2	0	6
Total	51	0	9	2	5	67

Rear End crashes account for approximately 40% of the total number of crashes, and No Collisions (Median Barrier swipes, Animal, Fixed Object, Run-off Road) crashes account for approximately 34% of the total number of crashes of the crashes on I-26. Rear end crashes account for over 75% of all crashes on Columbia Avenue.

Crashes within approximately 1,500 feet either side of the westbound exit ramp account for approximately 37% of all the Rear End crashes and approximately 40% of all of the No Collision crashes that occurred along the section of I-26 that was studied. Likewise, over 52% of all Rear End crashes on Columbia Avenue happen between the I-26 ramps and within 0.1 of a mile on either side.

Worksheet documenting the crash data are provided in Appendix G.

3.6. Higher Crash Rate Locations

Based upon the crash data, two areas were noted as having a higher number of crashes in the interchange study area. The crash data at the two areas is reviewed in the following paragraphs.

Of all the crashes that were recorded on I-26, 38% occurred within the 1500 feet of the I-26 Westbound Exit Ramp. Fifty-three PDO crashes and eleven injury crashes and one fatality crash occurred over the past five years. Of the crashes in this area, approximately 37% were Rear-End crashes and 40% were No-Collision wrecks.

On Columbia Avenue, over 37% of all the crashes occurred within 500' north and south of the I-26 EB/Columbia Avenue ramp intersection. There have been 20 PDO crashes and five injury crashes over the past five years. The majority of the manner of collision are rear-end crashes (18) which can be attributed to the excessive volume on the corridor and the number of driveways present near and adjacent to this location.

3.7. Crash Modification Factors (CMF)

As part of crash analysis, CMFs were applied to the observed crashes along Columbia Avenue. CMF is a multiplicative factor used to predict the number of crashes after implementing a countermeasure at a specific area or intersection. The CMFs used in the arterial crash analysis were obtained from the *Crash Modification Factors Clearinghouse* website (http://www.cmfclearinghouse.org/). Table 29 summarizes the proposed counter measures along S-48/Columbia Avenue and the associated CMFs.

Table 29 – Counter Measures & CMFs

Countermeasure	CMF ID	CMF
Change driveway density from 11 to 1 (67.5/mile to 6.13/mile)	2248	0.24
Convert 2 lane roadway to 4 lane divided roadway (Columbia Avenue)	7569	0.712
Signalize the I-26 Eastbound Ramps intersection	325	0.56
Provide Cloverleaf (Loop) ramp instead of Long ramp	479	0.77
Provide Long ramps instead of Short ramps	477	0.62
Install Left-Turn Lanes along Columbia Avenue	7997	0.924

The results of the CMF analyses indicate the following.

- Changing the driveway density along Columbia Avenue on the segment spanning from Shell Gas Station to just before the I-26 EB Ramps intersection is expected to reduce the number of crashes on this segment by approximately 76%. There were 18 crashes spanning between the Shell gas station intersection and the Chapin Furniture Driveway intersection; the number of crashes for this segment of Columbia Avenue is predicted to be reduced by approximately 13 crashes during a similar time period with the proposed improvements.
- Converting Columbia Avenue from a 2-lane roadway to a 4-lane divided roadway is expected to reduce crashes on the widened segment by approximately 29%. There were 37 crashes spanning from the Bojangles driveway intersection to the I-26 EB Ramps intersection; the number of crashes for this segment of Columbia Avenue is predicted to be reduced by approximately 11 crashes during a similar time period with the proposed improvement.
- Signalizing the Columbia Avenue & I-26 EB Ramps intersection is expected to reduce crashes at the intersection by approximately 44%. There were 11 crashes at the intersection; the number of crashes is predicted to be reduced by approximately 5 crashes during a similar time period with the proposed improvement.
- Providing a Cloverleaf (Loop) off ramp from I-26 WB for traffic bound to travel south on Columbia Avenue is expected to reduce crashes at the close vicinity of the interchange by approximately 23%. There were 74 crashes at the close vicinity of the interchange; the

number of crashes is predicted to be reduced by approximately 17 crashes during a similar time period with the proposed improvements.

- Providing long On and Off ramps at the Columbia Avenue and I-26 interchange is expected to reduce crashes at the vicinity of the interchange by approximately 38%. There were 172 crashes at the vicinity of the interchange; the number of crashes is predicted to be reduced by approximately 65 crashes during a similar time period with the proposed improvements.
- Installing left-turn lanes along Columbia Avenue at the I-26 EB Ramps and I-26 WB Ramps intersections is expected to reduce crashes at each of the I-26 Ramps intersections by approximately 7%. There were 172 crashes at the vicinity of the interchange; the number of crashes is predicted to be reduced by approximately 24 crashes at during a similar time period with the proposed improvements

Overall, the results of the CMF analyses indicate that with consideration of the proposed improvements, the number of existing crashes along Columbia Avenue between the Bojangles driveway intersection and the I-26 EB Ramps intersection will be reduced by approximately 78% (29 crashes) as compared to the No-Build scenario.

Overall, the results of the CMF analyses indicate that with consideration of the proposed improvements, the number of existing crashes at the vicinity of the Columbia Avenue & I-26 interchange will be reduced by approximately 62% (106 crashes) as compared to the No-Build scenario.

The output reports from the *Crash Modification Factors Clearinghouse* website are included in Appendix G.

4. INTERCHANGE JUSTIFICATION

FHWA policy requires that all requests for new or revised access should address two policy requirements and the appropriate issues and provide the information necessary to allow the FHWA to make an informed decision considering the potential consequences of a change in access. The two policy requirements (in bold) and responses specific to the proposed I-26 and Columbia Avenue Interchange Improvement Project are provided herein.

> ***1. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access. The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network. Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network. Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative.***

Policy Point 1 requires detailed operational and safety analysis of the relevant interstate segments including a comparison of the no-build and build conditions that are anticipated to occur through the design year of the project. The proposed interchange improvements to the I-26 & Columbia Avenue interchange include relocation of the interchange approximately 0.13-mile northwest of the existing interchange. The relocated interchange includes a new bridge with two southbound (SB) thru lanes, a SB left turn lane for access to eastbound I-26, one northbound (NB) lane, bike lanes in both directions, and sidewalks on either side of the bridge. The new interchange will be a parclo design with a loop in the northwestern quadrant.

The analysis considers the I-26 mainline east and west of exit 91, the Columbia Avenue interchange, and was conducted using methodologies and procedures outlined in the Transportation Research Board's *Highway Capacity Manual* and used the *HCS 7* software for freeway facilities; *Synchro*, Version 10 software for intersections; *Synchro SimTraffic* software for the arterial analysis; and the *HSM* CMFs for crash analyses.

The analysis of the 2044 Build condition of the proposed interchange improvements indicates that the project would not have any significant negative impact on the safety and the operation of the

facilities within the project area. The analysis shows that the I-26 mainline will not degrade from projected 2044 No-Build conditions and that I-26 & Columbia Avenue interchange ramp merge and diverge areas are projected to operate at LOS D or better during the 2044 AM and PM peak periods.

The results of the 2044 No-Build freeway facility analyses indicate that several segments are projected to operate under LOS F conditions. The results of the 2044 Build freeway facility analyses show that the proposed modifications will return the level of service to acceptable conditions during the peak hour.

The analysis results indicate that the signalized intersections along Columbia Avenue are projected to operate at LOS C or better with consideration of the proposed improvements for 2044 Build conditions.

Overall, the results of the CMF analyses indicate that with consideration of the proposed improvements, the number of existing crashes along Columbia Avenue between the Bojangles driveway intersection and the I-26 EB Ramps intersection will be reduced by approximately 78% (29 crashes) as compared to the No-Build scenario.

The safety evaluation and CMF analysis indicate that with consideration of the proposed improvements, the number of existing crashes along Columbia Avenue between the Bojangles driveway intersection and the I-26 EB Ramps intersection will be reduced by approximately 78% (29 crashes) as compared to the No-Build scenario. The number of existing crashes at the vicinity of the Columbia Avenue & I-26 interchange will be reduced by approximately 62% (106 crashes) as compared to the No-Build scenario.

A conceptual signing plan is included in Appendix H.

> ***2. The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards for Federal-aid projects on the Interstate System." In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.***

Policy Point 2 requires implementation of an interchange design for the new or modified access that allows for all relevant movements for traffic.

The I-26 & Columbia Avenue interchange is located at Exit 91 along the interstate and is currently a diamond configuration and currently provides for all movements between the interstate and Columbia Avenue. The proposed interchange improvements to the I-26 & Columbia Avenue interchange include relocation of the interchange approximately 0.13-mile northwest of the existing interchange. The relocated interchange includes a new bridge with two southbound (SB) thru lanes, a SB left turn lane for access to eastbound I-26, one northbound (NB) lane, bike lanes in both directions, and sidewalks on either side of the bridge. The new interchange will be a parclo design with a loop in the northwestern quadrant. The addition of the proposed I-26 westbound loop to Columbia Avenue eastbound will separate the I-26 westbound traffic flows accessing Columbia Avenue. These improvements will continue to provide full access for all traffic movements at the interchange.

APPENDIX A

SCDOT's December 2016 *Interchange Modification Report*

AECOM

INTERCHANGE MODIFICATION REPORT

I-26 AT S-48 (COLUMBIA AVENUE) INTERCHANGE IMPROVEMENTS

LEXINGTON COUNTY, SOUTH CAROLINA

PROJECT NO. R4035500-121734.01

PROJECT ID P042383

DECEMBER 2016

PREPARED FOR:

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

&

LEXINGTON COUNTY

SCDOT
South Carolina Department of Transportation

Lexington County South Carolina

AECOM

INTERCHANGE MODIFICATION REPORT

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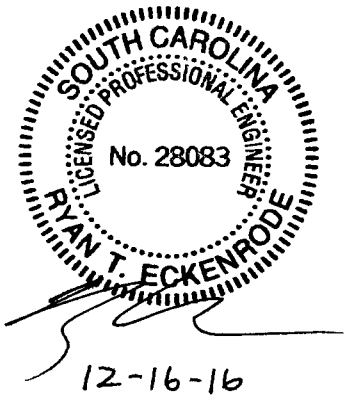
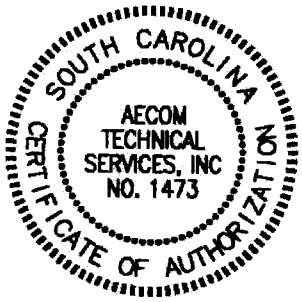


SCDOT
South Carolina Department of Transportation



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1.0 EXECUTIVE SUMMARY

To obtain approval from the Federal Highway Administration (FHWA), the following Interstate 26 at S-48 (Columbia Avenue) Interchange Modification Report (IMR) was developed for the South Carolina Department of Transportation (SCDOT). The I-26 at S-48 (Columbia Avenue) diamond interchange is located at Exit 91 in Lexington County, South Carolina. The S-48 (Columbia Avenue) portion of the interchange is just within the Town of Chapin limits, which is located approximately 20 miles northwest of Columbia, SC.

The purpose of the project is to improve operational efficiency and safety of the existing interchange and to accommodate future volumes. The current interchange design is approaching capacity as a two-lane bridge along with no turn lanes to / from S-48 and is functionally obsolete. Operation is expected to worsen with more daily traffic volumes based on past census data indicating the population has been increasing by approximately twenty (20) percent per decade since 1990. With this anticipated growth along with the recently approved Chapin Technology Park and a planned commercial development north of the interchange, modifications to the existing diamond interchange are needed.

The traffic analysis included the evaluation of Existing year 2014, Future year 2020, and Future year 2040 traffic volumes during the AM and PM peak hours. The future year analyses included a No-Build Alternative with the existing interchange / intersection layout and three Build Alternatives:

1. Diverging Diamond Interchange
2. Partial Clover Leaf
3. Dual Roundabout

Geometric design improvements to the adjacent intersections to the interchange are also addressed in this Interchange Modification Report (IMR). Plans to realign Crooked Creek Road (S-232) , currently intersecting with the I-26 Eastbound On Ramp, and Ellett Road (less than 50 feet from the I-26 Westbound Ramps) are expected to be realigned directly with S-48 approximately 1000 feet to the south under signal control. This report focuses on the interchange; however, plans are being conducted along S-48 (Columbia Avenue) to widen the existing two-lane highway to five-lanes. Traffic volumes used in this IMR were referenced from the S-48 (Columbia Avenue) Corridor Improvement Project Traffic Study dated October 17, 2016.

Adjacent interchanges Exit 85 (SC 202) and Exit 97 (US 176) were also studied even though both interchanges are more than 5 miles from the study interchange. As expected, Exit 97 (14 miles from Columbia and more developed) carries more traffic than the Exit 85, which is rural and 12 additional miles further away from Columbia. It should be noted, that there an I-26 widening project underway that extends from Exit 85 to Exit 101 which also includes some interchange improvements.

Analysis using Synchro 9.1 indicated that interchange alternatives 1 and 2 operated at an acceptable level-of-service (LOS) C; however, the diverging diamond interchange was selected based its minimal right-of-way acquisition and impact to future development as opposed to other study alternatives. The preferred alternative was also modeled using the microsimulation software VISSIM 7.0. Alternative 3 (dual roundabouts) did not provide an acceptable level-of-service (see **Appendix N**); therefore, it should be not be considered as a viable alternative.

Operation at Exit 97 (US 176 east of the study interchange) is expected to fail by 2040 with no improvements to the interchange. Consideration for widening of I-26 and a review of the interchange is recommended to accommodate projected traffic volumes. Operation at Exit 85 (SC 202 west of the study interchange) is expected to operate an acceptable level-of-service during the year 2040 with its existing design. **Figure 15** summarizes the Level-of-Service and delay for the projected 2040 preferred alternative.

This study recommends the best alternative to meet current and future surrounding area needs for Lexington County, South Carolina. SCDOT will submit this report for a validation of engineering and operational feasibility. Final approval of the IMR will be requested once all National Environmental Policy Act (NEPA) requirements have been met.

2.0 INTRODUCTION

2.1 BACKGROUND

Interstate 26 is a rolling four-lane East-West highway that is divided by a grassy median. The study area for the proposed project begins at Exit 85 (SC 202) and ends at Exit 97 (US 176). The interchange of emphasis in this report is Exit 91, which provides access to S-48 (Columbia Avenue) in Chapin, South Carolina. S-48 is a two lane minor arterial with future widening plans to accommodate future growth as part of this project. The approved Chapin Technology Park (a phased 2019 and 2024 Build-out) is approximately 1 mile south of the interchange and the planned commercial development just north of the interchange (northwest quadrant) was included in the traffic projections. The existing interchange at S-48 currently has minor queuing issues at the signalized I-26 westbound ramp and is expected to be over capacity based on the projected annual growth in the area and the added traffic volumes from the two large developments. The preferred alternative is to replace the existing diamond interchange design with a diverging diamond interchange (DDI) and to realign Crooked Creek Road and Ellett Road 1000 feet south of interchange under signal control improving the access management of S-48.

2.2 SCOPE

This report focuses on traffic analysis of existing and future conditions and provides recommendations for mitigating Level-of Service (LOS) and queuing. AECOM was tasked with studying traffic conditions in the vicinity of the proposed project during the weekday AM and PM peak hours for three scenarios:

- 2014 Existing: An analysis of existing conditions in the year 2014.
- 2020/2040 No-Build: An analysis of conditions in the years 2020 and 2040 with no changes to the interchange.
- 2020/2040 Project Build-Out: An analysis of conditions in the years 2020 and 2040 if a an interchange is modified, S-48 is widened to 5 lanes to the south, and Crooked Creek Road and Ellett Road are realigned 1000 feet to the south.

This study includes an analysis of the existing adjacent interchanges to the east and west of the proposed interchange modification of Exit 91. To the east is Exit 97 and to the west is Exit 85.

The scope of this interchange modification study included the following tasks:

1. Field visits to the study area were performed to collect data on the existing conditions such as lane configurations/geometry and current traffic control measures. Traffic counts and signal timing information at the interchanges were obtained from SCDOT.

2. Existing conditions of the interchanges were studied by utilizing the existing traffic volumes. Levels of service of the intersections at each interchange were determined using Synchro 9.1. I-26 freeway and interchange on / off ramps (segments, merges, and diverges, and off-ramps) were analyzed High Capacity Software 2010. VISSIM 7.0 was also used to model the entire network.

3. Two future design years were examined in this report. Build and No-Build scenarios were analyzed for the years 2020 and 2040. The No-Build scenario analyzed the conditions in both design years in which no modifications were made to the interchange or adjacent freeway and interchanges. The Build scenario analyzed the future conditions in both build years if the interchange modification and widening of S-48 (Columbia Avenue) were constructed. Adjacent merge and diverge areas (freeway segments, on-ramps, and off-ramps) were analyzed under the future design year (2020/2040) conditions of the study area.

4. The future design year conditions were analyzed for three (3) different interchange alternative scenarios. Adjacent merge and diverge areas (freeway segments, on-ramps, and off-ramps) were analyzed under the future design year (2020/2040) conditions of the study area. Only the preferred alternative was also modeled using VISSIM 7.0.

2.3 STUDY AREA

The study area is located in Lexington County, South Carolina. Specifically, the S-48 (Columbia Avenue) Widening project is located in the Town of Chapin, South Carolina. The study area of the IMR begins to the west of S-48 at Exit 85 of I-26 and ends to the east at Exit 97. The interchange of I-26 at S-48 is Exit 91. I-26 is an east-west four (4) lane freeway with two (2) travel lanes in each direction. The location of the project is shown in **Figure 1A** and **Figure1B.**

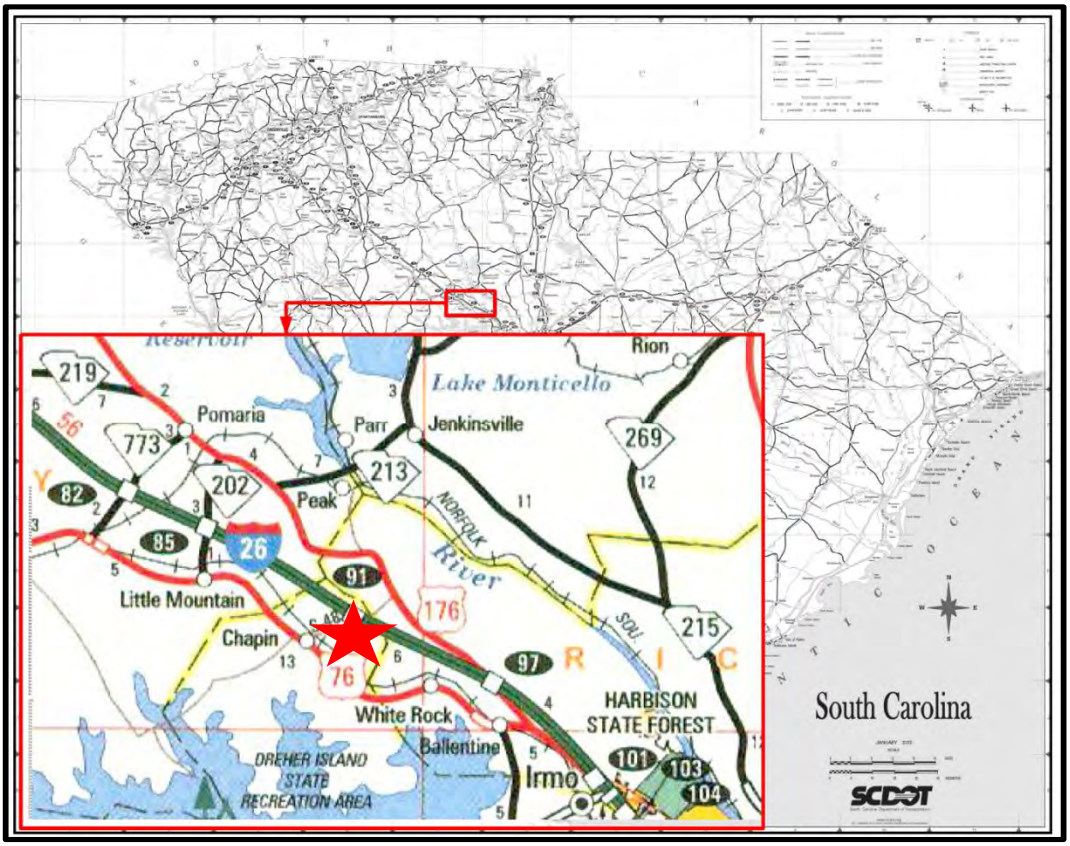


Figure 1A – Project Location

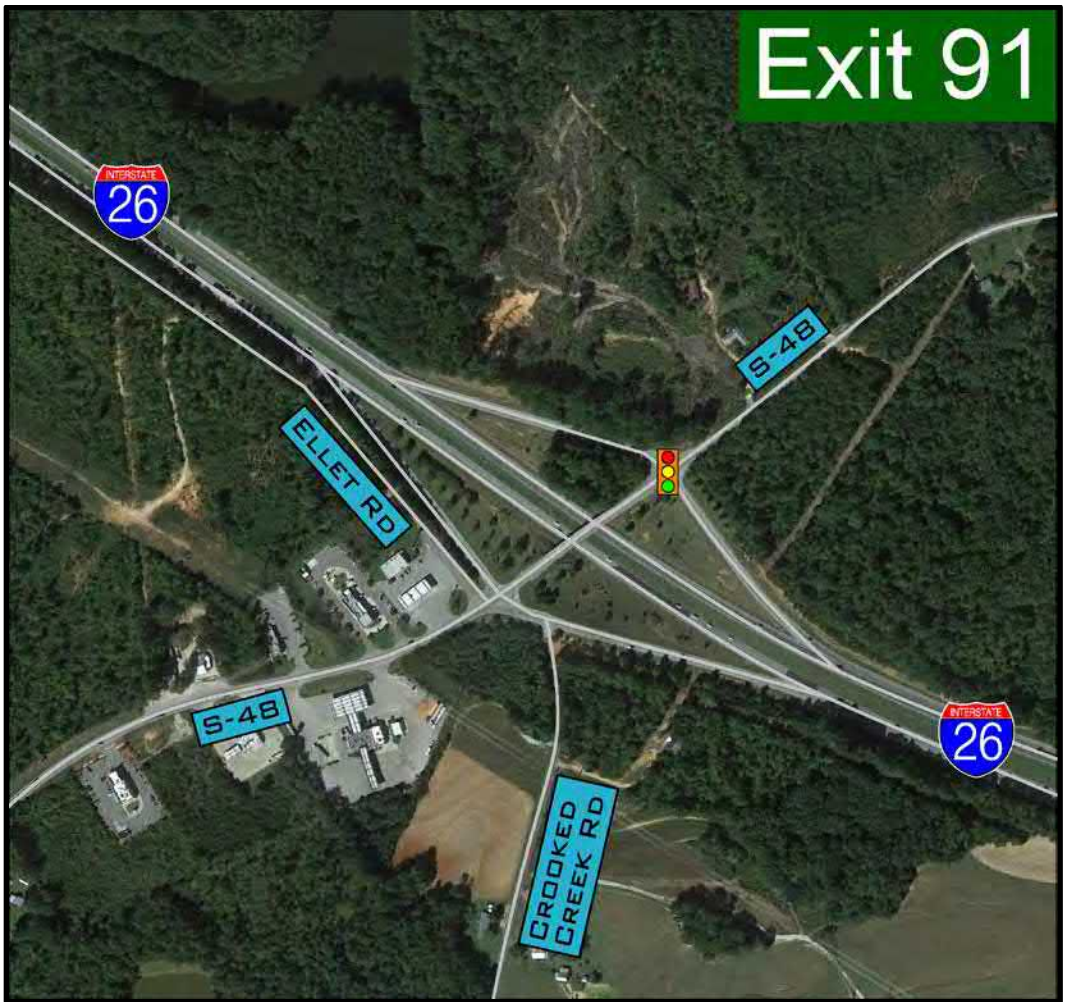


Figure 1B – Interchange Study Area

2.4 PURPOSE AND NEED STATEMENT

The purpose of this IMR is to study the impact of the modification of the interchange at Exit 91 on I-26 near Chapin, South Carolina. Chapin is located in Lexington County, northwest of Columbia. The population of Lexington County has been steadily increasing. In the 1990 Census, the population of Lexington County was 167,611. This grew to 216,014 (28.9% increase) in the 2000 Census and then reached 262,391 (21.5% increase) in 2010. Due to continual and anticipated growth in the area, improvements to the existing roadway network should be reviewed. This report is aimed at the potential improvements to the interchange from I-26 to Columbia Avenue in Chapin. The existing interchange is currently over capacity and the Frontage Road connection with S-48 and Crooked Creek Road connection with the I-26 EB On Ramp should be realigned for safety to meet SCDOT's latest criteria for access management. With new developments and construction in Chapin, such as the S-48 (Columbia Avenue) widening, there is a need for to modify the interchange to be able to accommodate this growth in terms of both capacity and safety.

2.5 EXISTING CONDITIONS FOR STUDY AREA

Currently S-48 is a 2-lane undivided minor arterial roadway with a 35 mile per hour (mph) posted speed limit that runs from US 76 at its intersection with S-51 (Amick Ferry Road) to the I-26 interchange. In the study area, I-26 is a 4-lane divided freeway with a 70 mph posted speed limit running in the east-west direction.

The AM peak hour studied was from 7:30-8:30 AM and the PM peak hour was from 4:45 – 5:45 PM based on the peak hour turning movement traffic counts. Heavy truck percentage for the peak hours varied; however, 4% was used for I-26 and 2% was used on the other studied roadways. It should be noted that SCDOT records indicate the daily heavy truck percentage on S-48 is 7% while I-26 is approximately 15%. Descriptions of the interchanges and a complete list of the study area are described below and shown in **Figure 2**:

1. I-26 Eastbound Ramps at S-48
2. I-26 Westbound Ramps at S-48
3. I-26 Eastbound Ramps at SC 202
4. I-26 Westbound Ramps at SC 202
5. I-26 Eastbound Ramps/ Exxon Driveway at US 176
6. I-26 Westbound Ramps at US 176

Exit 85

Approximately 6 miles to the west of Exit 91 on I-26 is Exit 85, a folded diamond/partial cloverleaf interchange. This interchange provides access to SC 202, a north-south 2-lane undivided roadway with a bridge over I-26. The eastbound off-ramp from I-26 is a stop controlled intersection where vehicles have the ability to turn left or right on to SC 202. The westbound off-ramp also has a stop controlled left turn onto SC 202 while the right turn from the ramp is yield controlled. A frontage road (Meadow Brook Road), less than 100 feet north of the I-26 westbound ramps, runs parallel to I-26 westbound, which is accessible from SC 202.

Exit 91

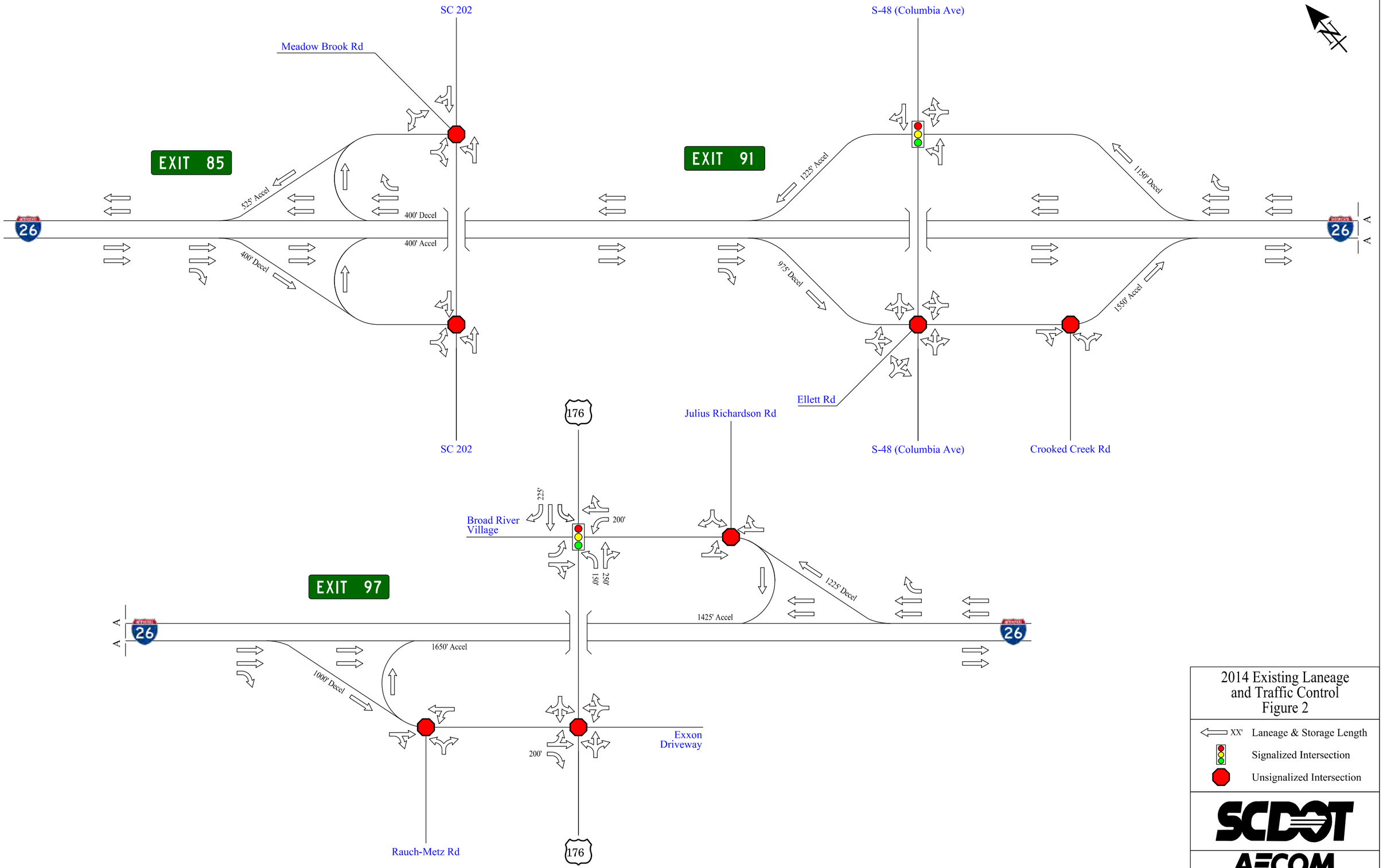
The interchange that intersects with S-48 is Exit 91 as a diamond interchange. This interchange provides access to S-48, which leads directly into Chapin. The eastbound off-ramp provides stop controlled access to S-48. The westbound off-ramp is signalized at the intersection with S-48. A frontage road (Ellett Road) intersects with S-48 approximately 50 feet to the southwest of the eastbound off-ramp. This road runs parallel to I-26 eastbound to the west of S-48. The eastbound on-ramp has access to Crooked Creek Road located on the ramp. There are multiple fast food restaurants and gas stations located west of the interchange on S-48.

Exit 97

Approximately 6 miles to the east of Exit 91 on I-26 is Exit 97. This interchange is a partial cloverleaf design for I-26 westbound and eastbound on ramp movements. The interchange

provides access to US 176, which has access to many residential developments near the interstate. The eastbound off-ramp leads to an intersection with US 176 that is stop controlled coming off the ramp. In addition to the intersection with US 176, the ramp intersects with Rauch Metz Road about half the distance between I-26 and US 176. Traffic traveling from Rauch Metz Road has the option to turn left to access the on-ramp to I-26 eastbound or turn right and head toward the intersection with US 176. The I-26 eastbound loop on-ramp also provides for vehicles to turn left onto Rauch Metz Road.

The I-26 westbound off-ramp intersects with US 176 at a signalized intersection. Through and left turn lane traffic approach the signal while the right turning traffic approaches a yield before continuing onto US 176. There is a driveway leading to a shopping center (Broad River Village) across from the off/on ramps at the signalized intersection.



2014 Existing Laneage and Traffic Control
Figure 2

XX' Laneage & Storage Length

Signalized Intersection

Unsignalized Intersection

SCDOT

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3.0 OPERATIONAL ANALYSIS

3.1 ANALYSIS METHODOLOGY

The highway capacity analyses performed are based on methodologies from the Highway Capacity Manual (HCM 2010). Traffic modeling software used in the capacity analyses were Synchro 9.1 and SimTraffic 9.0, (Build 908, Rev 56), and VISSIM 7.0 for intersection analyses.

The traffic carrying ability of a roadway is described by levels of service (LOS) that range from LOS A to LOS F. LOS A represents unrestricted maneuverability and operating speeds. LOS B represents reduced maneuverability and operating speeds. LOS C represents restricted maneuverability and operating speeds closer to the speed limit. LOS D represents severely restricted maneuverability and unstable, low operating speeds. LOS E represents operating conditions at or near the capacity level. LOS F represents breakdown conditions characterized by stop and go travel. A visual representation of each LOS is shown below.

The Highway Capacity Manual (HCM) 2010 defines LOS at an unsignalized intersection by average control delay per vehicle, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the controlled delay for unsignalized intersections, such as availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue. The Highway Capacity Manual explains that drivers perceive that a signalized intersection is designed to carry higher traffic volumes and therefore expect to experience greater delays at signalized intersections. Unsignalized intersections are assigned a LOS for each minor movement. Typically, LOS C is

considered the minimum acceptable level of service at an intersection for a suburban area. **Table 1** presents LOS thresholds for unsignalized intersections.

Table 1: LOS Thresholds for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

LOS for a signalized intersection is defined in terms of average control delay per vehicle, which is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. A single LOS describes a signalized intersection. **Table 2** presents LOS thresholds for signalized intersections.

Table 2: LOS Thresholds Signalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

A basic freeway segment can be characterized by three performance measures: density in terms of passenger cars per mile per lane, speed in terms of mean passenger-car speed, and volume to capacity (v/c) ratio. Each of these measures is an indication of how well traffic flow is being accommodated by the freeway. The measure used to provide an estimate of level of service is density. **Table 3** defines the traffic density conditions at each level of service.

Traffic flow within a basic freeway segment can vary greatly depending on the conditions constricting flow at upstream and downstream bottleneck locations. Bottlenecks can be created by ramp merges or weaving segments, lane drops, maintenance and construction activities, accidents, and objects in the roadway.

Table 3: LOS Thresholds for Freeway Segments

Level of Service	Density Range (pc/mi/ln
A	≤ 11.0
B	> 11.0 and ≤ 18.0
C	> 18.0 and ≤ 26.0
D	> 26.0 and ≤ 35.0
E	> 35.0 and ≤ 45.0
F	> 45.0

A ramp is a length of roadway providing an exclusive connection between two highway facilities. On freeways, all entering and exiting maneuvers take place on ramps that are designed to facilitate smooth merging of on-ramp vehicles into the freeway traffic stream and smooth diverging of off-ramp vehicles from the freeway traffic stream onto the ramp.

A ramp consists of three geometric elements of interest: the ramp-freeway junction, the ramp roadway, and the ramp street junction. The ramp freeway junction is typically designed to permit high-speed merging and diverging with varying acceleration and deceleration lanes. Ramp roadways can vary between locations in terms of number of lanes, design speeds, grades, and horizontal curvature. The design of ramp roadways is seldom a source of operational difficulty unless a traffic incident causes disruption along the length of the ramp. Ramp-street terminal problems can cause queuing along the length of ramp, but this is generally not related to the design of the ramp roadway. **Table 4** defines the traffic density conditions at each level of service.

Table 4: LOS Thresholds for Merge / Diverge Areas

Level of Service	Density Range (pc/mi/ln
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	Demand Exceeds Capacity

3.2 TRAFFIC VOLUMES

Traffic volumes were for this IMR were referenced from the S-48 (Columbia Avenue) Corridor Improvement Project Traffic Study dated 10-17-16. In summary, the 2014 existing traffic volumes were grown at a linear rate of 1.25% to obtain the base Opening Year (2020) and Design Year (2040) traffic projections. After these projections were complete, a traffic study for the Chapin Technology Park and Chapin Commerce Village Development became available. These two developments are significant in size and impact the S-48 corridor and interchange. At the direction of Lexington County and SCDOT, additional traffic volumes were added to the base volumes to be conservative and to better estimate the turning movement volumes to / from S-48. Additional volumes were generated using:

- Chapin Technology Park (120 acre industrial park, 450 single family houses, and 350,000 SF of commercial). Based on the final traffic study submitted and approved by SCDOT on October 13, 2015 for the Chapin Technology Park, the opening year is 2019. These new trips were added to the Opening Year (2020). The Chapin Technology Park is not expected to be complete until 2024 as these trips at full build-out were added to the Design Year (2040). The Technology Park is located north of Columbia Avenue near Woodthrush Road.

- Chapin Commerce Village (132,000 SF Specialty Retail, 8,350 SF Quality Restaurant, 8,350 SF General Office, 4,500 SF Fast Food Restaurant with Drive-Through, 8,350 High Turn-Over (Sit-Down) Restaurant, 4,050 SF Fast Food Restaurant with Drive-Through, 4,950 SF Convenience Market with Gasoline Pumps, 8,350 SF Quality Restaurant, 120 Room Hotel, 8,350 Quality Restaurant, and 4,050 SF General Office Building). This development has not had a traffic study and is only in the early planning stages. It is located just east of I-26 along S-48 (Columbia Avenue).

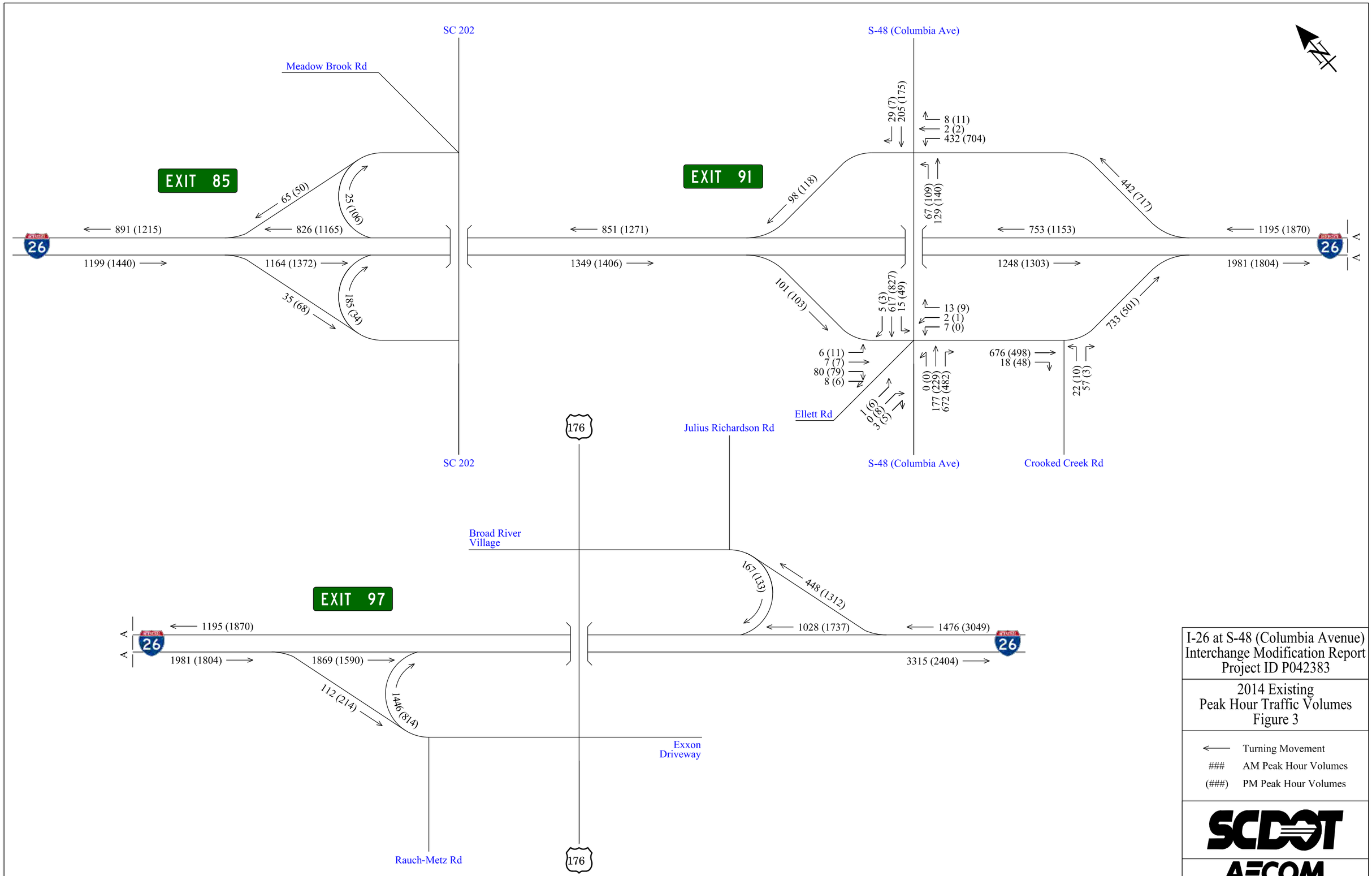
A complete memo describing the methodology with traffic figures can be referenced in **Appendix A**.

The memo does not provide volumes along I-26, therefore, AECOM used an I-26 traffic count located just east Exit 91 and determined other sections along I-26 in the study area by balancing with the known ramp volumes at Exit 85 and Exit 97. The raw traffic counts are located in **Appendix B**. Finalized traffic volumes (balanced) for all study scenarios are displayed in **Figures 3-9**.

3.3 CRASH ANALYSIS

Crash data collected over the last 3.4 years show low crash rates along I-26 within the Exit 91 interchange area. There was a total 40 crashes with 75 percent of the crashes consisting of either running off the road or rear end. Of the 40 crashes, 8 people were injured with 1 fatality. The one fatality appears to be pedestrian related occurring during the dusk hours. The crash data also indicates that there were 8 rear-end collisions between the on / off ramps (stack 6) over the 3.4 year period which may be attributed to queuing from the westbound off-ramp extending onto the interstate. Crash summaries can be found in **Appendix C**.

The preferred Alternative Diverging Diamond Interchange design is not expected change the existing diamond interchange as the ramp design and number of lanes on the freeway are expected to remain the same. A modification to the S-48 interchange is not expected to have a significant adverse effect on safety on I-26 but is expected to improve the safety on S-48 at the ramps with the fewer conflict points.



I-26 at S-48 (Columbia Avenue)
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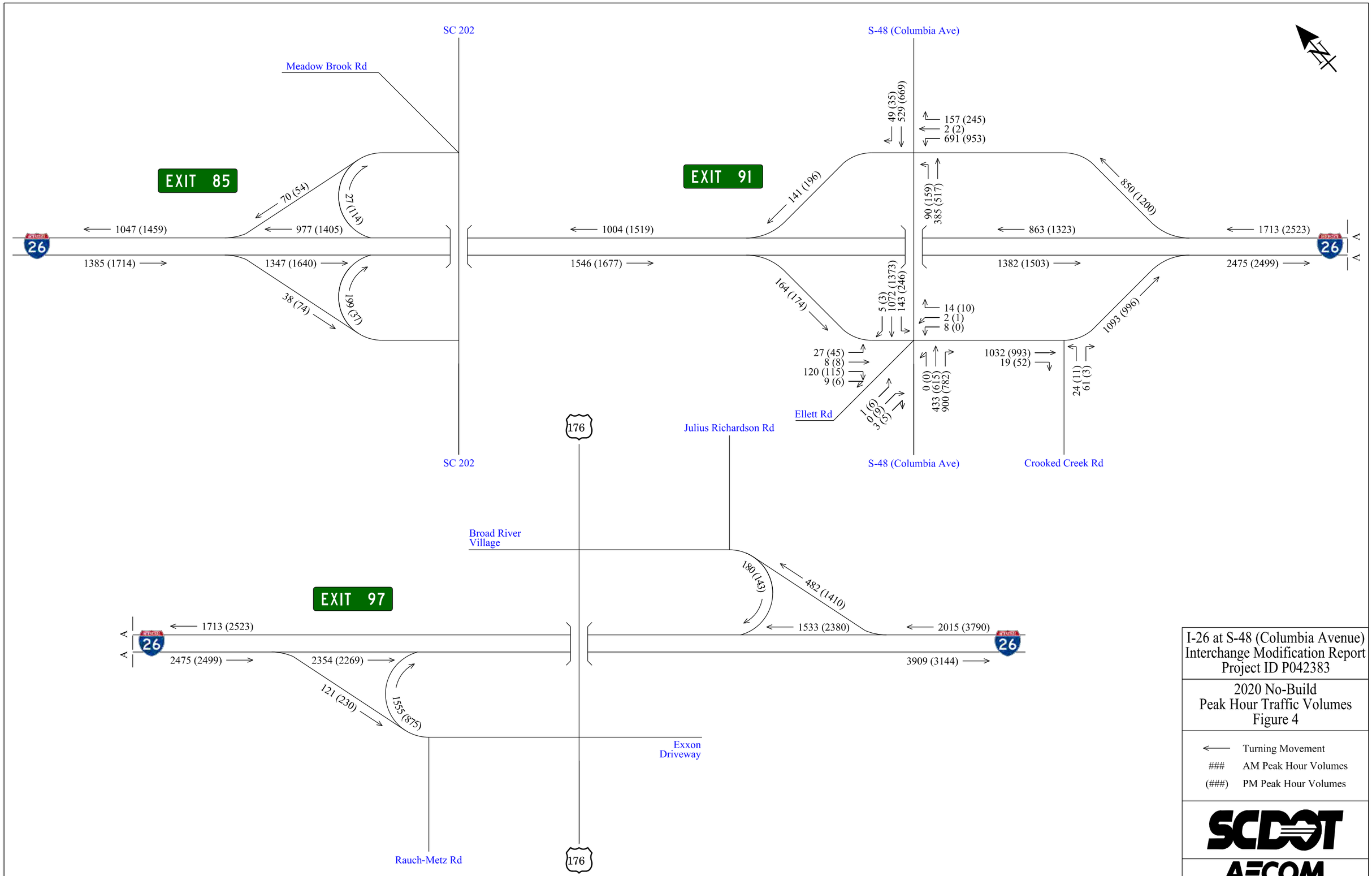
2014 Existing
Peak Hour Traffic Volumes
Figure 3

⟵	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM



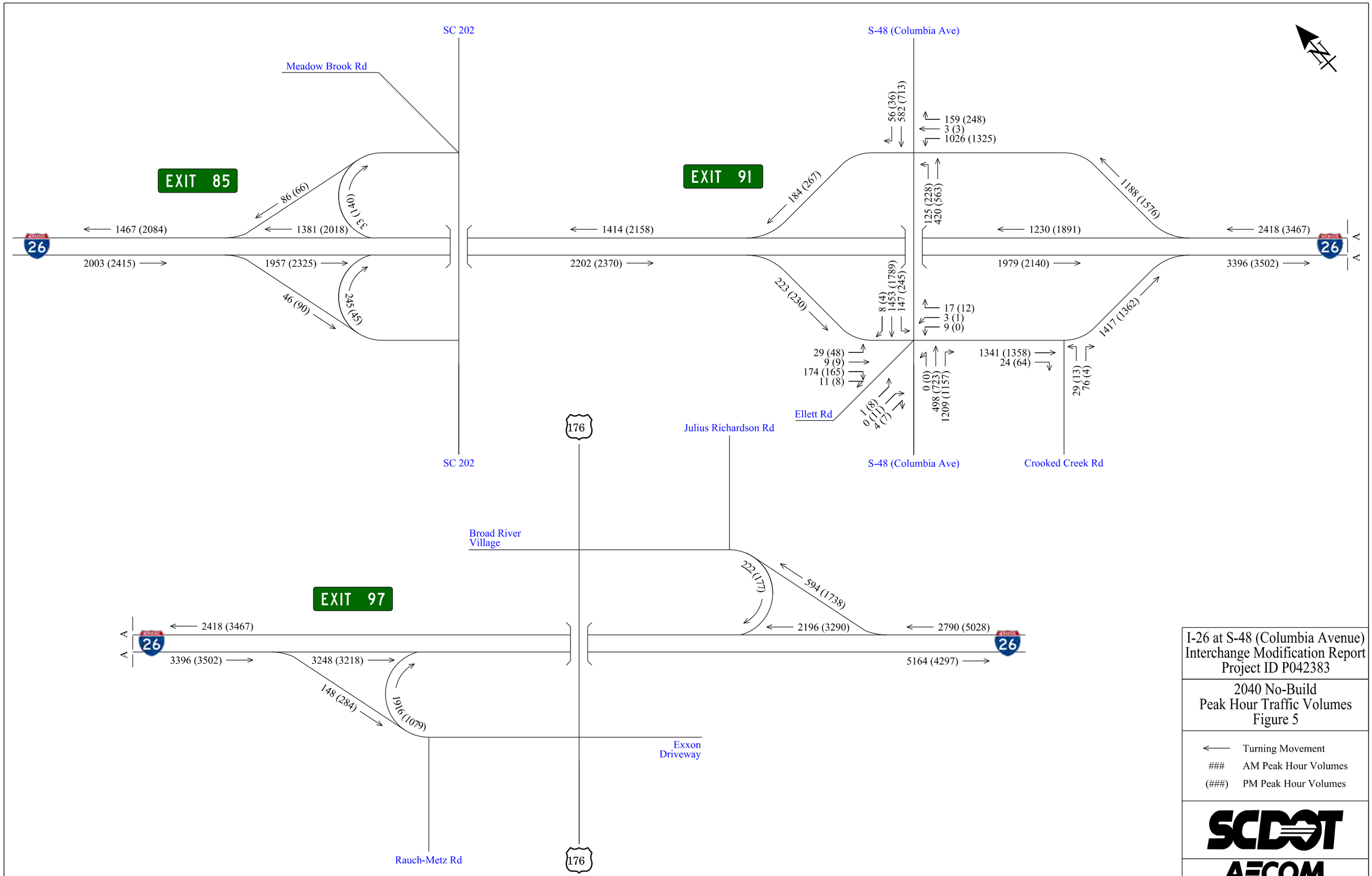
I-26 at S-48 (Columbia Avenue)
Interchange Modification Report
Project ID P042383

2020 No-Build
Peak Hour Traffic Volumes
Figure 4

←	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM



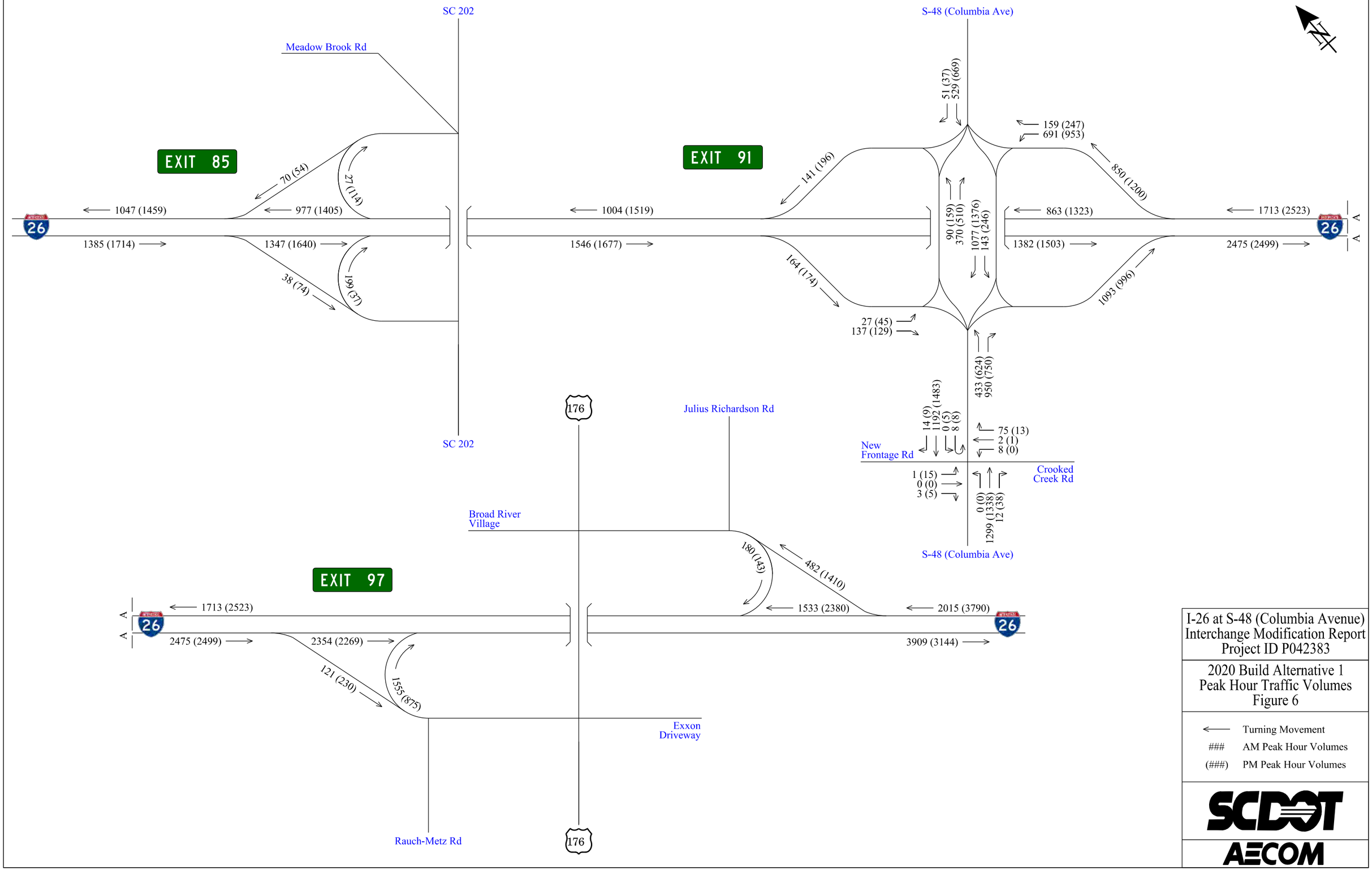
I-26 at S-48 (Columbia Avenue) Interchange Modification Report Project ID P042383

2040 No-Build Peak Hour Traffic Volumes Figure 5

⟵	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM



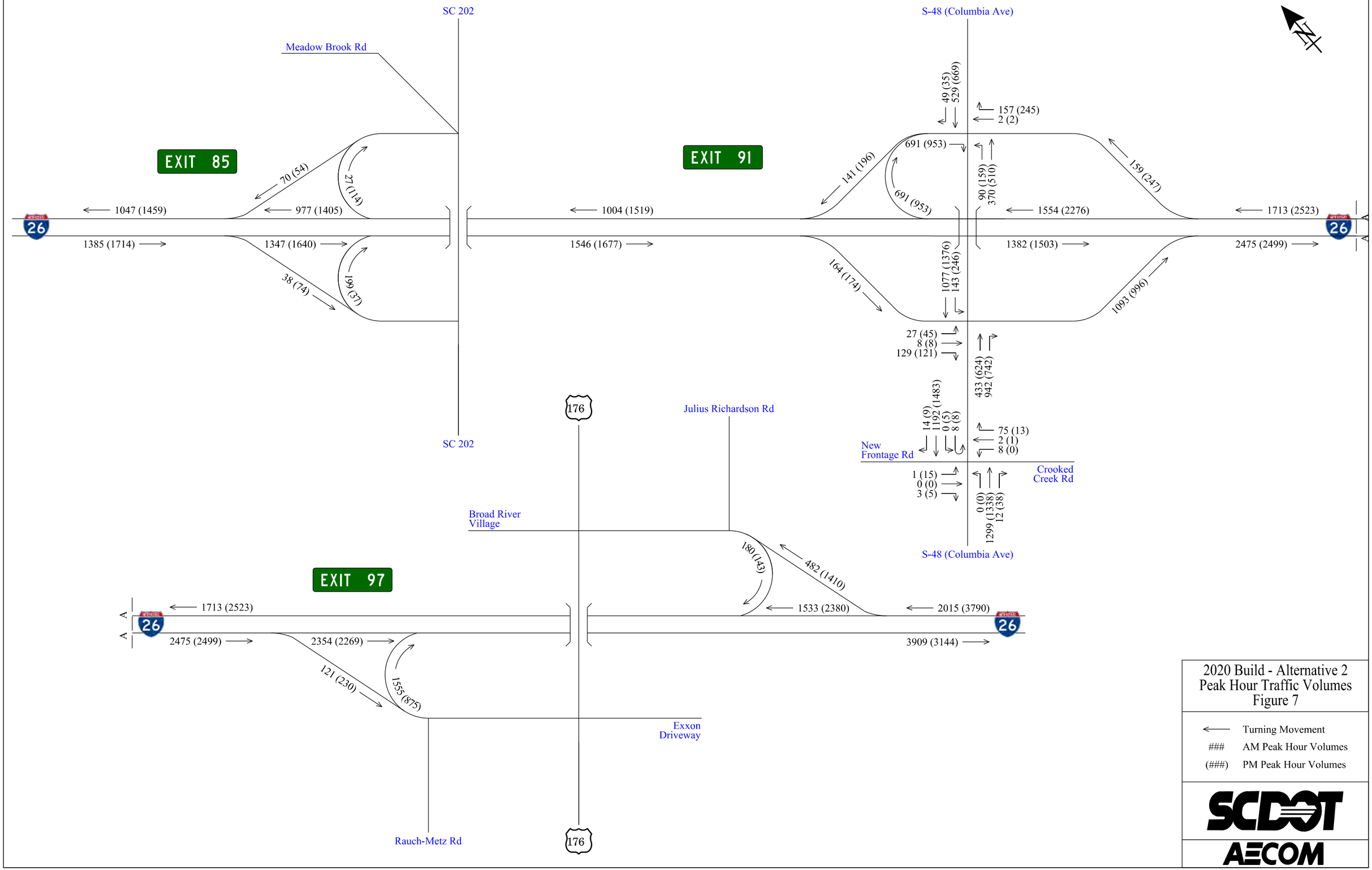
I-26 at S-48 (Columbia Avenue) Interchange Modification Report Project ID P042383

2020 Build Alternative 1 Peak Hour Traffic Volumes Figure 6

⟵	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM

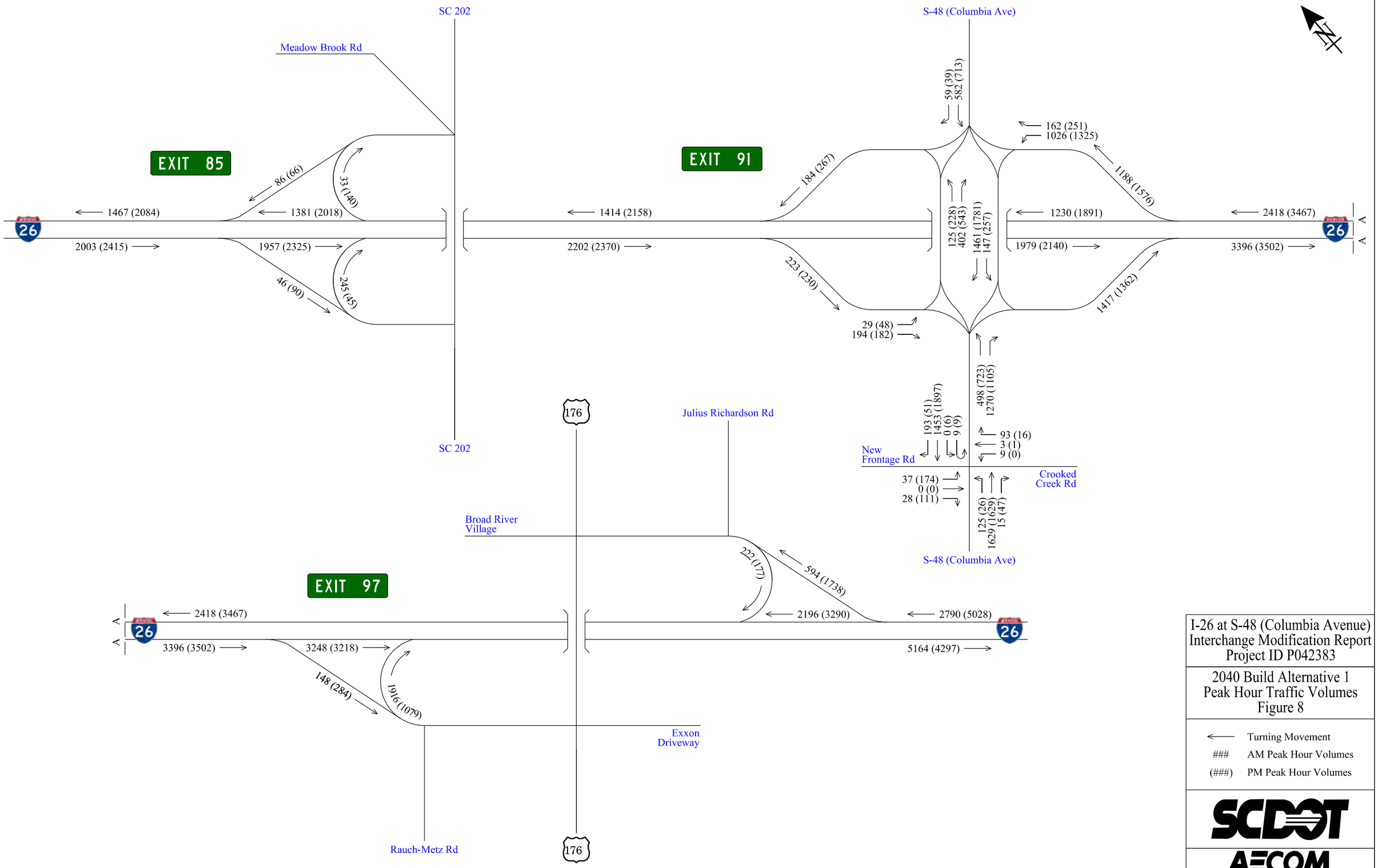


2020 Build - Alternative 2
Peak Hour Traffic Volumes
Figure 7

⟵	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM



I-26 at S-48 (Columbia Avenue)
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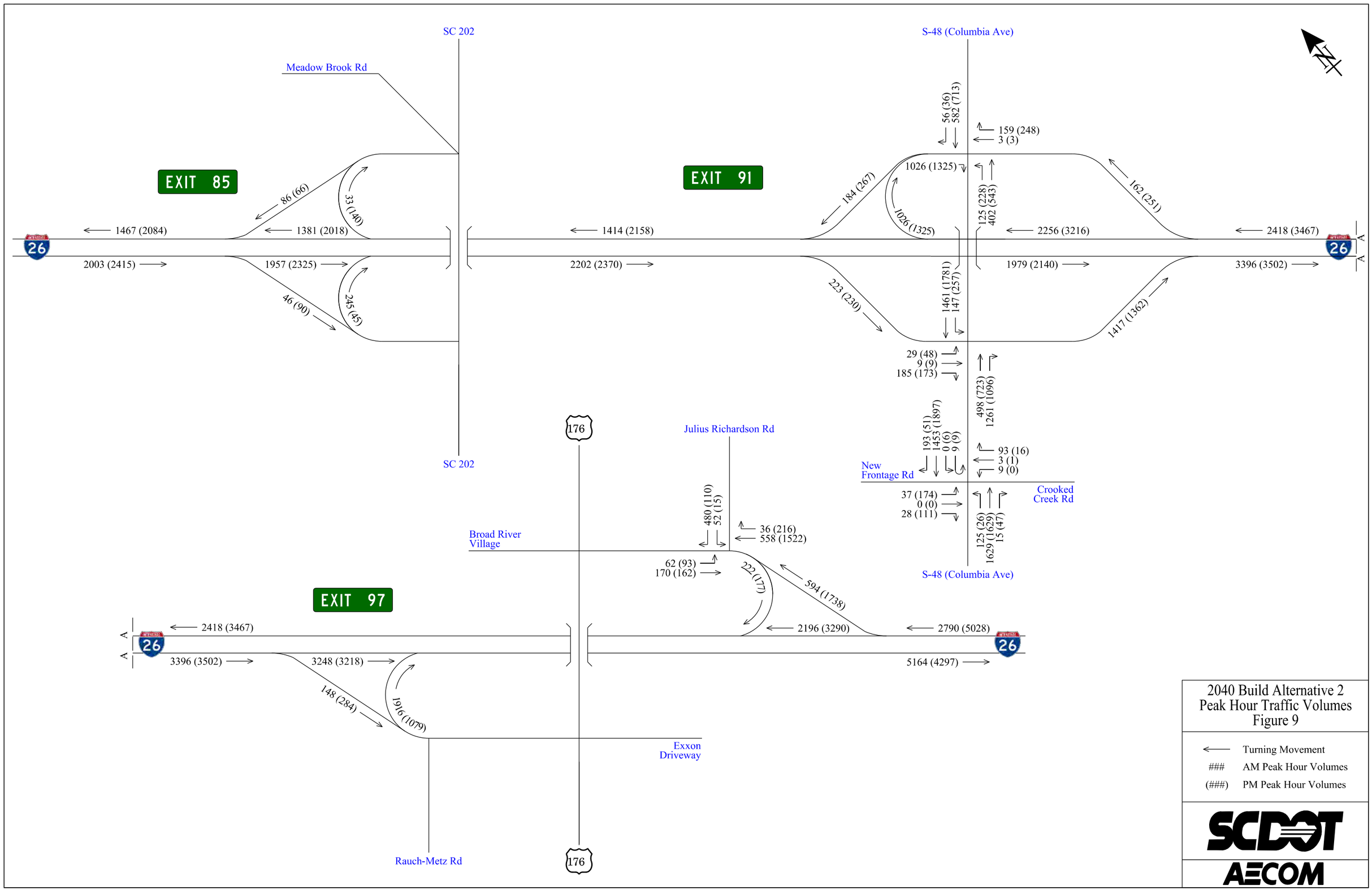
2040 Build Alternative 1
Peak Hour Traffic Volumes
Figure 8

⟵	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM



2040 Build Alternative 2
Peak Hour Traffic Volumes
Figure 9

⟵	Turning Movement
###	AM Peak Hour Volumes
(###)	PM Peak Hour Volumes

SCDOT

AECOM

3.4 EXISTING 2014 TRAFFIC ANALYSIS

The results of the Existing 2014 intersection analysis using Synchro 9.1 indicate that S-48 at I-26 eastbound ramp is currently operating LOS D in the AM Peak hour and LOS E during PM for the minor street approaches. The westbound off ramp under signal control is operating at LOS B; however, queues from the signal may extend onto I-26.

Table 5 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix D**.

Table 5: Existing 2014 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48)							
1	I-26 Eastbound Off Ramp / Crook Creek Road at S-48	Unsignalized	WB (AM)* EB (PM)*	D	E	28.4	42.7
2	I-26 Westbound Ramps at S-48	Signalized	-	B	B	11.7	19.1

*Since vehicles from Crooked Creek Road can access the I-26 eastbound on ramp to S-48 (Columbia Avenue), the worst of the two minor approaches was reported.

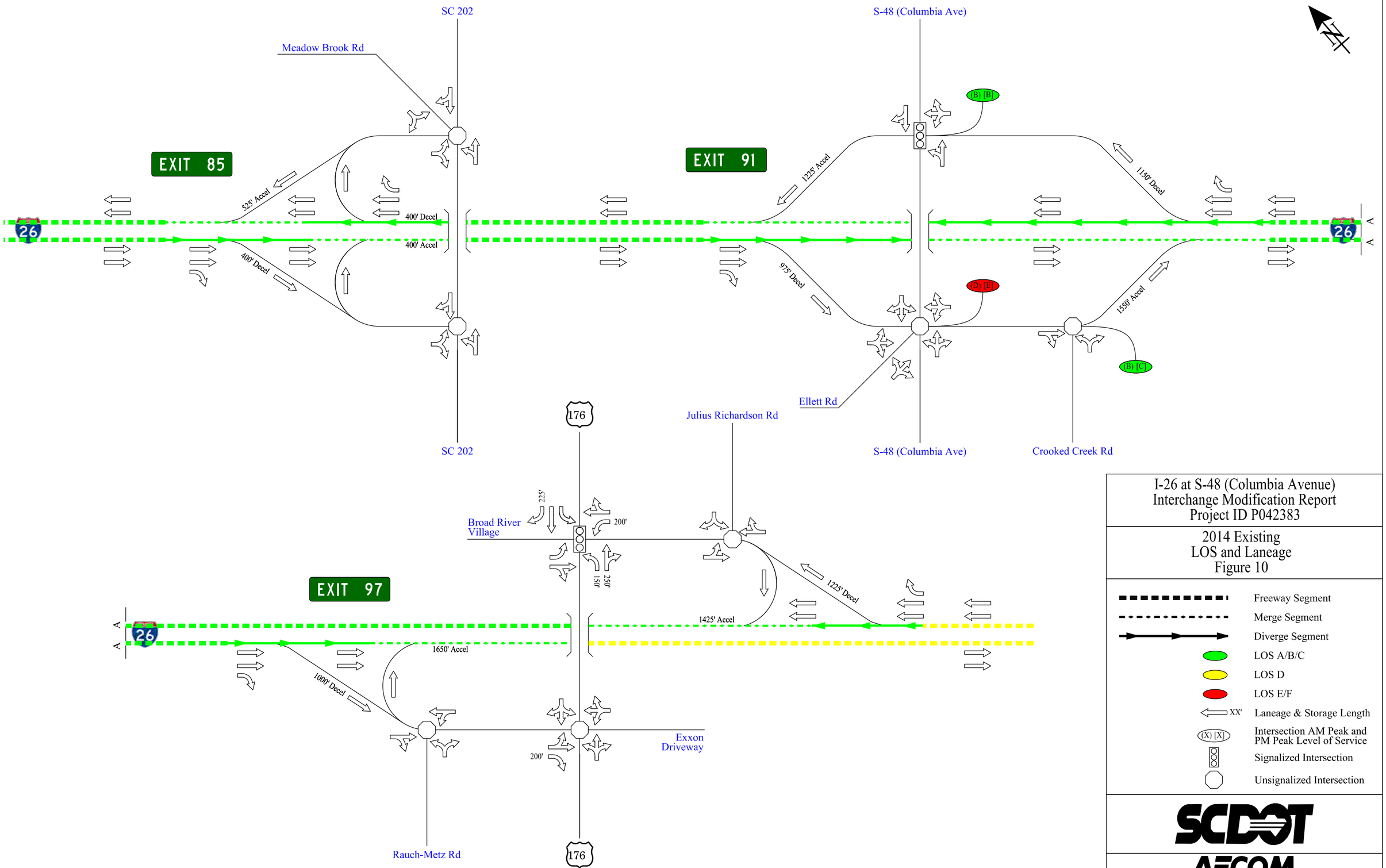
The results of the Existing 2014 Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is operating at LOS D in the AM peak hour (eastbound) and during the PM peak hour (westbound). All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 6 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix E**.

Table 6: Existing 2014 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	A	B	9.4	11.3
	Between Exit 85 and Exit 91	A	B	10.6	11.0
	Between Exit 91 and Exit 97	B	B	15.6	14.2
	East of Exit 97	D	C	30.0	19.4
Westbound	East of Exit 97	B	D	11.6	26.4
	Between Exit 91 and Exit 97	A	B	9.4	14.7
	Between Exit 85 and Exit 91	A	A	6.7	10.0
	West of Exit 85	A	A	7.0	9.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	B	B	15.2	15.9
	EB Exit 91 On-Ramp	B	B	13.7	12.2
	EB Exit 97 On-Ramp	C	B	25.4	17.5
Westbound	WB Exit 97 On-Ramp	A	B	7.4	13.6
	WB Exit 91 On-Ramp	A	A	5.5	9.4
	WB Exit 85 On-Ramp	B	B	10.3	13.3
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	B	B	12.8	15.2
	EB Exit 91 Off-Ramp	A	A	9.1	9.7
	EB Exit 97 Off-Ramp	B	B	15.3	13.5
Westbound	WB Exit 97 Off-Ramp	A	C	8.2	24.1
	WB Exit 91 Off-Ramp	A	B	5.3	12.2
	WB Exit 85 Off-Ramp	A	B	9.3	13.5

Figure 10 shows the LOS for the Existing 2014 conditions.



I-26 at S-48 (Columbia Avenue)
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2014 Existing
LOS and Laneage
Figure 10

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

SCDOT

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3.5 NO-BUILD 2020 TRAFFIC ANALYSIS

The 2020 No-Build scenario analyzes the conditions if there were no improvements made to the interchange. The results of the No-Build 2020 intersection analysis using Synchro 9.1 indicate that S-48 at I-26 is expected to operate at LOS F in the AM and PM peak hours.

Table 7 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix F**.

Table 7: No-Build 2020 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48)							
1	I-26 Eastbound Off Ramp / Crook Creek Road at S-48	Unsignalized	WB (AM)* EB (PM)*	F	F	900+	900+
2	I-26 Westbound Ramps at S-48	Signalized	-	F	F	126.0	433.7

*Since vehicles from Crooked Creek Road can access the I-26 eastbound on ramp to S-48 (Columbia Avenue), the worst of the two minor approaches was reported.

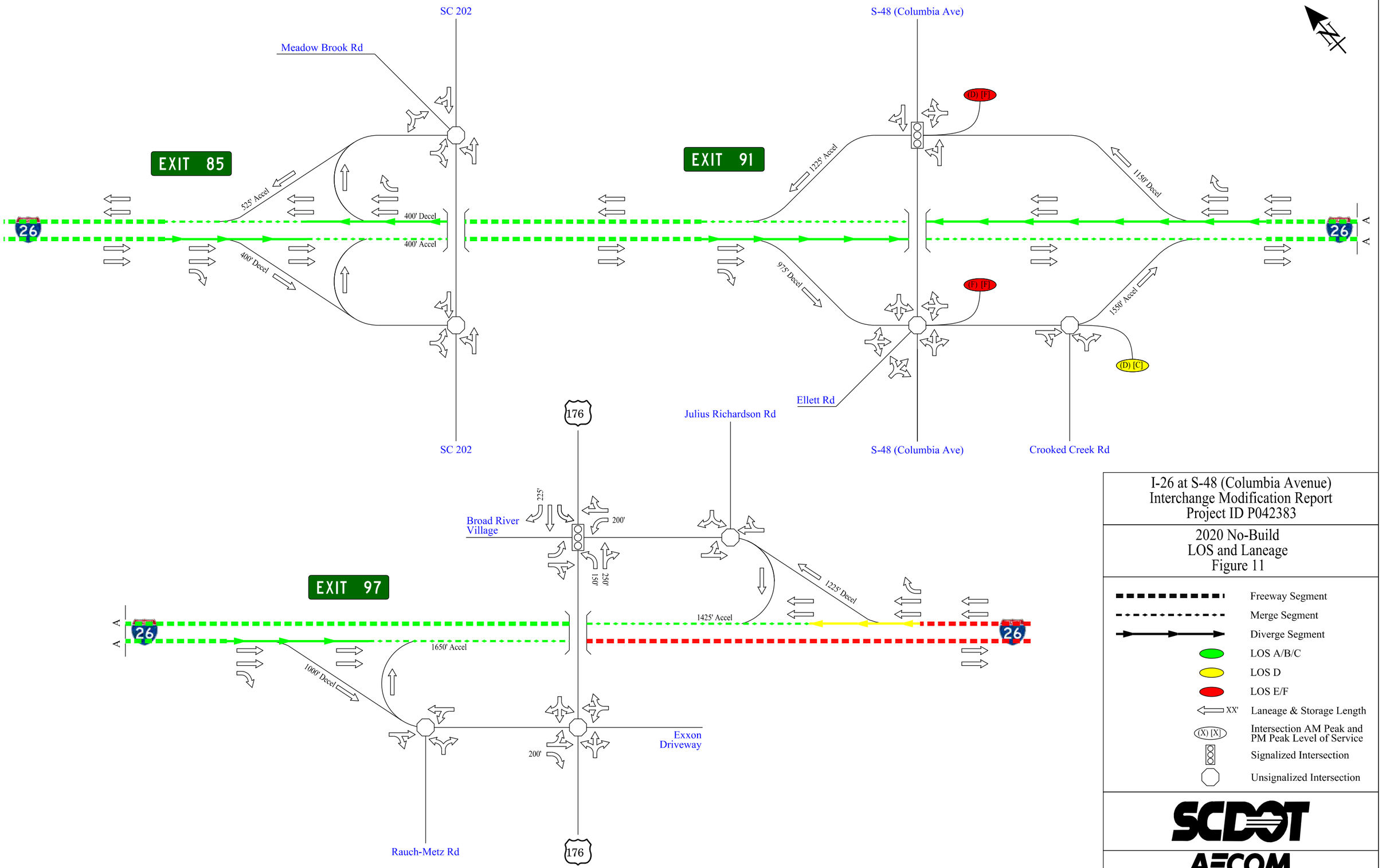
The results of the 2020 No-Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS E in the AM peak hour (eastbound) and during the PM peak hour (westbound). In addition the I-26 eastbound merge area from Exit 97 is expected to operate at LOS D along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 8 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix G**.

Table 8: No-Build 2020 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	A	B	10.9	13.5
	Between Exit 85 and Exit 91	B	B	12.1	13.2
	Between Exit 91 and Exit 97	C	C	20.1	20.3
	East of Exit 97	E	D	40.9	27.6
Westbound	East of Exit 97	B	E	15.9	38.4
	Between Exit 91 and Exit 97	B	C	13.5	20.5
	Between Exit 85 and Exit 91	A	B	7.9	11.9
	West of Exit 85	A	B	8.2	11.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	B	B	17.0	18.3
	EB Exit 91 On-Ramp	B	B	18.0	18.2
	EB Exit 97 On-Ramp	D	C	30.8	24.3
Westbound	WB Exit 97 On-Ramp	B	B	12.1	19.6
	WB Exit 91 On-Ramp	A	B	6.9	11.6
	WB Exit 85 On-Ramp	B	B	11.7	15.5
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	B	B	14.7	18.0
	EB Exit 91 Off-Ramp	B	B	11.1	12.5
	EB Exit 97 Off-Ramp	C	C	20.3	20.6
Westbound	WB Exit 97 Off-Ramp	B	D	13.6	31.6
	WB Exit 91 Off-Ramp	B	B	10.6	18.8
	WB Exit 85 Off-Ramp	B	B	10.8	16.0

Figure 11 shows the LOS for the No-Build 2020 conditions.



I-26 at S-48 (Columbia Avenue)
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2020 No-Build
LOS and Laneage
Figure 11

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

SCDOT

AECOM

3.6 NO-BUILD 2040 TRAFFIC ANALYSIS

The 2040 No-Build scenario analyzes the conditions if there were no improvements made to the interchange. The results of the No-Build 2040 intersection analysis using Synchro 9.1 indicate that S-48 at I-26 is expected to continue to operate at LOS F in the AM and PM peak hours. **Table 9** summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix H**.

Table 9: No-Build 2040 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48)							
1	I-26 Eastbound Off Ramp / Crook Creek Road at S-48	Unsignalized	WB (AM)* EB (PM)*	F	F	900+	900+
2	I-26 Westbound Ramps at S-48	Signalized	-	F	F	247.4	900+

*Since vehicles from Crooked Creek Road can access the I-26 eastbound on ramp to S-48 (Columbia Avenue), the worst of the two minor approaches was reported.

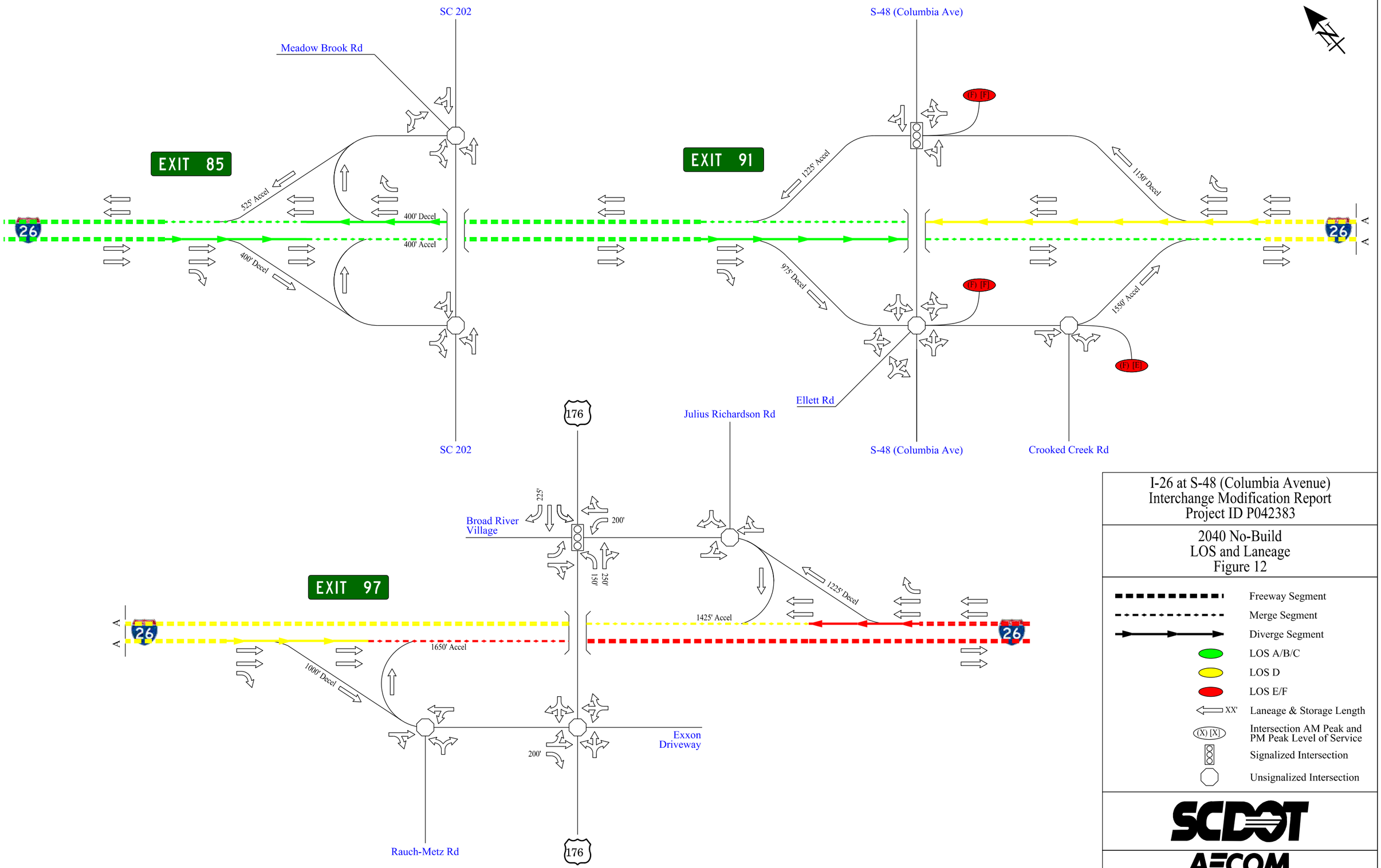
The results of the 2040 No-Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS F in the AM and PM peak hours. Between Exit 91 and Exit 97, the freeway is expected to operate at LOS D in the AM peak hour (eastbound) and PM peak hour (westbound). The PM hour diverge at Exit 91 is also LOS D. In addition the I-26 eastbound merge area from Exit 97 is expected to operate at LOS F along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 10 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix I**.

Table 10: No-Build 2040 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	B	C	15.8	19.5
	Between Exit 85 and Exit 91	B	C	17.5	19.1
	Between Exit 91 and Exit 97	D	D	31.3	33.0
	East of Exit 97	F	F	105.3	50.3
Westbound	East of Exit 97	C	F	23.3	91.3
	Between Exit 91 and Exit 97	C	D	19.5	32.4
	Between Exit 85 and Exit 91	B	B	11.1	17.1
	West of Exit 85	B	B	11.5	16.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	C	C	23.0	24.7
	EB Exit 91 On-Ramp	C	C	26.2	27.2
	EB Exit 97 On-Ramp	F	F	42.0	34.7
Westbound	WB Exit 97 On-Ramp	B	D	18.6	28.3
	WB Exit 91 On-Ramp	B	B	10.6	17.4
	WB Exit 85 On-Ramp	B	C	15.6	21.3
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	C	C	20.9	25.1
	EB Exit 91 Off-Ramp	B	B	17.8	19.5
	EB Exit 97 Off-Ramp	D	D	29.7	30.7
Westbound	WB Exit 97 Off-Ramp	C	F	21.5	44.2
	WB Exit 91 Off-Ramp	B	D	17.7	28.3
	WB Exit 85 Off-Ramp	B	C	15.0	22.5

Figure 12 shows the LOS for the 2040 No-Build Conditions



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2040 No-Build
LOS and Laneage
Figure 12

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

SCDOT

AECOM

3.7 BUILD 2020 TRAFFIC ANALYSIS

The 2020 Build scenario analyzes the conditions for three-interchange alternatives at Exit 91. For all three Alternatives, the following changes were included in the 2020 Build scenario:

- A New Frontage Road approximately 1000 feet to the south of the I-26 eastbound ramps was included to carry the traffic of the proposed Chapin Technology Park. The new Frontage Road was assumed to be a signalized intersection.
- Ellet Road (old frontage road) was removed in the Build scenario. In the Build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with S-48. In the Build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

The results of the Build 2020 analysis using Synchro 9.1 indicate that two of three alternatives are expected to operate at LOS C of better. Alternative 1 (DDI) is expected to have signals at both ramps; therefore, the LOS is balanced at both intersections to obtain proper signals timing. Alternative 2 (Partial Cloverleaf) has an expected LOS A at the I-26 eastbound ramps because no signal is recommended at the I-26 westbound ramps and signal can operate independently. Alternative 3 (Dual Roundabouts) is expected to operate at LOS F for the westbound ramps during the PM peak hour; therefore, it should not be considered as a viable alternative.

Table 11 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix J and K**. Detailed Sidra output reports are found in **Appendix N**.

Table 11: Build 2020 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48) – Diverging Diamond Interchange – Alt 1							
1	I-26 Eastbound Ramps at S-48	Signalized	-	C	C	20.9	22.3
21	I-26 WB Ramps at S-48	Signalized	-	B	C	17.2	23.6
22	S-48 at I-26 WB Off Ramp	Signalized	-	C	B	20.5	16.9
Exit 91 (I-26 at S-48) – Partial Cloverleaf – Alt 2							
1	I-26 Eastbound Ramps at S-48	Signalized	-	A	A	4.1	4.7
2	S-48 at I-26 WB Off Ramp	Unsignalized	WB	B	C	12.7	19.8

The results of the 2020 Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS E in the AM peak hour (eastbound) and during the PM peak hour (westbound). In addition

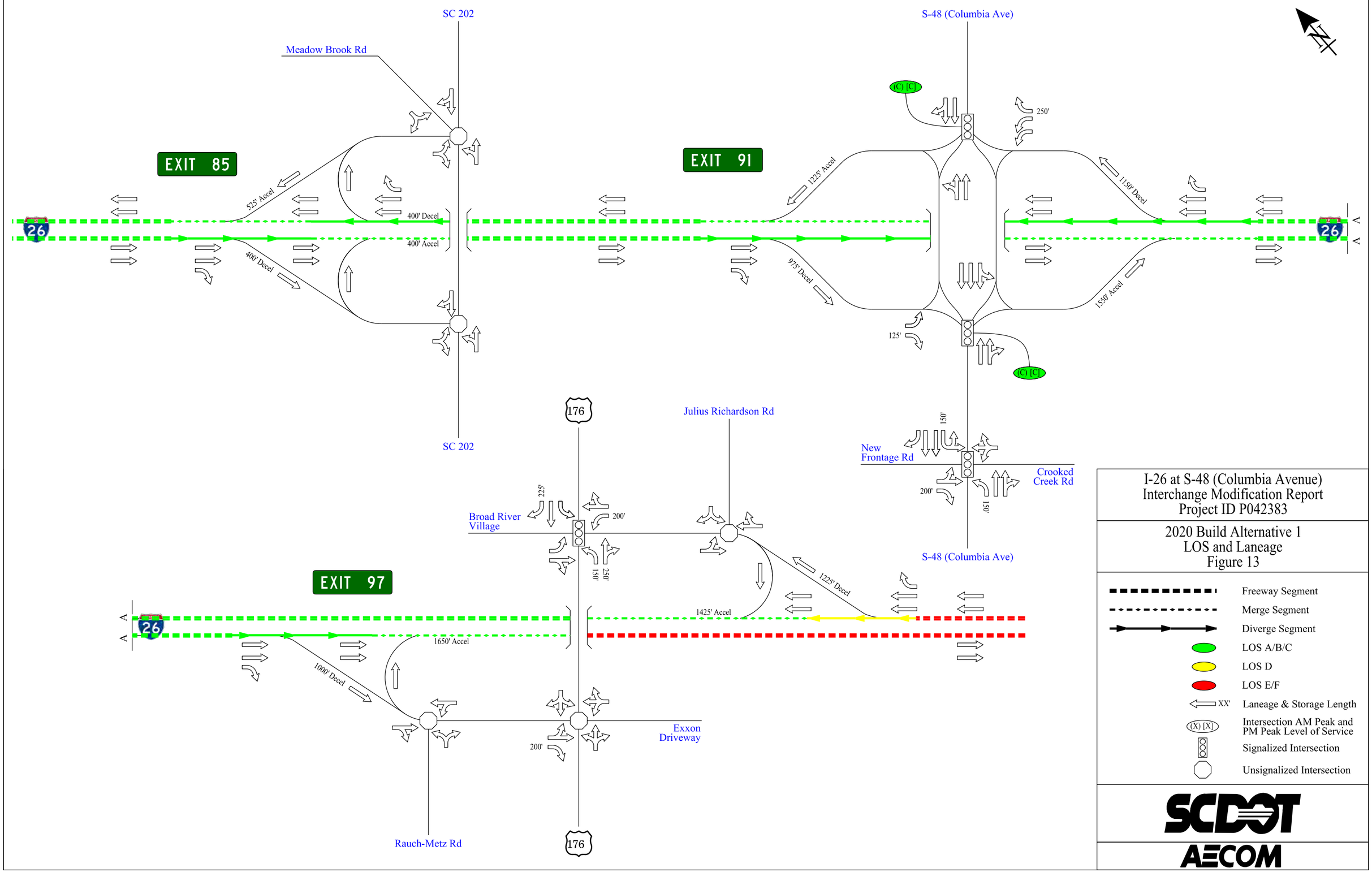
the I-26 eastbound merge area from Exit 97 is expected to operate at LOS D along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 12 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix G**.

Table 12: Build 2020 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	A	B	10.9	13.5
	Between Exit 85 and Exit 91	B	B	12.1	13.2
	Between Exit 91 and Exit 97	C	C	20.1	20.3
	East of Exit 97	E	D	40.9	27.6
Westbound	East of Exit 97	B	E	15.9	38.4
	Between Exit 91 and Exit 97	B	C	13.5	20.5
	Between Exit 85 and Exit 91	A	B	7.9	11.9
	West of Exit 85	A	B	8.2	11.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	B	B	17.0	18.3
	EB Exit 91 On-Ramp	B	B	18.0	18.2
	EB Exit 97 On-Ramp	D	C	30.8	24.3
Westbound	WB Exit 97 On-Ramp	B	B	12.1	19.6
	WB Exit 91 On-Ramp	A	B	6.9	11.6
	WB Exit 85 On-Ramp	B	B	11.7	15.5
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	B	B	14.7	18.0
	EB Exit 91 Off-Ramp	B	B	11.1	12.5
	EB Exit 97 Off-Ramp	C	C	20.3	20.6
Westbound	WB Exit 97 Off-Ramp	B	D	13.6	31.6
	WB Exit 91 Off-Ramp – Alt 1	B	B	10.6	18.8
	WB Exit 91 Off- Ramp – Alt 2	B	B	10.6	16.3
	WB Exit 91 Off Loop Ramp – Alt 2	A	B	9.0	18.8
	WB Exit 85 Off-Ramp	B	B	10.8	16.0

Figure 13 and 14 shows the LOS for the 2020 Build Conditions for Alternative 1 and 2.



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2020 Build Alternative 1
LOS and Laneage
Figure 13

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

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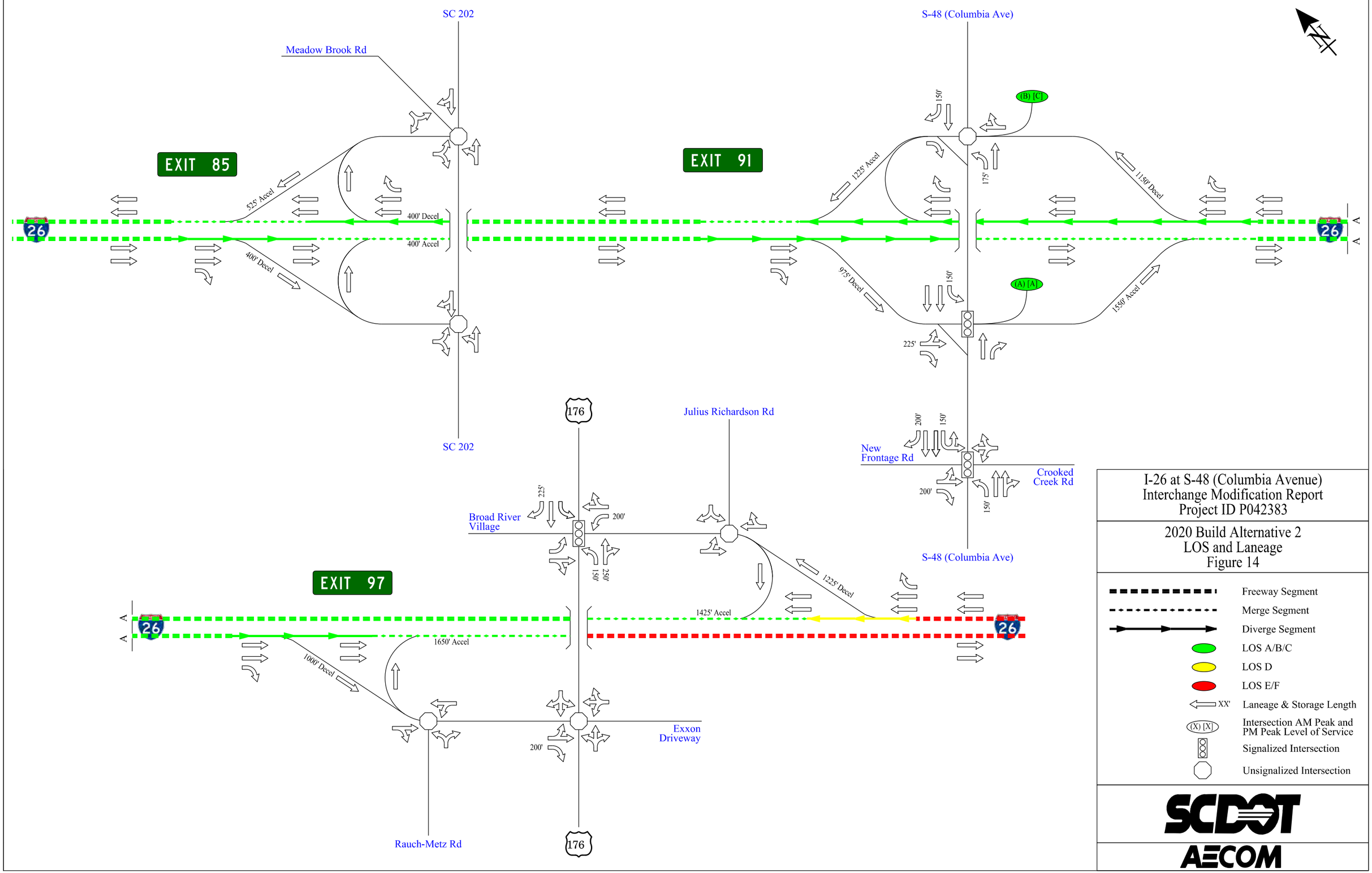
AECOM



I-26 at S-48 (Columbia Avenue)
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Project ID P042383

2020 Build Alternative 2
LOS and Laneage
Figure 14

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

SCDOT
AECOM

3.8 BUILD 2040 TRAFFIC ANALYSIS

The 2040 Build scenario analyzes the conditions for three-interchange alternatives at Exit 91. For three Alternatives, the following changes were included in the 2040 Build scenario:

- A New Frontage Road approximately 1000 feet to the south of the I-26 eastbound ramps was included to carry the traffic of the proposed Chapin Technology Park. The new Frontage Road was assumed to be a signalized intersection.
- Ellet Road (old frontage road) was removed in the Build scenario. In the Build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with S-48. In the Build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

The results of the Build 2040 analysis using Synchro 9.1 indicate that two of three alternatives are expected to operate at LOS C of better. Alternative 1 (DDI) is expected to have signals at both ramps; therefore, the LOS is balanced at both intersections to obtain proper signals timing. Alternative 2 (Partial Cloverleaf) has an expected LOS A at the I-26 eastbound ramps because no signal is recommended at the I-26 westbound ramps and signal can operate independently. Alternative 3 (Dual Roundabouts) is expected to operate at LOS F for the westbound ramps during the PM peak hour; therefore, it should not be considered as a viable alternative.

Table 13 summarizes the LOS and delay for each of study intersections with detailed Synchro reports found in **Appendix L and M**. Detailed Sidra output reports are found in **Appendix N**.

Table 13: Build 2040 Intersection LOS and Delay

ID	Intersection	Traffic Control	Approach	HCM 2010 Level of Service (LOS)		Control Delay (sec/veh)	
				AM	PM	AM	PM
Exit 91 (I-26 at S-48) – Diverging Diamond Interchange – Alt 1							
1	I-26 Eastbound Ramps at S-48	Signalized	-	C	C	24.3	25.1
21	I-26 WB Ramps at S-48	Signalized	-	C	C	26.6	29.2
22	S-48 at I-26 WB Off Ramp	Signalized	-	B	B	19.4	16.9
Exit 91 (I-26 at S-48) – Partial Cloverleaf – Alt 2							
1	I-26 Eastbound Ramps at S-48	Signalized	-	A	A	4.2	5.0
2	S-48 at I-26 WB Off Ramp	Unsignalized	WB	B	C	13.3	21.0

The results of the 2040 Build Freeway / Merge / Diverge analysis using Highway Capacity Software (HCS) 2010 indicate that just east of Exit 97 (US 176), I-26 is expected to operate at LOS F in the AM and PM peak hours. Between Exit 91 and Exit 97, the freeway is expected to

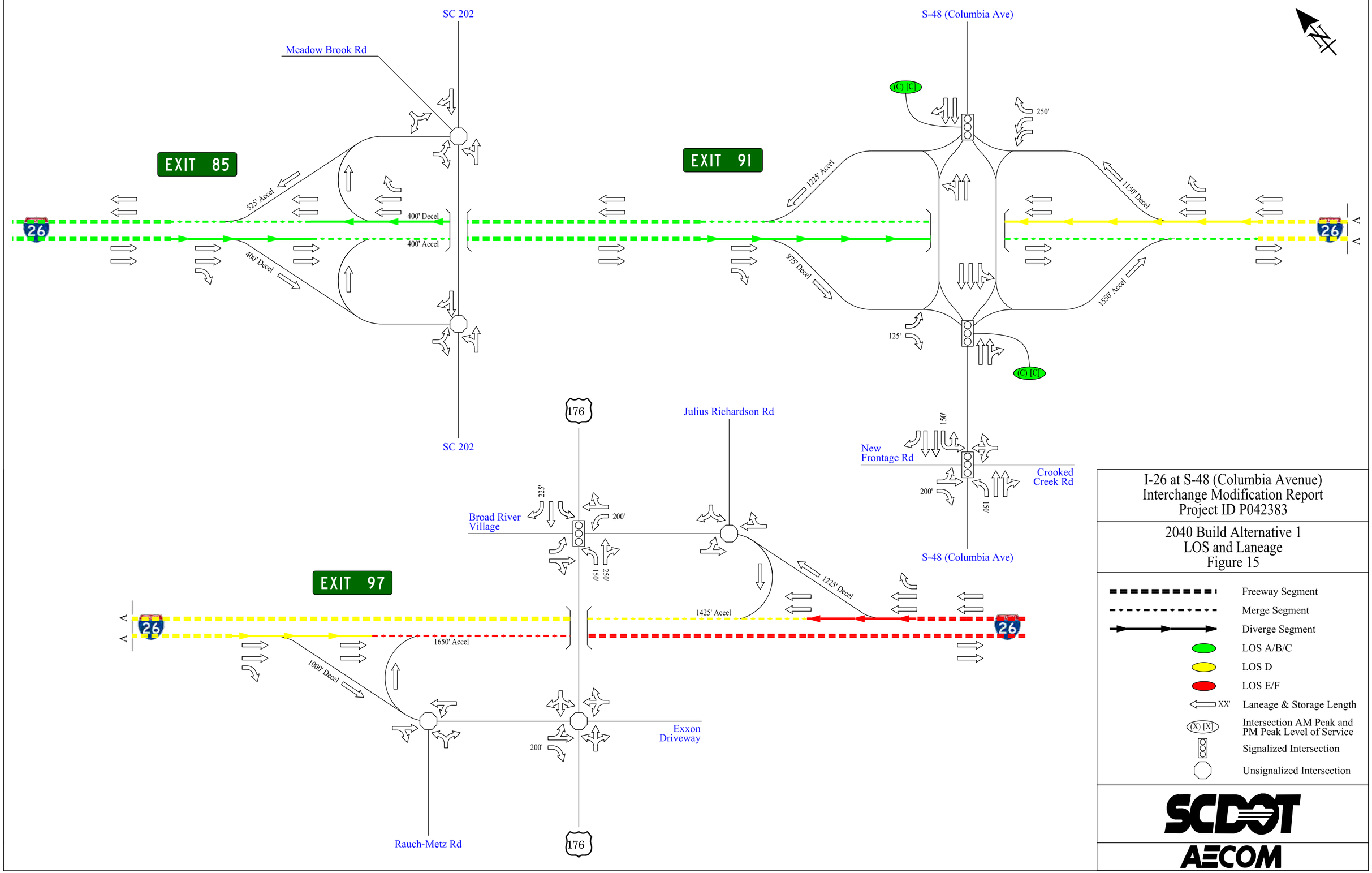
operate at LOS D in the AM peak hour (eastbound) and PM peak hour (westbound). The PM hour diverge at Exit 91 is also LOS D. In addition the I-26 eastbound merge area from Exit 97 is expected to operate at LOS F along with the I-26 westbound diverge area during the PM peak hour. All other freeway segment / merge / diverge analyses are operating at LOS C or better.

Table 14 summarizes the LOS and density for each merge / diverge area with detailed HCS reports found in **Appendix I**.

Table 14: Build 2040 Freeway / Merge / Diverge LOS and Density

Approach	Description	HCM 2010 Level of Service (LOS)		Density (pc/mi/ln)	
		AM	PM	AM	PM
Freeway Segment					
Eastbound	West of Exit 85	B	C	15.8	19.5
	Between Exit 85 and Exit 91	B	C	17.5	19.1
	Between Exit 91 and Exit 97	D	D	31.3	33.0
	East of Exit 97	F	F	105.3	50.3
Westbound	East of Exit 97	C	F	23.3	91.3
	Between Exit 91 and Exit 97	C	D	19.5	32.4
	Between Exit 85 and Exit 91	B	B	11.1	17.1
	West of Exit 85	B	B	11.5	16.5
Merge Area					
Eastbound	EB Exit 85 On-Ramp	C	C	23.0	24.7
	EB Exit 91 On-Ramp	C	C	26.2	27.2
	EB Exit 97 On-Ramp	F	F	42.0	34.7
Westbound	WB Exit 97 On-Ramp	B	D	18.6	28.3
	WB Exit 91 On-Ramp	B	B	10.6	17.4
	WB Exit 85 On-Ramp	B	C	15.6	21.3
Diverge Area					
Eastbound	EB Exit 85 Off-Ramp	C	C	20.9	25.1
	EB Exit 91 Off-Ramp	B	B	17.8	19.5
	EB Exit 97 Off-Ramp	D	D	29.7	30.7
Westbound	WB Exit 97 Off-Ramp	C	F	21.5	44.2
	WB Exit 91 Off-Ramp – Alt 1	B	D	17.7	28.3
	WB Exit 91 Off- Ramp – Alt 2	B	A	10.6	6.7
	WB Exit 91 Off Loop Ramp – Alt 2	B	C	16.1	25.8
	WB Exit 85 Off-Ramp	B	C	15.0	22.5

Figure 15 and 16 shows the LOS for the 2040 Build Conditions for Alternative 1 and 2.



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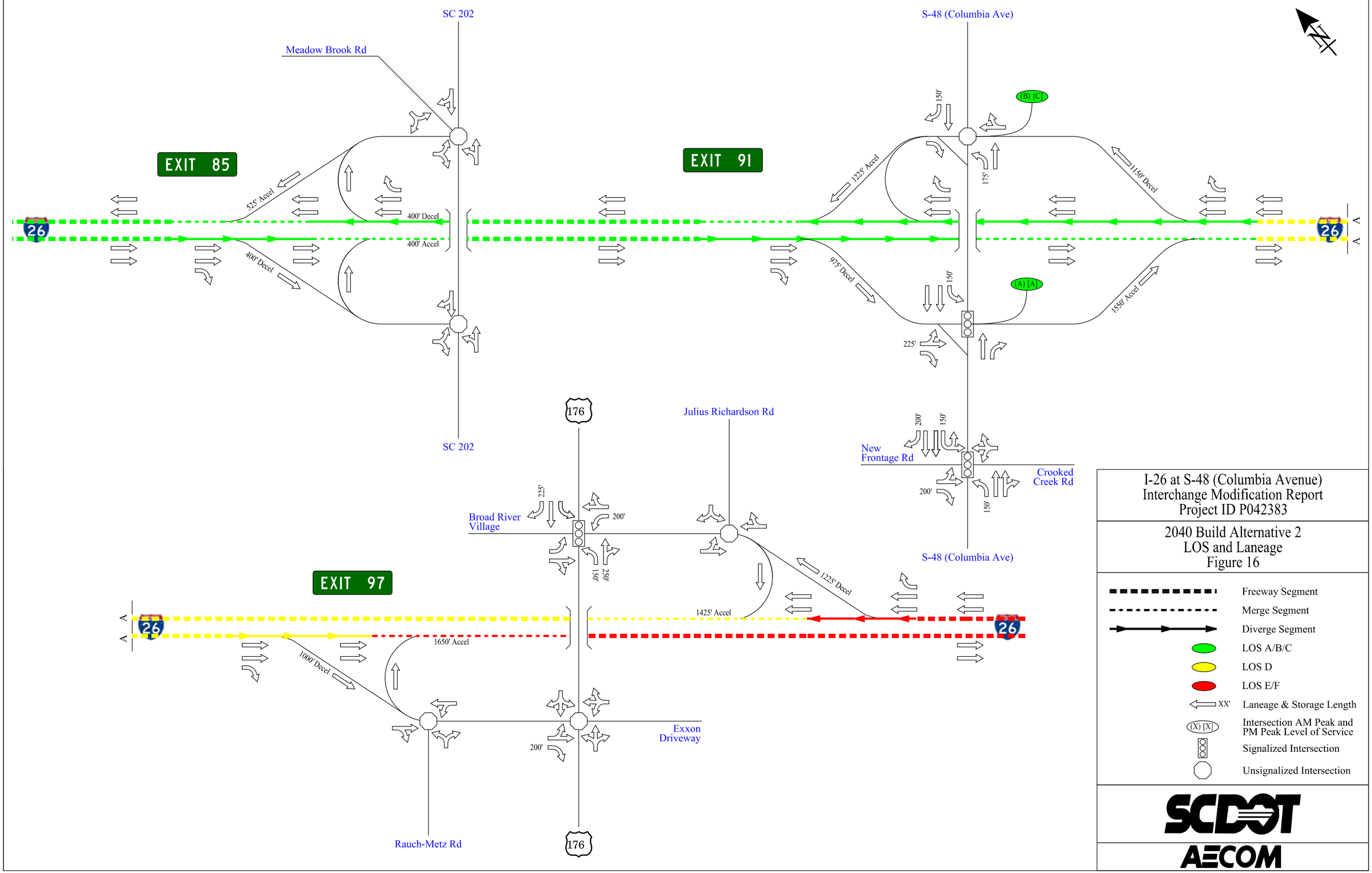
2040 Build Alternative 1
LOS and Laneage
Figure 15

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

SCDOT
AECOM



I-26 at S-48 (Columbia Avenue)
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2040 Build Alternative 2
LOS and Laneage
Figure 16

- Freeway Segment
- Merge Segment
- Diverge Segment
- LOS A/B/C
- LOS D
- LOS E/F
- XX' Laneage & Storage Length
- (X) [X] Intersection AM Peak and PM Peak Level of Service
- Signalized Intersection
- Unsignalized Intersection

SCDOT
AECOM

4.0 VISSIM ANALYSIS

Simulation modeling is a very useful tool for designing improvements to the roadway system. It enables engineers and planners to predict and compare the outcomes of both No-Build and Build alternatives. For this project VISSIM 7.0 software was selected for the traffic operational analysis due to its powerful multi-model modeling capabilities. VISSIM is stochastic traffic simulation software that uses the psycho-physical driver behavior model developed by R. Wiedemann. It combines a perceptual model of the driver with a vehicle model. Every driver with his or her specific behavior characteristics is assigned to a specific vehicle. As a result, the driver behavior corresponds to the technical capabilities of his vehicle. In addition, the optional 3D visualization capability makes it easier to visualize the traffic flow patterns in the corridor. As a result the analyst can see the issues in the model and propose the appropriate solution

4.1 MODEL DEVELOPMENT

The following subsections summarize the data collection, field observations, traffic assignment, and other relevant inputs that were required for the development of the VISSIM models. First, the existing condition models were developed and calibrated, which then served as the base for the development of the future year No-Build and Build model networks.

4.1.1 Geometric Data

To assist in coding of the model network, aerial photography was obtained using VISSIM 7's built-in Bing Maps aerial feature. In addition, Google Maps was also used to for the geometrical information of the study corridor. Lane configurations were initially taken from the aerial pictures and confirmed with the field observations.

Grades (gradient) are an important element of the microsimulation models as they directly impact the vehicle acceleration and deceleration parameters. It is particularly very important for a heavy truck's acceleration and deceleration travelling at the higher speed. The field observations data suggested that grades are very slight in the study area. The study team utilized United States Geological Survey (USGS)[1] data to obtain grades for the model segments.

4.1.2 Traffic Control Data

4.1.2.1 Signal Controllers

VISSIM can model signalized intersections using either the built-in fixed-time control or various other external signal control logic formats. Among the available external logic formats is the Ring Barrier Controller (RBC), which was used in this model at the signalized intersection. The settings on this controller type are saved to an external data file with the extension *.rbc.

[1] http://viewer.nationalmap.gov/basic/

It should be noted that in the 2014, 2020 No-Build and 2040 No-Build scenarios the signals were coded as RBC – Actuated Uncoordinated.

For the 2020 and 2040 Build AM and PM scenarios, the signals on S-48 (Columbia Avenue) interchange (DDI) were coded as RBC- Actuated Coordinated. In addition, the signal at I-26 WB On & Off Ramps and US-176 are coded as Actuated Uncoordinated.

4.1.2.2 Signal Timings

Traffic signal timing plans for the two signalized intersections; I-26 westbound On-Off Ramps & Columbia Avenue intersection and I-26 WB On-Off Ramps & Columbia Avenue intersection were obtained from the South Carolina Department of Transportation. However, the plans only had minimum, maximum, yellow, red times and phase information. Based on this, 2014 AM and PM peak hour Synchro models were developed and optimized to calculate the splits and cycle lengths. Split and cycle length information was entered into the VISSIM models.

Similarly, 2020 and 2040 AM and PM peak hour No-Build and Build synchro models were developed to obtain the signal timing information, which was then used in the VISSIM models.

4.1.2.3 Stop Signs

Stop controlled intersections are modeled in VISSIM using a combination of stop signs and priority rules. The stop sign and stop line of the priority rule define the location at which vehicles must stop. The amount of time a vehicle is stopped is determined by the time distribution assigned to the respective vehicle class. In the absence of time distributions, a vehicle will stop for one time step. Priority rules are implemented to establish the minimum gap time and headway at which the stopped vehicle may proceed into the receiving traffic stream. Stop and yield signs were coded based on the aerial data.

4.1.3 Speed Data

The posted speed limits data on the roadways were collected from Google Maps' street view function. For the existing year model calibration, the average speed data for section along the interstate corridor was collected from INRIX. This data was used to develop the desired speed distribution for the I-26 segments. The desired speed distribution for the turning vehicles at an intersection was assumed to be 17 MPH and 14 MPH for cars and heavy vehicles respectively with a 1.5 MPH of standard deviation.

Table 15: Speed Distribution

SD No	Speed Limit (MPH)	Min	Max	15%	85%
3	15	10	20		
5	25	20	30		
7	35	30	40		
8	40	35	45		
9	45	40	50		
10	50	45	55		
15	65	40	75	60	70
18	65	60	85	70	78.8

Desired Speed Decision points are used for permanent speed changes within the network and are coded at locations where the speed change would typically occur (location of speed signs).

A new series of desired speed distributions are assigned to each vehicle class at the Desired Speed Decision point. Therefore, as a vehicle passes over a decision point, its speed is adjusted according to the new distribution.

Reduced Speed Areas were used to model short sections with reduced speeds (curves or turns). Similar to the Desired Speed Decision points, a new set of desired speed distributions (in this case 'reduced' speeds) are assigned to each vehicle class to account for slower speeds within the reduced speed area. However, unlike the Desired Speed Decision Point, when encountering a Reduced Speed Area, each vehicle begins to decelerate in advance to reach the lower desired speed as it enters the defined area. After leaving the reduced speed area, the vehicle returns to its actual desired speed.

The Reduced Speed Areas coded in the model correspond to turns (left and right) and locations that because of their geometry will impose a mandatory reduction on the speed of vehicles, independently of their originally desired speed.

4.1.4 Traffic Input

VISSIM supports two different forms of vehicle assignments; Dynamic and Static. In dynamic assignment, the vehicle travels from its origin to designation based on the best available route. Parking lots are used as the origin and destination points and generally there are multiple routes between each origin and destination.

Static assignment assumes that the vehicle will follow an assigned path or route from its origin to destination irrespective of the friction or cost. Route is a sequence of links and connectors from a routing decision point to the destination(s).

The study corridor does not have multiple routes option i.e. for a vehicle there is only one route available to travel between any origin and destination. Hence, it was determined that the static assignment would be the most suitable to replicate the existing conditions. Each vehicle input source on I-26 and cross-streets had its routing decision point. Route stretched to each on and off-ramp followed by another routing decision (origin) to eventually take the vehicles through interchange to reach its destination. No vehicles are taken out or added to the network automatically; therefore, it is important that balanced volume flows are entered.

4.1.4.1 Traffic Composition

The default vehicle types available in VISSIM are Car, HGV (truck), Bus, Tram (transit), Bike, and Pedestrian. These can be used to define traffic composition for a microsimulation model. For the purpose of this study, only two default vehicle types; Car and HGV (truck) were utilized. Traffic compositions are the proportions of each vehicle type present in each of the vehicle input sources. Vehicle Inputs are time variable traffic volumes entered at the source node. For the modeling purpose, I-26 (East and West ends of the model) and the cross-streets were defined as source nodes.

4.1.4.2 Exiting Condition Volumes

The 2014 Existing Condition AM and PM peak hour turning movement volumes were developed from the (2014) collected counts. Most of the collected approach and receiving volumes were balanced. However, at some locations where the approach and receiving volumes were off, minor adjustments were done to get the balanced volumes. No vehicles were taken out or added to the network automatically; therefore, it was important that balanced volume flows were entered.

4.1.4.3 2020 and 2040 No-Build and Build Volumes

It was assumed that in 2020 or 2040 the traffic pattern i.e. origin and destination would remain unchanged between the No-Build and Build scenarios. Hence, the No-Build and Build condition traffic volumes were kept consistent.

4.1.5 Driving behavior Parameters

During the simulation, the driver behavior parameters are used to guide the vehicles through the model network. VISSIM uses five driving behavior models, out of which only two; Urban (Motorized) and Freeway (Free Lane Selection) were used for the development of the base year model network. The Urban (Motorized) parameter was used to model surface streets within the network. The Freeway (Free Lane Selection) parameter was used to model the freeway facilities within the project network.

4.1.5.1 Data Limitations

There were a few limitations associated with the collected data. Limitations and relevant logical solution are listed below:

- Traffic Signal Data:
  - Signal plans were obtained from the SCDOT, however, the signal timing, splits and offsets were not available.
    - VISSIM (RBC controller) requires various signal parameter inputs. Using the information provided in the signal plan, Synchro models were developed to develop and optimized to generate the splits and timings.
    - Using the base year Synchro model, 2020 and 2040 No-Build Synchro models and signal timing data were developed.

- Grade/Elevation Data:
    - Grade or Elevation is an important component of microsimulation as it can have a significant impact on the acceleration and deceleration parameter of a vehicle, especially on the heavy trucks. As mentioned in the **Section 4.2** elevation data was obtained from the United States Geological Survey (USGS) and grades were calculated using the best engineering judgement. Grades were then applied to the model segments.

- Traffic Volumes:
  - At some locations, including on I-26 mainline, traffic counts were not available such as west of Exit 91. The only 24-hour traffic count on I-26 that was conducted just east of Exit 91.
    - Using the engineering judgement, logical existing and future traffic volumes were back calculated and balanced.

4.2 BASE YEAR MODEL CALIBRATION AND VISUAL VALIDATION

In order to achieve logical microsimulation results, it is imperative to calibrate and validate the model using observed field data. It should be noted that there are no universally accepted or definitive methods for performing model calibration and validation. The responsibility lies with the modeler to adopt and implement a suitable procedure depending upon the scope and budget of the project that will provide an acceptable level of confidence in the model results. Once the calibration targets are achieved, the same parameters can then be applied to the future year models.

4.2.1 Calibration Criteria

To ensure satisfactory calibration of the model, standards were used to establish targets regarding traffic flows and travel times. The targets of this calibration effort were set at the values included in Traffic Analysis Toolbox Volume III –Guidelines for Applying Traffic Microsimulation Modeling Software[2] published by the Federal Highway Administration (FHWA) shown below:

Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed	
Individual Link Flows	
Within 15%, for 700 veh/h < Flow < 2700 veh/h	> 85% of cases
Within 100 veh/h, for Flow < 700 veh/h	> 85% of cases
Within 400 veh/h, for Flow > 2700 veh/h	> 85% of cases
Sum of All Link Flows	Within 5% of sum of all link counts
GEH Statistic < 5 for Individual Link Flows*	> 85% of cases
GEH Statistic for Sum of All Link Flows	GEH < 4 for sum of all link counts
Travel Times, Model Versus Observed	
Journey Times, Network	
Within 15% (or 1 min, if higher)	> 85% of cases
Visual Audits	
Individual Link Speeds	
Visually Acceptable Speed-Flow Relationship	To analyst's satisfaction
Bottlenecks	
Visually Acceptable Queuing	To analyst's satisfaction

GEH measure is a formula used in traffic modeling to compare two sets of traffic volumes (Observed and Modeled). Its mathematical formulation is similar to the Chi-Squared test, but it is not a true statistical test but rather an empirical formula. The formulation for the GEH Statistic is as follows:

$$GEH = \sqrt{\frac{2 * (M - O)^2}{(M + O)}}$$

Where M represents model estimate volume and O represents field counts.

[2] http://ops.fhwa.dot.gov/trafficanalysistools/tat_vol3/vol3_guidelines.pdf, page64

This statistic is typically used to offset the discrepancies that occur when using only simple percentages, as traffic volumes vary over a wide range. In other words, if using only percentages, small absolute discrepancies have no impact on large volumes but a large percent impact in smaller numbers, and vice versa. It has been shown that for traffic volumes smaller than 10,000 a five percent variation yields smaller numbers than a GEH of five. Beyond 10,000, five percent differences keep growing linearly whereas GEH=5 follows a decaying curve.

Based on the scope and purpose of this study it was determined that base year model calibration will be based on the link flows, travel time and speed criteria. For the link volume calibration, 2014 traffic counts and turning movements were used to compare with the model link volumes.

For the link speed comparison, it was recommended to use the INRIX speed data against the model link speeds. In the study area, INRIX only provided speeds on the I-26 links, therefore only I-26 model link speeds were used for the calibration and validation purposes. Data collection points were placed on I-26 corridor in areas upstream and downstream of merge and diverge at the locations of the INRIX speed data collection.

4.2.2 Simulation Setting and Random Seed Variation

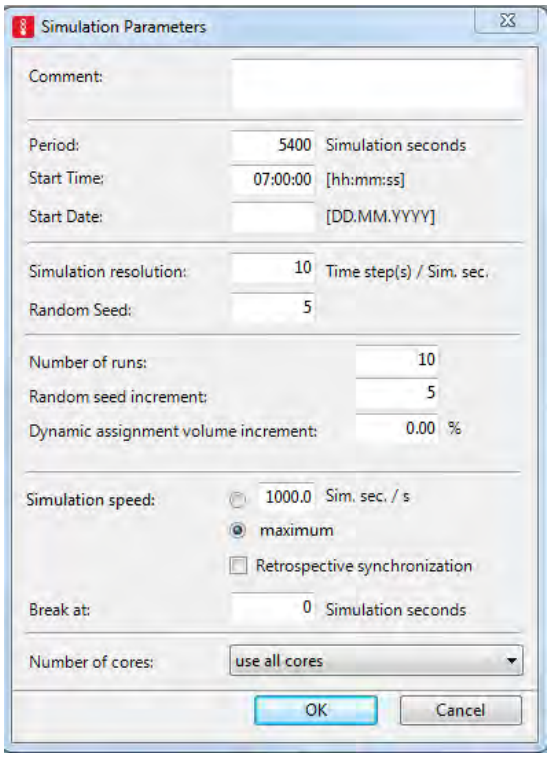
The AM peak hour model was set run from 7:00-8:30 AM with 30 minutes of seeding time. Hence, the actual analysis period was 7:30-8:30AM. Similarly, the PM peak hour model was set to run from 4:15 – 5:45PM with 30 minutes of seeding time. The actual PM analysis period was from 4:45 – 5:45PM. The model was ran ten times starting with a random seed at five with five seed increments. Simulation parameter settings are pictorially shown on the following page.

4.2.3 Visual Validation

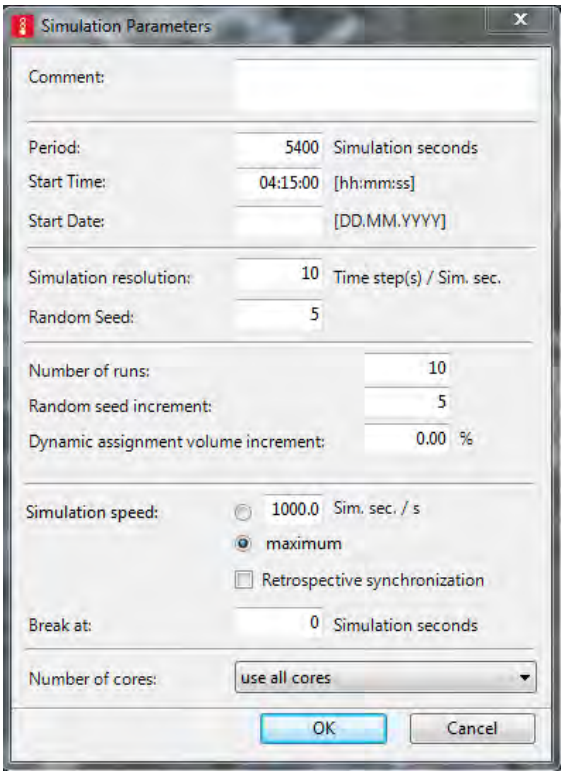
Visual validation of the models is an imperative step in the development and calibration of the model. It is essential for the modeler to perform a thorough visual validation to eliminate any coding errors and achieving logical results.

After coding, the models were ran and visually inspected multiple times. The errors pertaining to the lane change decision, yield, conflict area, etc. were then addressed to achieve realistic vehicle movements. The validation process was performed for all the existing, no-build and build models.

Simulation Settings – AM



Simulation Settings – PM



4.2.4 Calibration Results

2014 Existing Condition AM and PM peak hour models were run with the VISSIM's default simulation parameters settings. It was observed that with the default simulation parameters the models' link volumes were within the desired ranges for the calibration. However, the model link speeds were less than the observed INRIX speeds on the I-26 links. Hence, some minor adjustments to the desired speed distribution and speed curve were performed to account for the higher speeds observed in the INRIX data.

4.2.4.1 Link Volumes and Speed

A model is assumed to be reasonably calibrated, if:

- Link flows satisfy modeled versus observed flow thresholds for 85% of the individual links.
- Sum of all link flows is within 5% of sum of all link counts.
- 85% of the network link flows have a GEH less than 5.
- Model link speeds fall within ±2.5MPH of INRIX Speeds.

Table 16 and 17 shows overall calibration results under AM and PM peak hours.

Table 16: 2014 AM Peak Hour Calibration Results

Calibration Summary			
Speed Data			
MOE Criteria	**Target**	**Actual**	**Calibrated**
Within Acceptable Range (±5 MPH of INRIX Speed)	90%	100.0%	Calibrated
Within Desirable Range(±2.5 MPH of INRIX Speed)	75%	100.0%	Calibrated
Flow (Count) Data			
MOE Criteria	**Target**	**Actual**	**Calibrated**
Individual Link Flow	85%	99.1%	Calibrated
Sum of All Link Flows	5%	1.4%	Calibrated
GEH Individual Link	85%	98.0%	Calibrated
GEH - All Links	5.00	2.40	Calibrated

Table 17: 2014 PM Peak Hour Calibration Results

Calibration Summary			
Speed Data			
MOE Criteria	**Target**	**Actual**	**Calibrated**
Within Acceptable Range (±5 MPH of INRIX Speed)	90%	100.0%	Calibrated
Within Desirable Range(±2.5 MPH of INRIX Speed)	75%	100.0%	Calibrated
Flow (Count) Data			
MOE Criteria	**Target**	**Actual**	**Calibrated**
Individual Link Flow	85%	100.0%	Calibrated
Sum of All Link Flows	5%	1.2%	Calibrated
GEH Individual Link	85%	100.0%	Calibrated
GEH - All Links	5.00	2.26	Calibrated

4.2.4.2 Travel Time

A model is reasonably calibrated when the modeled travel times are within 15% (or one minute if higher) of the average field collected travel time for 85% of the cases. **Table 18** shows the AM and PM peak hour travel time calibration results.

Table 18: Travel Time Calibration Results

Time	Percentage	Calibrated
7:30 AM - 8:30 AM	100%	Calibrated
4:45 PM - 5:45 PM	100%	Calibrated

Percentage of Travel Times within 15% (or one minute)

4.3 MEASURES OF EFFECTIVENESS

4.3.1 95th Percentile (Worst Case) Methodology

For the AM and PM peak hourly analysis, *95 percent Worst Case Result method*[3] as described in the FHWA Tool Box was utilized for the worst case (density) determination. The equation below shows the 95th percentile density equation:

95 percent Worst Result = *M* +1.64 * S
Where,
M = Mean observed result (weighted density) in the model runs;
S = Standard deviation of the result (weighted density) in the model runs

Weighted delay results from the 10 batch runs were compiled by each intersection. Further, average and standard deviation in the model runs were calculated. The resultant weighted delay was calculated utilizing the 95 percent worst case result method. Error! Reference source not found.**Table 19** below shows the 95th percentile delay calculation method.

Table 19: 95th Percentile Calculation Method

Time	Calibrated
Model Runs	Intersection Average Delay
Run 1	D1
Run 2	D2
Run 3	D3
…	…
Run 10	D16
Average Wt. Delay (D_a)	D_a = (D1+D2+D3+……..+D10) / 10
St. Deviation (S_d)	S_d = Stand. Dev (D1, D2, D3, …..,D10)

[3] http://ops.fhwa.dot.gov/trafficanalysistools/tat_vol3/Vol3_Guidelines.pdf page 77

4.3.2 Delay Reporting for Stop and Signal Controlled Intersections

Stop Controlled Intersection
Most of the stop controlled intersections in the study corridor are "1-Way Stop". Because the main approach is generally a free-flow with heavy traffic movement, the stop controlled movement is weighted out. As a result, even though the stop controlled approach operated at LOS E or F but overall the intersection reported as operating at LOS D or better. It was determined that for stop controlled intersections, worst approach delay should be reported.

Signalized (or Signal Controlled Intersection)
For the signal controlled intersections, the 95th percentile of the overall (weighted) delays were calculated.
MOEs for the all the No-Build and Build models are compiled in the following subsections.

4.3.3 2014 Existing Condition AM and PM Peak Hour MOEs

After the existing conditions VISSIM model was calibrated, the measures of effectiveness (MOEs) for existing conditions were obtained for the AM and PM peak hours.

Table 20 shows the intersection delay and Level of Service for the both the peak periods.

Table 20: 2014 Existing AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2014 Existing Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	14.1	B	19.5	B
S-48 and I-26 EB Ramps		Stop	14.5	B	19.7	C
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

4.3.4 2020 No-Build AM and PM Peak Hour MOEs

Table 21 shows the intersection delay and level of service for the AM and PM peak hours under 2020 No-Build scenario.

Table 21: 2020 No-Build AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2020 No-Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	51.6	D	81.0	F
S-48 and I-26 EB Ramps		Stop	>300.0	F	>300.0	F

*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.

4.3.5 2020 Build (DDI) AM and PM Peak Hour MOEs

In addition to the DDI project, the following changes were included in the 2020 Build scenario:

- A New Frontage was included to carry the traffic of the proposed future developments. It was connected to the Columbia Avenue around Shell Gas Station, south of the I-26 EB Ramps intersection. It coded and analyzed as a signalized intersection.
- Ellet Road was removed in the built scenario. In the build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with Columbia Avenue. In the build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

Table 22 shows the intersection delay and level of service for the AM and PM peak hours under 2020 Build scenario. The build scenario would be a Diverging Diamond Interchange (DDI) at I-26 and Columbia Avenue interchange.

Table 22: 2020 Build (DDI) AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2020 Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	15.5	B	16.3	B
S-48 and I-26 EB Ramps		Signalized	12.0	B	12.6	B
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

4.3.6 2040 No-Build AM and PM Peak Hour MOEs

Table 23 shows the intersection delay and level of service for the 2040 No-Build AM and PM peak hour scenario.

Table 23: 2040 No-Build AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2040 No-Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	74.2	E	90.9	F
S-48 and I-26 EB Ramps		Stop	>300.0	F	>300.0	F
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

4.3.7 2040 Build (DDI) AM and PM Peak Hour MOEs

In 2040 Build scenario, in addition to the DDI project, the following changes were included in the 2040 Build scenario:

- A New Frontage was included to carry the traffic of the proposed future developments. It was connected to the Columbia Avenue around Shell Gas Station, south of the I-26 EB Ramps intersection. It coded and analyzed as a signalized intersection.
- Ellet Road was removed in the built scenario. In the build scenario, Ellet Road traffic redistributed and added to the New Frontage Road traffic.
- Crooked Creek Road was realigned to connect to the New Frontage Road intersection with Columbia Avenue. In the build scenario, it will not have direct access to the I-26 EB on ramp. Crooked Creek Road traffic was redistributed and added to the Frontage Road traffic.

Table 24 shows the intersection delay and level of service for the 2040 Build AM and PM peak hour scenario.

Table 24: 2040 Build (DDI) AM / PM Peak Hour Delay and LOS (VISSIM)

Intersection	2040 Build Condition					
	Exit #	Intersection Traffic Controller	AM		PM	
			Avg. Delay (Sec. / Veh.)	LOS*	Avg. Delay (Sec. / Veh.)	LOS*
S-48 and I-26 WB Ramps	91	Signalized	17.8	B	15.7	B
S-48 and I-26 EB Ramps		Signalized	24.5	C	27.5	C
*Delay and LOS for the stop controlled intersection is the worst case approach delay and LOS observed. It is not the overall delay and LOS for the stop controlled intersection.						

5.0 SUMMARY OF FINDINGS

The following is a summary of the results for the analysis of the project to provide interchange improvements at Exit 91 – S-48 (Columbia Avenue). As shown in this analysis, under the No-Build conditions, by 2020 the level of service begins to fail (LOS E/F) at the I-26 ramps. In the 2040 No-Build scenario, all intersections of concern at Exit 91 are at failing level of service conditions.

1. I-26 Eastbound Ramps at S-48
2. I-26 Westbound Ramps at S-48

The scenario in which the diverging diamond interchange alternative is constructed, the 2020 and 2040 Build conditions show an acceptable level of service (C or higher) at all intersections.

The HCS analysis of the freeway, merge, and diverge segments reach similar conclusions regarding acceptable levels of service. The freeway segments directly adjacent to Exit 91 in the Existing, No-Build, and Build scenarios operate at level of service D or better. Merge and diverge analysis at Exit 91 also indicates a level of service of D or better in the existing and 2020/2040 No-Build and Build years.

It should be noted that at Exit 97, to the East of Exit 91, intersections reach a failing level of service by 2020. Freeway segments reach failing conditions in 2040.

5.1 FINDINGS

2014 Existing Condition
The 2014 analysis results show that most of the intersections in the study area operate at LOS C or better.

2020 No-Build Condition
In the 2020 No-Build AM and PM scenarios, only a few stop controlled approaches operate at LOS D or better. The signalized intersections and stop controlled approaches listed below operate at a LOS E or worse.

- I-26 EB Ramps & S-48 Intersection ; Stop Controlled Approach
- I-26 WB Ramps & S-48 Intersection; Signalized Intersection

2020 Build (DDI) Condition
In the 2020 Build (DDI) AM and PM scenarios, both the intersections on S-48 (Columbia Avenue) operate well at LOS B. The signalized intersections listed below operate at a LOS E or worse:

- I-26 WB Off-Ramp & US-176; Signalized Intersection

2040 No-Build Condition
Under the 2040 No-Build condition the signalized intersections and stop controlled approaches listed below operate at a LOS E or worse:

- I-26 EB Ramps & S-48 Intersection ; Stop Controlled Approach
- I-26 WB Ramps & S-48 Intersection; Signalized Intersection

2040 Build (DDI) Condition

All the signalized intersections on S-48 (Columbia Avenue) operate at LOS C or better.

5.2 CONCLUSION AND RECOMMENDATION

The traffic analysis presented in this report suggests that the proposed diverging diamond alternative at S-48 (Columbia Avenue) interchange will operate acceptably in both the 2020 and 2040 build scenarios and does not adversely impact the adjacent interchanges.

6.0 FEDERAL HIGHWAY ADMINISTRATION (FHWA) POLICY

It is in the national interest to maintain the Interstate System to provide the highest level of service on terms of safety and mobility. Adequate control of access is critical to providing such service. Therefore FHWA has developed policy points that must be addressed prior to granting a new or modified access point to the interstate system. The policy points were originally detailed in the Federal Register on October 22, 1990 955 FR 42670), and updated in the Federal Register: February 11, 1998 (Volume 63, Number 28). On August 27, 2009 FHWA published a new policy in the Federal Register (Volume 74, Number 165. The following section details how the proposed action meets the requirements for the new or revised access points to the existing Interstate System.

Policy Point #1: *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).*

Interstate 26 is an east / west main route of the interstate highway system in the southeastern United States. It spans from US 17 in Charleston, South Carolina to US 23 in Kingsport, Tennessee. I-26 is a 4-lane divided highway with a posted speed limit of 70 mile per hour. S-48 (Columbia Avenue) is a two lane minor arterial that connects downtown Chapin with I-26 at Exit 91. The existing Exit 91 interchange is a diamond interchange approximately 20 miles from Columbia, South Carolina. The eastbound off ramp is under stop control while westbound off ramp is signalized. No turn lanes are present to / from I-26. Access management concerns include Ellett Road which is less than 100 feet south of the I-26 eastbound off ramp and Crooked Creek Road which intersects with I-26 eastbound on ramp.

Access management along S-48 is also expected to improve with the proposed DDI. There are plans to consolidate closely spaced driveways adjacent to the interchange termini ramps to one frontage road intersecting S-48 over 1000 feet south of the interchange under signal control.

The purpose of the interchange modification is to improve the operational efficiency and safety of the existing interchange configuration and to accommodate projected traffic volumes. Based on 2020 and 2040 projection traffic volumes, both interstate off-ramps are expected to operate at LOS F with the current interchange configuration. Safety concerns include I-26 westbound off ramp queuing onto I-26 and unsignalized traffic control for the I-26 eastbound off ramp.

Policy Point #2: *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).*

The diverging diamond interchange and partial cloverleaf alternatives were analyzed as part of this report. Results from the analysis indicates both alternatives are expected to provide a LOS C or better for the 2040 projected design volumes. The preferred alternative was the diverging

diamond interchange due its right-of-way costs and location of the planned development north of the interchange. Ramp metering, mass transit, and HOV facilities are not warranted based on existing or design year volumes and are not expected to improve operations for this suburban interchange.

Policy Point #3: *An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)).*

Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

An operational analysis was performed for Existing 2014, Opening 2020, and Design 2040 years along I-26 between Exit 85 (SC 202) and Exit 97 (US 176). All mainline segments, merge and diverge ramp junctions as well as surface street intersection were studied. Synchro 9.1 was used for the intersections, HCS 2010 for the mainline segments and merge / diverge areas, and VISSIM 7.0 to model everything together.

The Existing 2014 traffic analysis indicates as shown in Figure 10 that majority of the study is operating at LOS C or better with following exceptions:

- US 176 at I-26 westbound off ramp (Exit 97)
- I-26 freeway segment east of Exit 97

The No-Build 2020 and 2040 traffic analysis indicates, as shown in Figure 11 and 12, that basically everything east of Exit 91 (S-48) is not operating at an acceptable LOS C. Please note the intersections on Exit 91 (S-48) are expected to operate at LOS F while the I-26 westbound segment prior to Exit 91 and off-ramp are projected to operate at LOS D.

The Build 2020 and 2040 traffic analysis indicates, as shown in Figure 13 and 15, that overall operations at the interchange of I-26 at S-48 (Columbia Avenue) would be improved when comparing to the No-Build scenario. East of Exit 91 (S-48) would continue to operate at LOS D until Exit 97 where the LOS worsens to F due to capacity on the mainline. Operation at the intersections on the surface streets at Exit 97 would not be impacted with the proposed interchange modification due to the 6-mile distance to the study interchange and would continue to operate the same as in the No-Build scenario.

Policy Point #4: *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

The proposed interchange modification for this project would provide all relevant traffic movements at the I-26 and S-48 interchange. The proposed interchange design concept will meet or exceed all applicable SCDOT, AASHTO, and FHWA design standards.

It should be noted that the proposed design plans to remove the existing Crooked Creek Road access with the I-26 eastbound on ramp and realign it with S-48 (Columbia Avenue) to the south. In addition, the closely spaced Ellett Road just south of the I-26 eastbound off ramp is expected to be realigned with this new Crooked Creek Road.

Policy Point #5: *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

The proposed project is consistent with the COATS 2035 Long Range Transportation Plan, and lists the S-48 (Columbia Avenue) project as a Prioritized Road Widening Project. The project is also included as a system upgrade in SCDOT's Statewide Transportation Improvement Program (STIP) for Lexington County. The STIP covers all federally funded transportation improvements for which funding has been approved and that are expected to be undertaken in the six-year period the STIP covers. The fiscally-constrained STIP includes approximately $13,000,000 for preliminary design services, right-of-way acquisition, and project construction through 2019. Full funding is reasonably anticipated to be available for its completion.

Policy Point #6: *In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).*

There are currently no planned or programmed additional interchanges within the study area for the project or the expanded study area for analysis of the adjacent interchanges in the SCDOT STIP or the Central Midland Council of Governments (CMCOG) Long Range Plan.

In the event that a project to construct an interchange is initiated in the future it will also be subject to the FHWA policy for additional access to the Interstate System, and an Interchange Justification Report will be required.

Policy Point #7: *When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).*

The current report incorporates planned traffic volumes from two major developments in the area. The Chapin Technology Park (approved) and Chapin Commerce Village (planned). Chapin Technology Park is located south of the interchange along S-48 (Columbia Avenue) and Chapin Commerce Village (planned), located north of the interchange. Both development are planned generate a significant number of vehicles and were accounted for with the proposed design of diverging diamond interchange alternative. There have been a series of public meetings that have taken place.

Policy Point #8: *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

The proposed alternative is expected to have minimal impact on natural environment such was water quality, floodplains, farmland, and cultural resources as a result retrofitting the existing diamond to a diverging diamond interchange.

A draft Environmental Assessment (EA) is currently being prepared for SCDOT and submitted to FHWA. Effects on human and natural environment was assessed.

Approval of this IMR can only be given by FHWA with the completion of a successful NEPA document.

APPENDIX A

S-48 TRAFFIC PROJECTIONS MEMO

AECOM
10 Patewood Drive, Building VI, Suite 500
Greenville, SC 29615
T 864-234-3000; www.aecom.com

Memorandum

To:	Mrs. Gaye Sprague, PE
	Sprague & Sprague Consulting Engineers
From:	Ryan Eckenrode, P.E., PTOE, Traffic Engineer, AECOM
Date:	June 14, 2016
Reference:	S-48 (Columbia Avenue) Corridor Improvement Project – Traffic Projections

As directed by Mead & Hunt / Lexington County and SCDOT, AECOM developed a traffic forecast for Opening Year (2020) and Design Year (2040) for the S-48 (Columbia Avenue) Corridor Improvement Project. AECOM originally recommended a 1.64% linear growth rate; however, SCDOT approved a 1.25% linear growth rate at the following intersections on July 24, 2014:

1. Columbia Avenue and I-26 Eastbound Ramps
2. Columbia Avenue and I-26 Westbound Ramps
3. I-26 Eastbound ramp and Crooked Creek Road
4. Ellet Road and Columbia Avenue
5. Columbia Avenue and Eagle Chase Court
6. Columbia Avenue and Woodthrush Road
7. Columbia Avenue and Ellet Road/Chapin High School (1)
8. Columbia Avenue and Chapin High School (2)
9. Columbia Avenue and Ellet Road/Chapin High School (3)
10. Columbia Avenue and East Boundary Street
11. Columbia Avenue and Clark Street/Peak Street
12. Lexington Street and Columbia Avenue
13. Lexington Street and Beaufort Street
14. Lexington Street and Chapin Road
15. Lexington Street and Water Street
16. Lexington Street and Clark Street
17. Amicks Ferry Road and Columbia Avenue
18. Amicks Ferry Road and Chapin Road
19. Amicks Ferry Road and Zion Church Road
20. Amicks Ferry Road and Broomstraw Road
21. Amicks Ferry Road and Virginia Street

AECOM used the 2014 existing traffic volumes and grew them at a linear rate of 1.25% to obtain the base Opening Year (2020) and Design Year (2040) traffic projections. After these projections were complete, a traffic study for the Chapin Technology Park and Chapin Commerce Village Development became available. These two developments are significant in size and impact the S-48 corridor. At the direction of Prime Consultant Mead & Hunt, Lexington County and SCDOT, AECOM added additional traffic volumes to the base

volumes previously presented to be conservative and to better estimate the turning movement volumes to / from Columbia Avenue. The following describes the methods AECOM used to add the additional volumes:

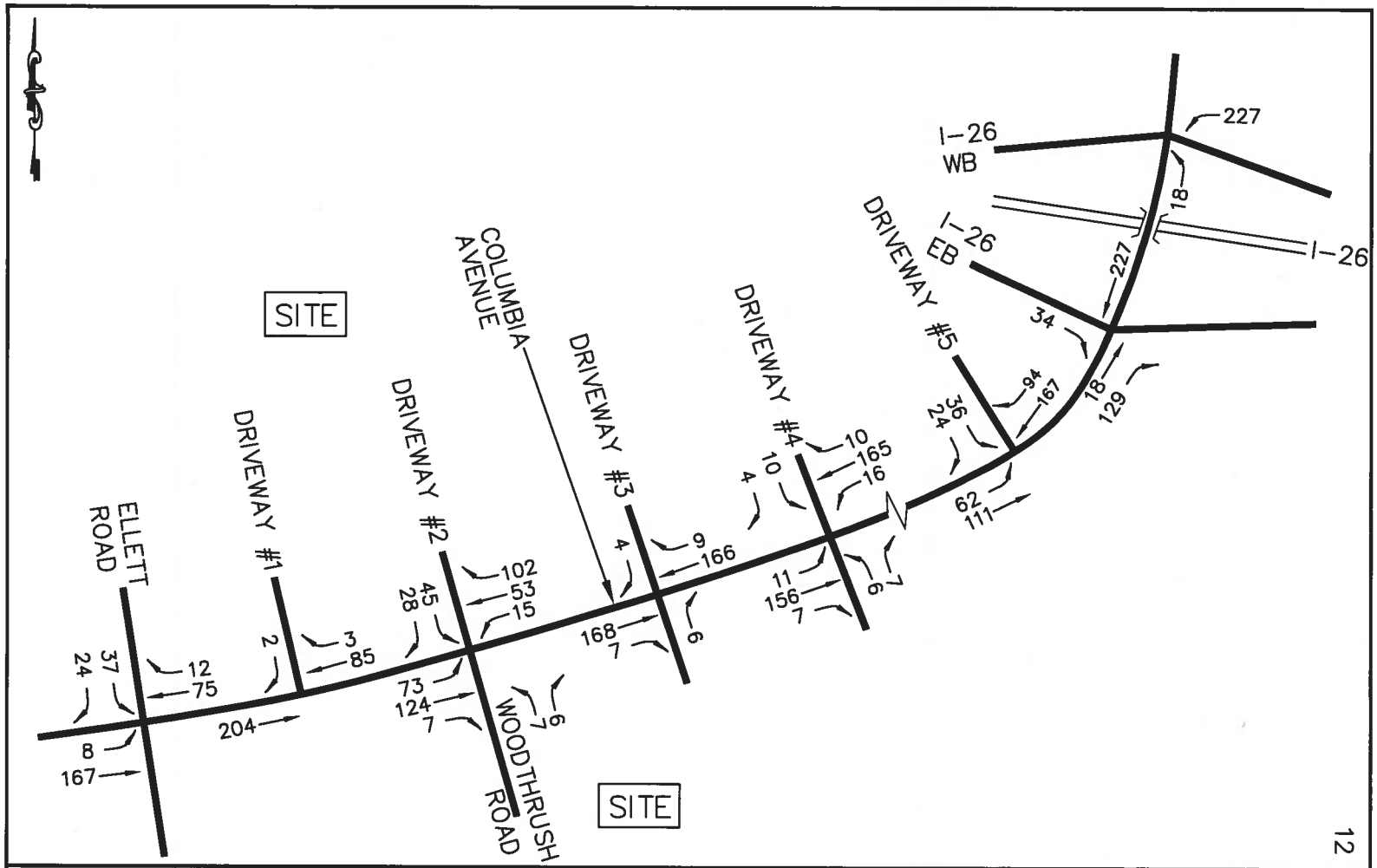
- Chapin Technology Park (120 acre industrial park, 450 single family houses, and 350,000 SF of commercial). Based on the final traffic study submitted and approved by SCDOT on October 13, 2015 for the Chapin Technology Park, the opening year is 2019. AECOM added these new trips to the Opening Year (2020). The Chapin Technology Park is not expected to be complete until 2024 as these trips at full build-out were added to the Design Year (2040). The Technology Park is located north of Columbia Avenue near Woodthrush Road.
- Chapin Commerce Village (132,000 SF Specialty Retail, 8,350 SF Quality Restaurant, 8,350 SF General Office, 4,500 SF Fast Food Restaurant with Drive-Through, 8,350 High Turn-Over (Sit-Down) Restaurant, 4,050 SF Fast Food Restaurant with Drive-Through, 4,950 SF Convenience Market with Gasoline Pumps, 8,350 SF Quality Restaurant, 120 Room Hotel, 8,350 Quality Restaurant, and 4,050 SF General Office Building). This development has not had a traffic study and is only in the early planning stages. It is located just east of I-26 along S-48/Columbia Avenue.

Traffic volume figures showing how both of these developments were distributed within the study area are attached to this document. Once the 2020 and 2040 No-Build traffic volumes projections were developed, AECOM rerouted traffic for Alternative 9A. AECOM looked at the existing traffic patterns and the path of the new road to determine the percentage of traffic that would use the new facility. Based on these two criterions, the following engineering assumptions were made:

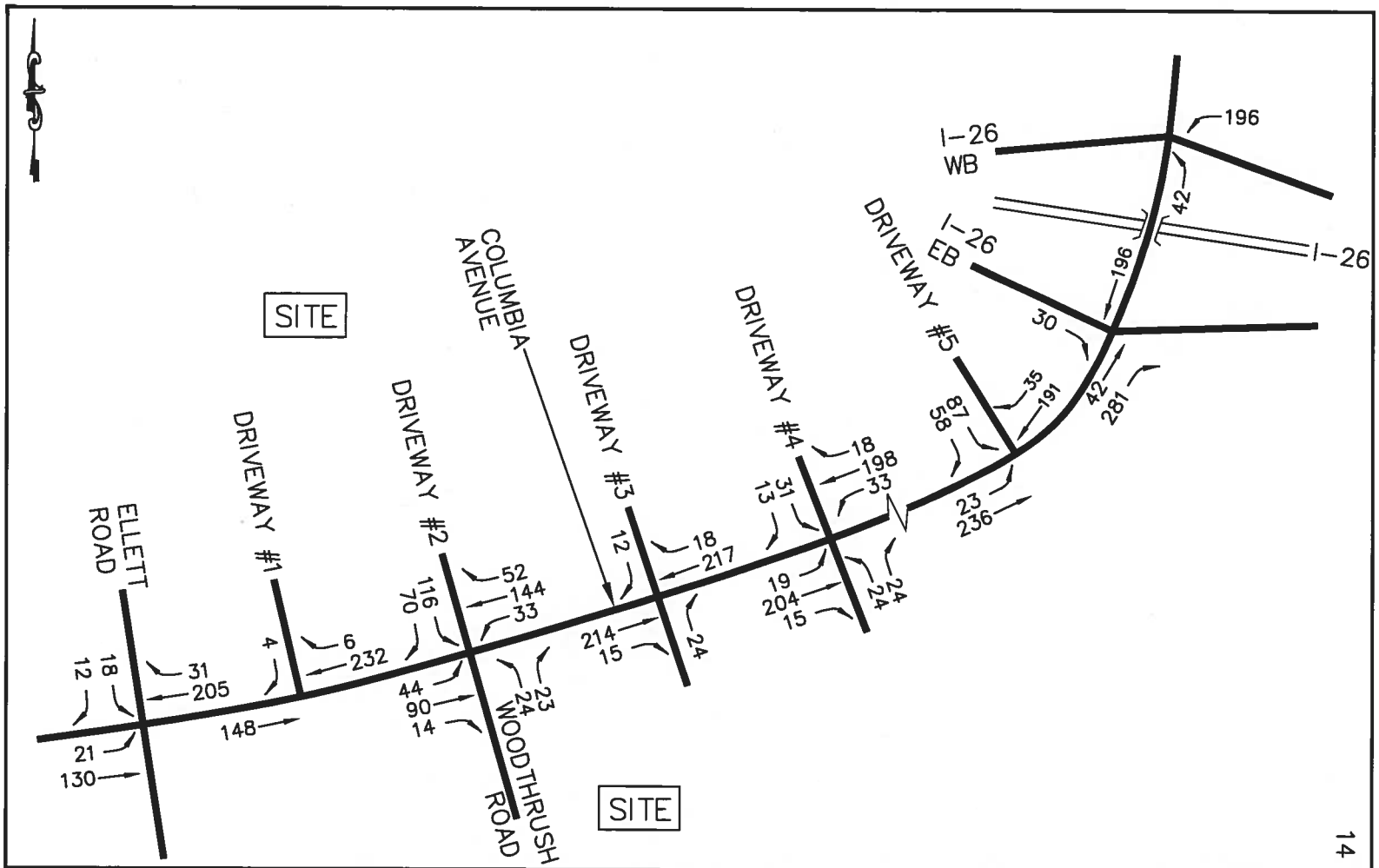
- 25% of Westbound Left-turns from Columbia Avenue onto Lexington Avenue are expected to use New Road as shown in alternative 9A.
- 25% of Westbound Left-turns from Columbia Avenue onto Amicks Ferry Road is expected to use New Road as shown in Alternative 9A.
- 25% of Northbound Right-turns from Lexington Avenue on Columbia Avenue is expected to use New Road as shown in Alternative 9A.
- 25% of Northbound Right-turns from Amicks Ferry Road on Columbia Avenue is expected to use New Road as shown in Alternative 9A.
- 50% of Westbound Left-turns from Chapin Road onto Amicks Ferry Road is expected to use New Road as shown in Alternative 9A.
- 50% of Westbound Left-turns from Chapin Road onto Lexington Avenue is expected to use New Road as shown in Alternative 9A.
- 50% of Northbound Right-turns from Amicks Ferry Road onto Chapin Road is expected to use New Road as shown in Alternative 9A.
- 50% of Northbound Right-turns from Lexington Road onto Chapin Road is expected to use New Road as shown in Alternative 9A.
- E. Boundary Street at Columbia Avenue becomes a Right-in Right-out, so 75% Eastbound Right-turns move to New Road / Clark Street. Also 75% of the Northbound Right turns move to New Road / Clark Street.

Each one of these engineering assumptions is documented in the attached figures with its own color to carefully track the new traffic patterns. It is to be noted that the traffic volume assumptions are likely to change if Columbia Avenue (between Boundary Street and Amicks Ferry Road) becomes over capacity. The New Road is not expected to be at capacity using these assumptions and therefore can handle additional traffic if necessary.

Volume Development Figures

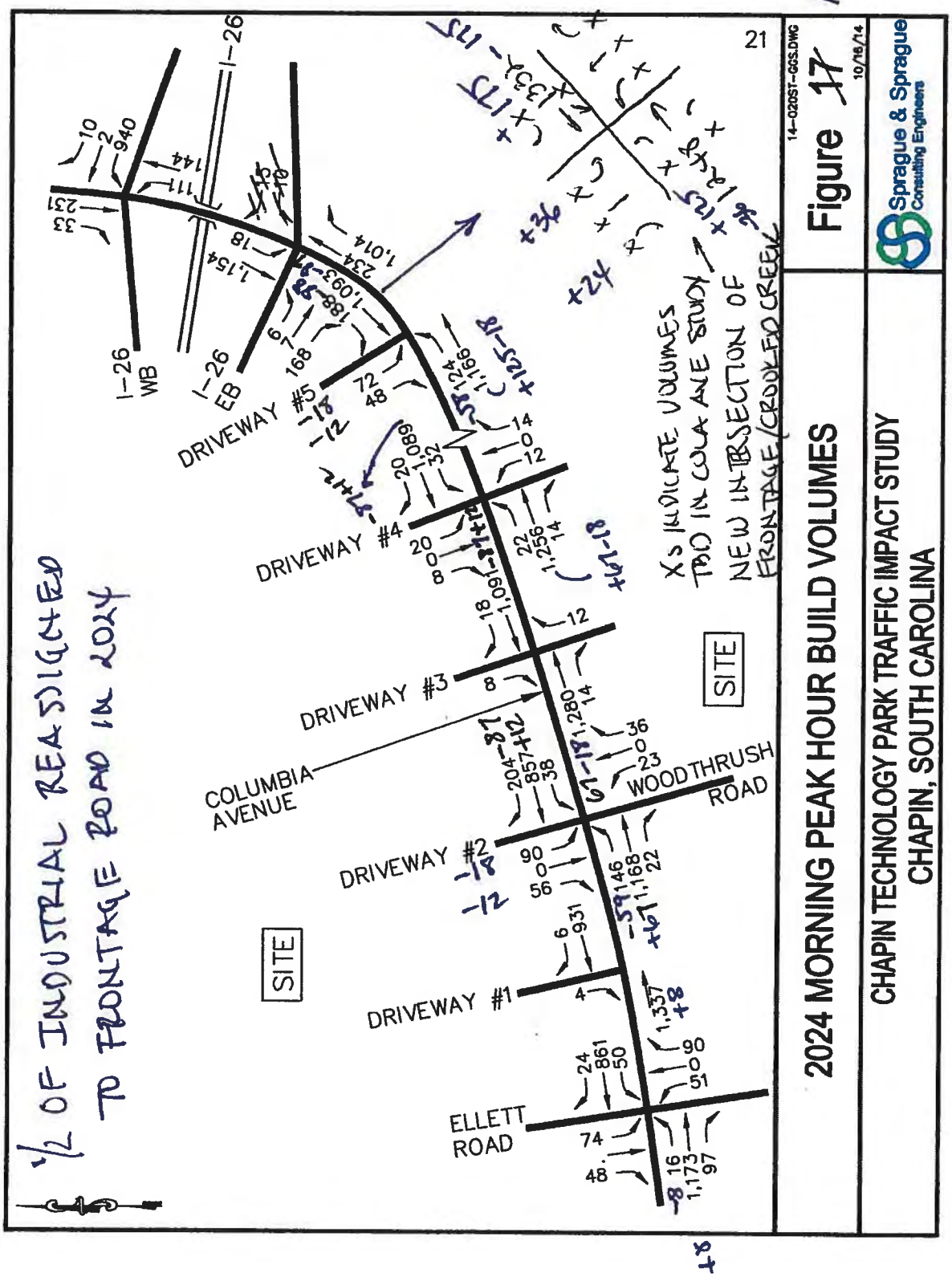


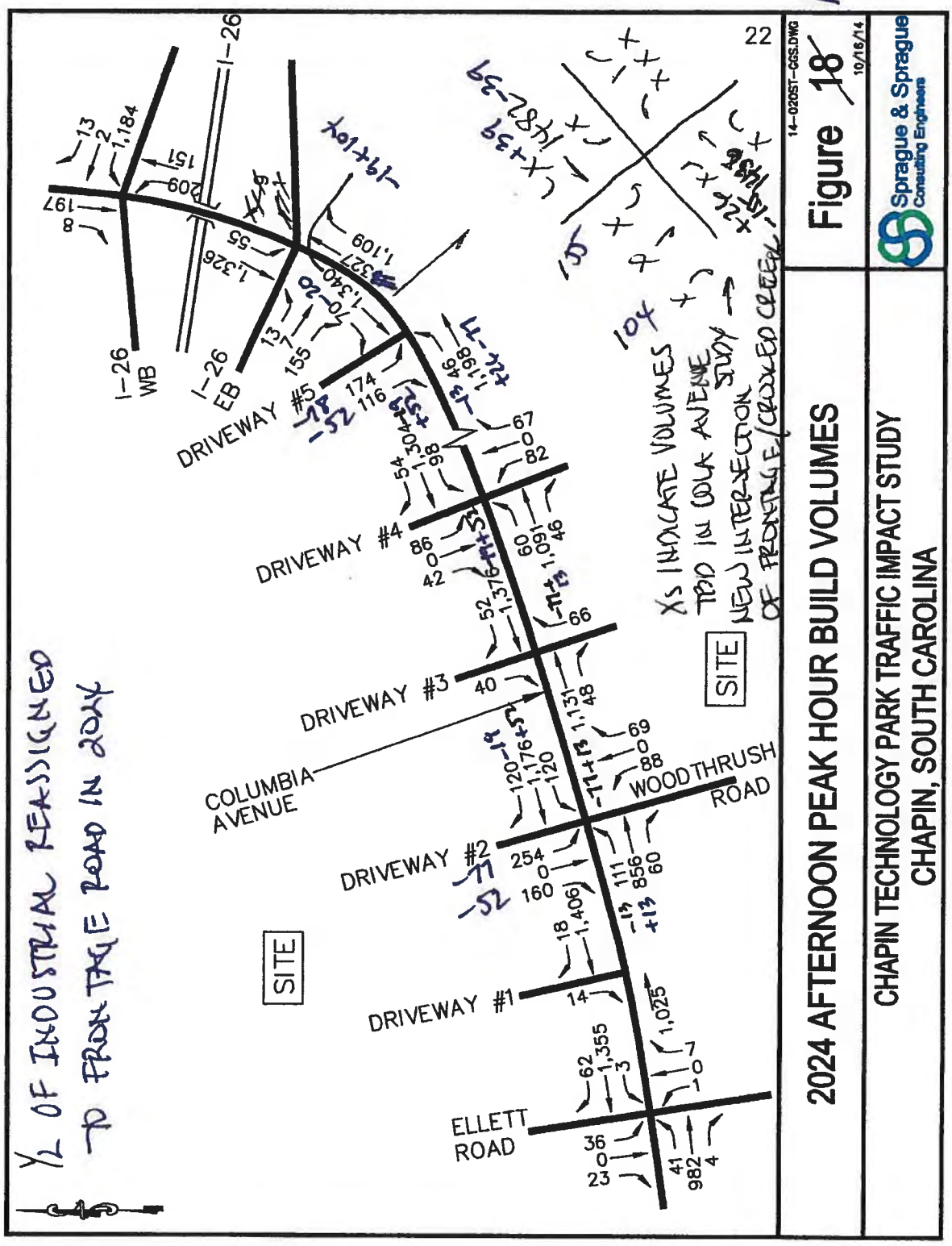
2019 MORNING PEAK HOUR PRIMARY SITE TRIP TOTALS	14-020ST-GGS.DWG Figure 8 10/16/14
CHAPIN TECHNOLOGY PARK TRAFFIC IMPACT STUDY CHAPIN, SOUTH CAROLINA	Sprague & Sprague Consulting Engineers



2019 AFTERNOON PEAK HOUR PRIMARY SITE TRIP TOTALS	14-020ST-GGS.DWG Figure 10 10/16/14
CHAPIN TECHNOLOGY PARK TRAFFIC IMPACT STUDY CHAPIN, SOUTH CAROLINA	Sprague & Sprague Consulting Engineers

A-1





Project: Chapin Commerce Village
Date: 10/22/2014

Location	Description of Use	Units		Trips/Unit	PM Peak Hours Trips
North Parcel A	Specialty Retail Center	132000	SF	0.00271	358
North Parcel B	Quality Restaurant	8350	SF	0.00749	63
North Parcel C	General Office Building	8350	SF	0.00149	12
North Parcel D	Fast Food Restaurant with Drive-Through	4500	SF	0.03384	152
		Total PM Peak Hour Trips			**585**

Location	Description of Use	Units		Trips/Unit	PM Peak Hours Trips
South Parcel E	High-Turnover (Sit-Down) Restaurant	8350	SF	0.01115	93
South Parcel F	Fast Food Restaurant with Drive-Through	4050	SF	0.03384	137
South Parcel G	Convenience Market with Gasoline Pumps	4950	SF	0.05092	252
South Parcel H	Quality Restaurant	8350	SF	0.00749	63
South Parcel I	Hotel	120	Rooms	0.6	72
South Parcel J	Quality Restaurant	8350	SF	0.00749	63
South Parcel K	General Office Building	4050	SF	0.00149	6
		Total PM Peak Hour Trips			**685**

SITE ELEMENTS

- TOTAL AREA - 25 ACRES (NORTH PARCELS)
  TOTAL AREA - 20.9 ACRES (SOUTH PARCELS)
- PARCEL A - 17 ACRES
  (151,500 SF BUILDING & 476 PARKING SPACES SHOWN)
- PARCEL B - 2.1 ACRES
- PARCEL C - 3.7 ACRES
- PARCEL D - 2.2 ACRES
- PARCEL E - 2.0 ACRES
  (7,500 SF BUILDING & 121 PARKING SPACES SHOWN)
- PARCEL F - 1.2 ACRES
  (4,000 SF BUILDING & 55 PARKING SPACES SHOWN)
- PARCEL G - 2.0 ACRES
  (12,500 SF BUILDING & 60 PARKING SPACES SHOWN)
- PARCEL H - 2.2 ACRES
  (7,500 SF BUILDING & 123 PARKING SPACES SHOWN)
- PARCEL I - 2.8 ACRES
  (FOUR STORY HOTEL & 135 PARKING SPACES SHOWN)
- PARCEL J - 2.0 ACRES
- PARCEL K - 1.1 ACRES

DEVELOPER

M & R ASSOCIATES, LLC.
DEVELOPERS AND COPSULTANTS
P.O. BOX 1053
CHAPIN, SOUTH CAROLINA 29036

CONTACTS: MARK BOLDING 803-429-1023
RUSSELL COOK 803-730-7208

HYBRID engineering, inc.
hybrideng.com

NORTH

0' 50' 100' 200'
GRAPHIC SCALE: 1" = 100'

CHAPIN COMMERCE VILLAGE

January 2014

Chapin Commerce Village

Table 1 - Trip Generation

Land Use		Intensity		Daily			AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out	Total	In	Out
310	Hotel	120	rooms	702	351	351	64	38	26	72	37	35
710	General Office Building*	8,350	s.f.	92	46	46	13	11	2	12	2	10
710	General Office Building*	4,050	s.f.	46	23	23	6	5	1	6	1	5
826	Speciality Retail	132,000	s.f.	5,686	2,843	2,843	-	-	-	338	149	189
853	Convenience Market with Gasoline Pumps	4,950	s.f.	4,186	2,093	2,093	203	102	101	252	126	126
931	Quality Restaurant	8,350	s.f.	752	376	376	7	6	1	63	52	11
931	Quality Restaurant	8,350	s.f.	752	376	376	7	6	1	63	52	11
931	Quality Restaurant	8,350	s.f.	752	376	376	7	6	1	63	52	11
932	High-Turnover (Sit Down) Restaurant	8,350	s.f.	1,062	531	531	90	50	40	82	49	33
934	Fast Food Restaurant with Drive-Through	4,500	s.f.	2,234	1,117	1,117	204	104	100	147	76	71
934	Fast Food Restaurant with Drive-Through	4,050	s.f.	2,010	1,005	1,005	184	94	90	132	69	63
	Subtotal			**18,274**	**9,137**	**9,137**	**785**	**422**	**363**	**1,230**	**665**	**565**

***Rate was used due to the small square footage**

AECOM

JOB TITLE _____

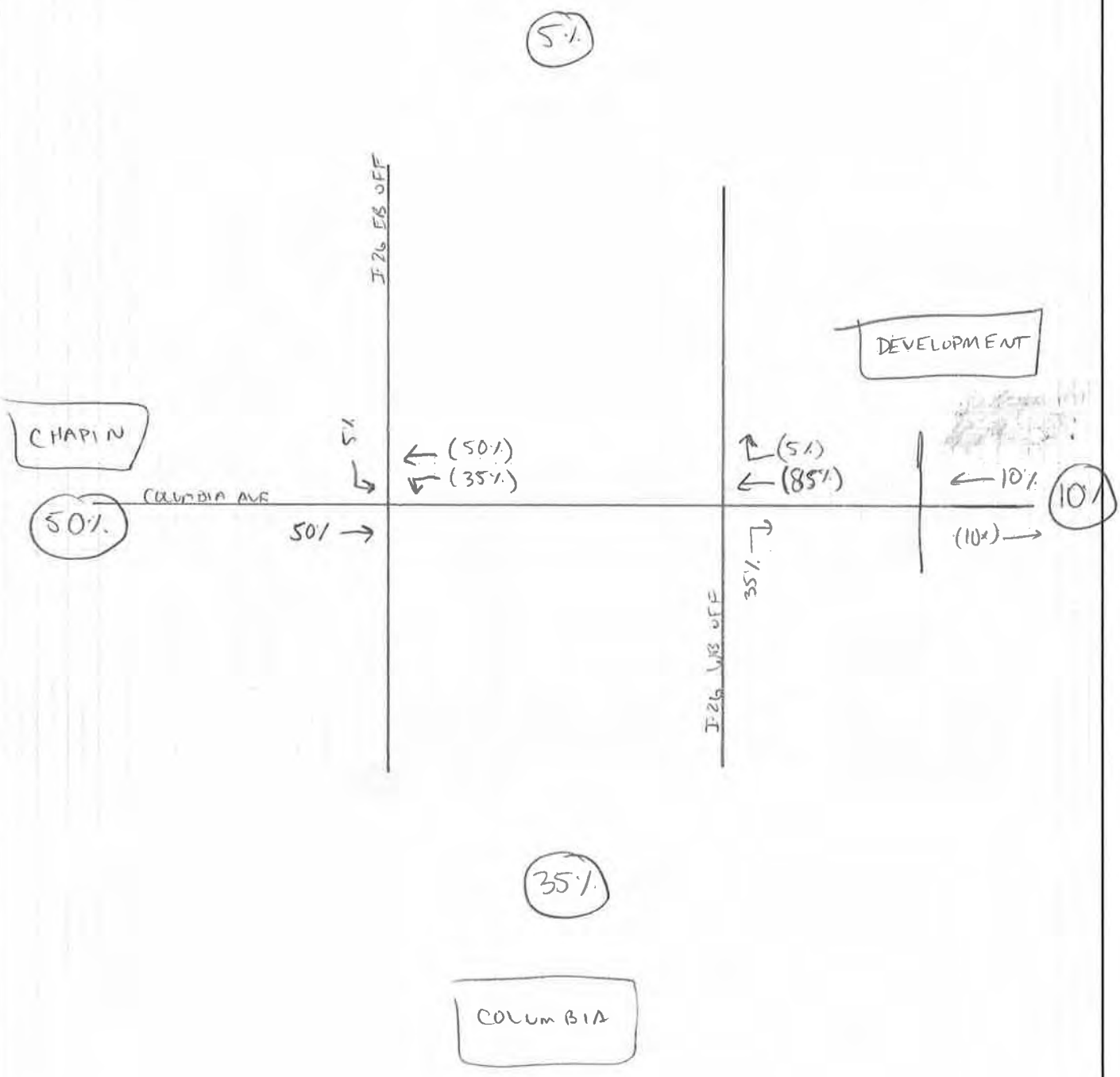
JOB NO. _____ CALCULATION NO. _____

ORIGINATOR _____ DATE _____

REVIEWER _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

TRIP DISTRIBUTION



Grid: 10x10 = 1"

AECOM

JOB TITLE _____

JOB NO. _____ CALCULATION NO. _____

ORIGINATOR _____ DATE _____

REVIEWER _____ DATE _____

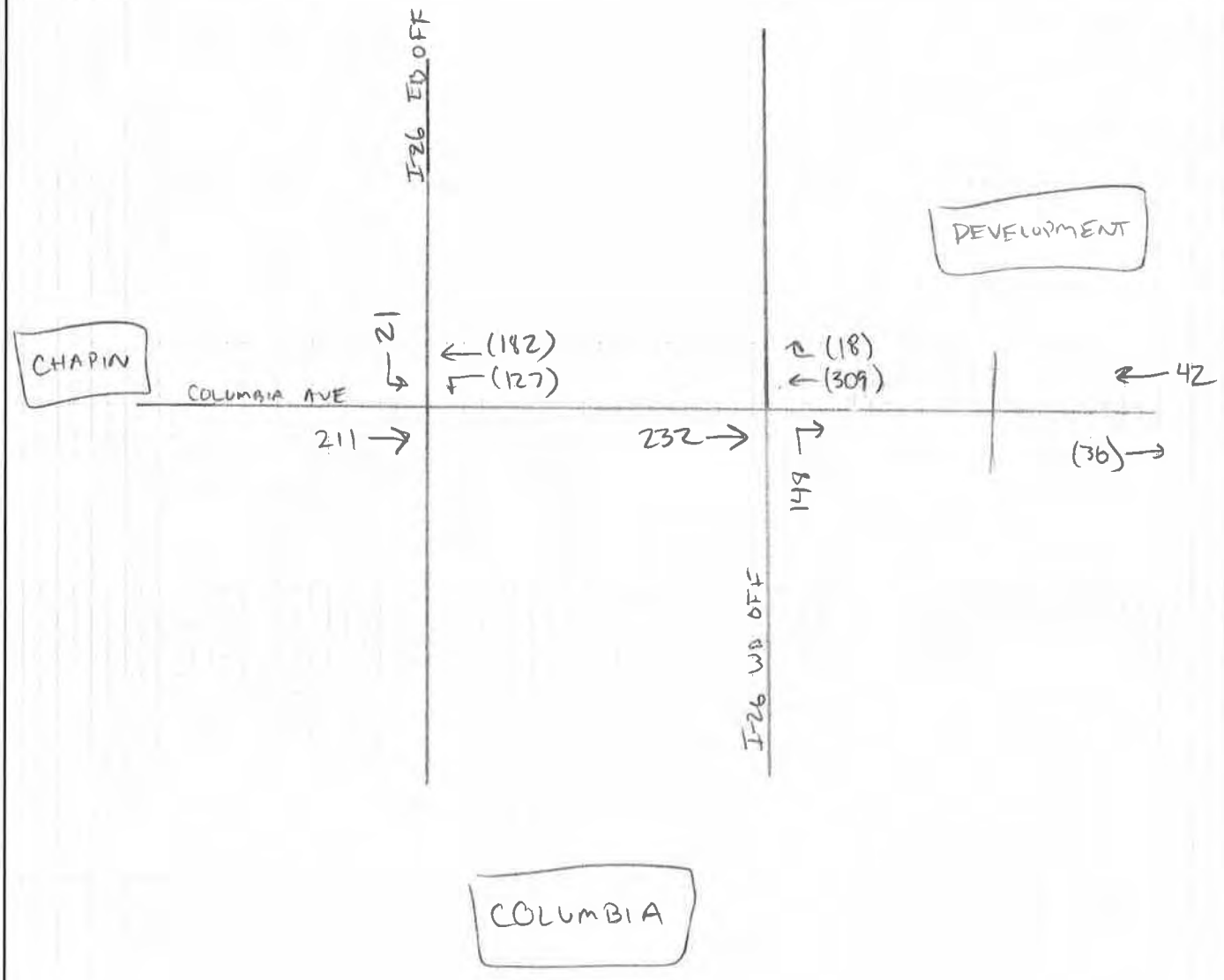
SCALE _____ SHEET NO. _____ OF _____

AM PEAK

TOTAL TRIP = 785

ENTER = 422

EXIT = 363



Grid: 10x10 = 1"

AECOM

JOB TITLE _____

JOB NO. _____ CALCULATION NO. _____

ORIGINATOR _____ DATE _____

REVIEWER _____ DATE _____

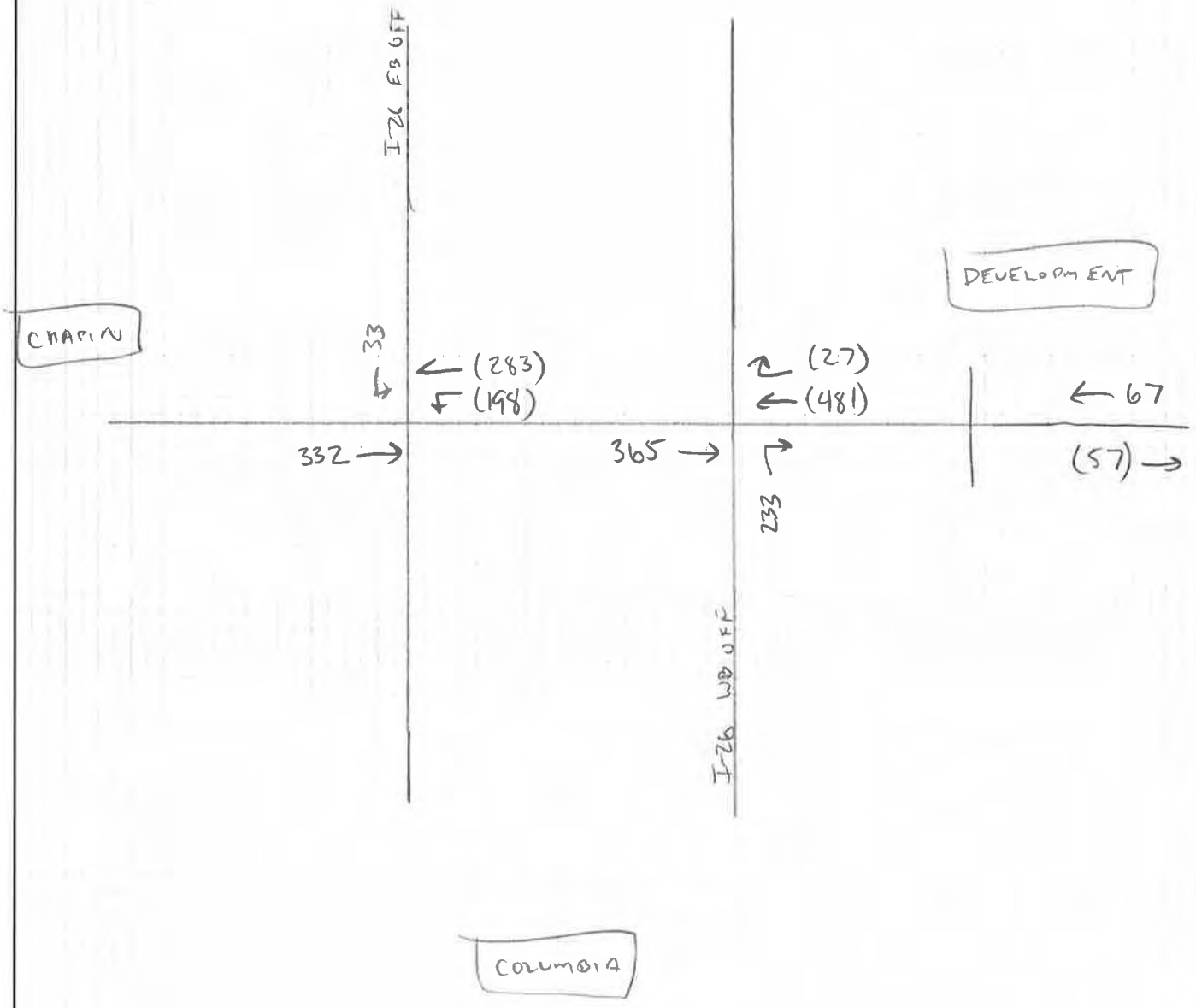
SCALE _____ SHEET NO. _____ OF _____

PM PEAK

TOTAL TRIPS = 1,230

ENTER = 665

EXIT = 565



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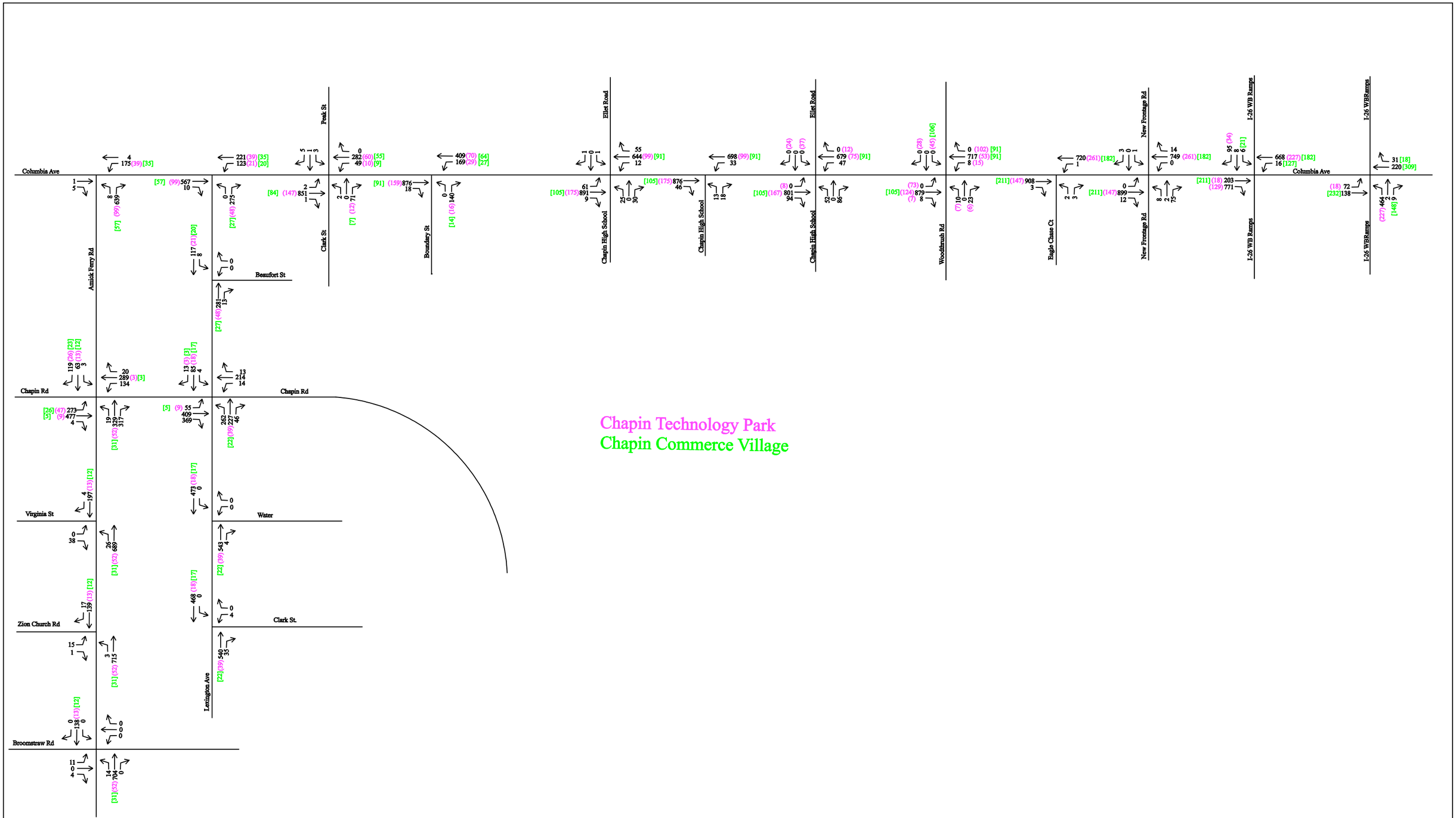
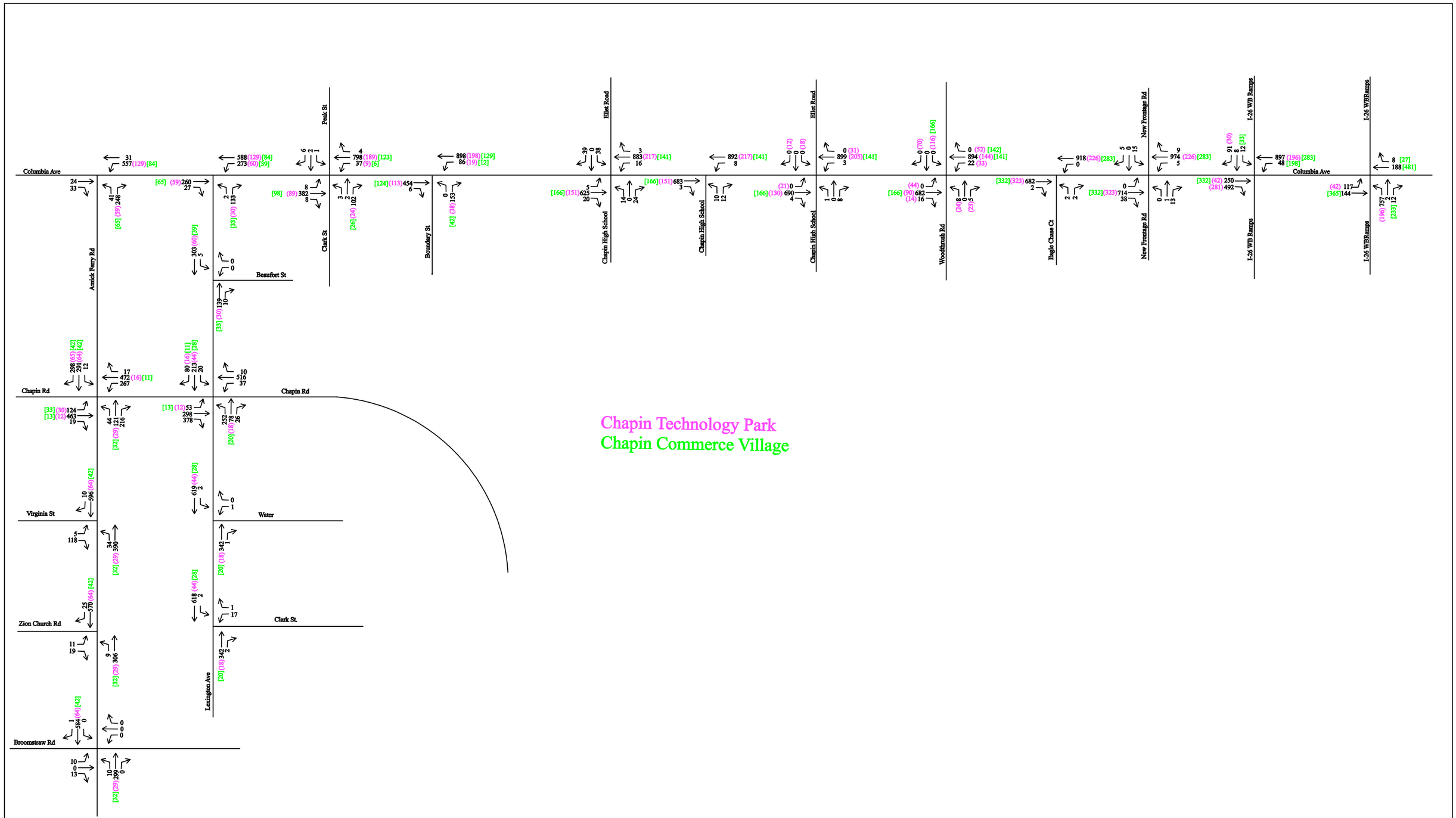


2020 No-Build AM Peak
Traffic Forecast Development

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2020 No-Build PM Peak
Traffic Forecast Development

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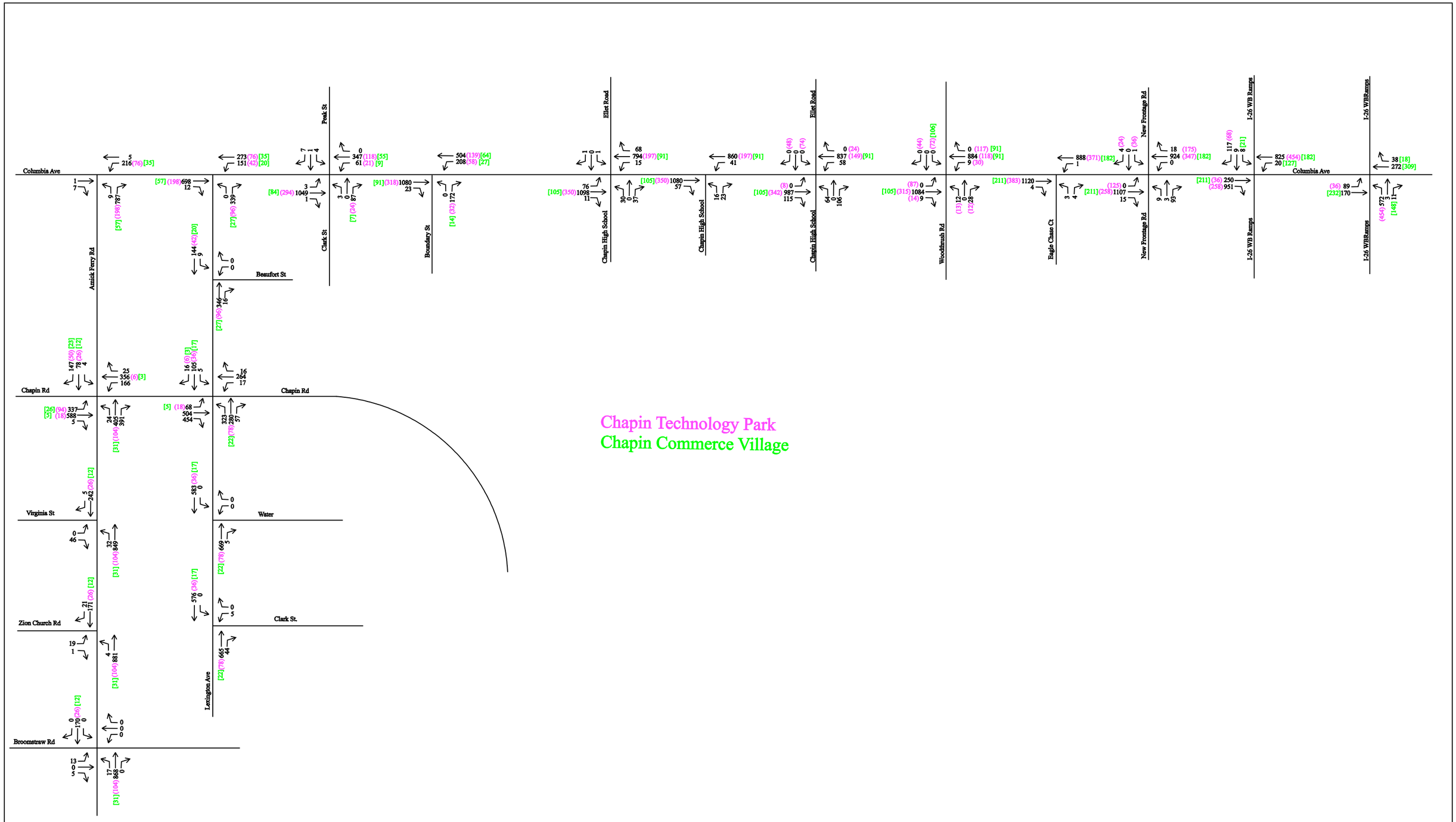
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2040 No-Build AM Peak
Traffic Forecast Development

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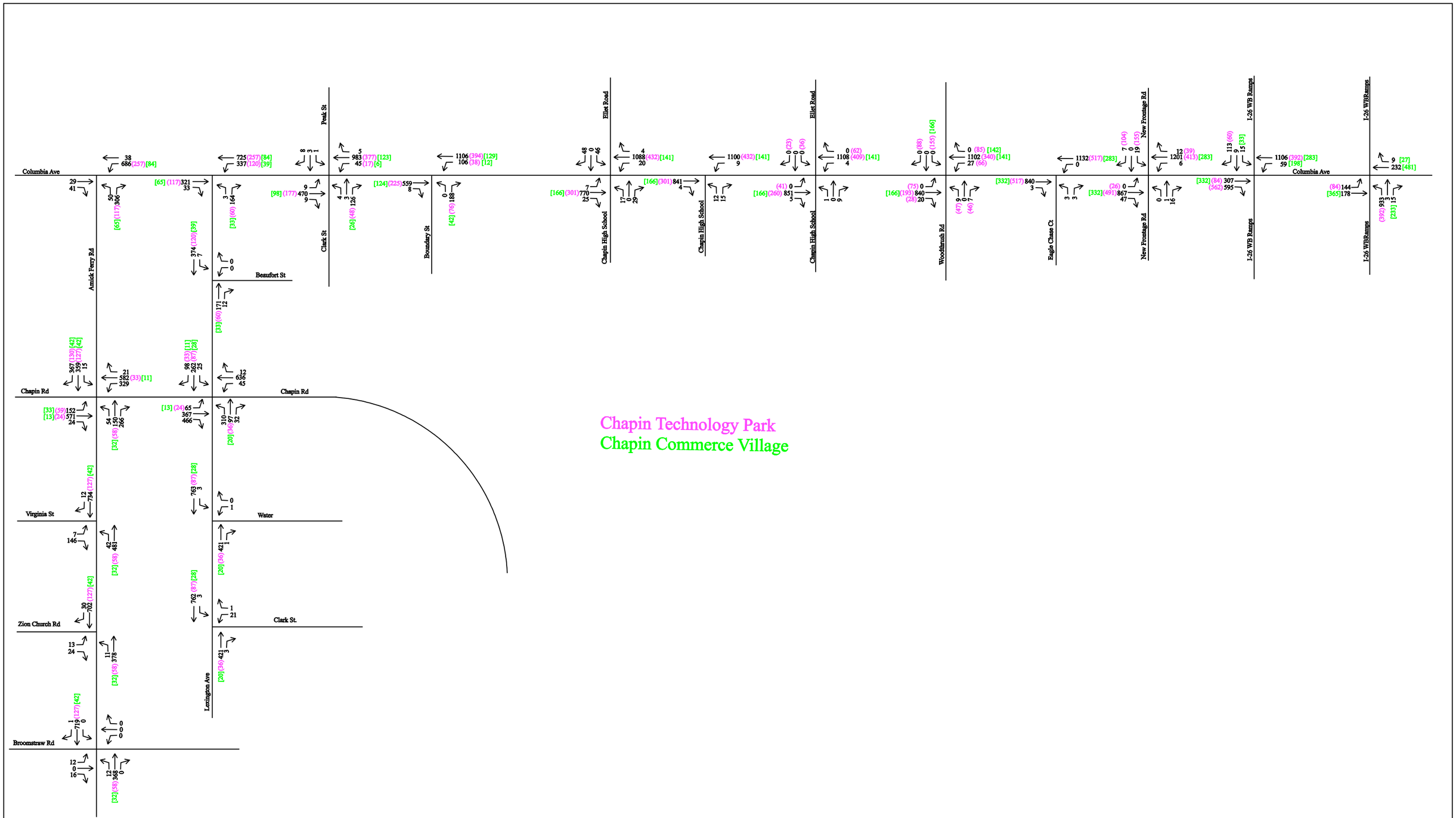
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2040 No-Build PM Peak Traffic Forecast Development

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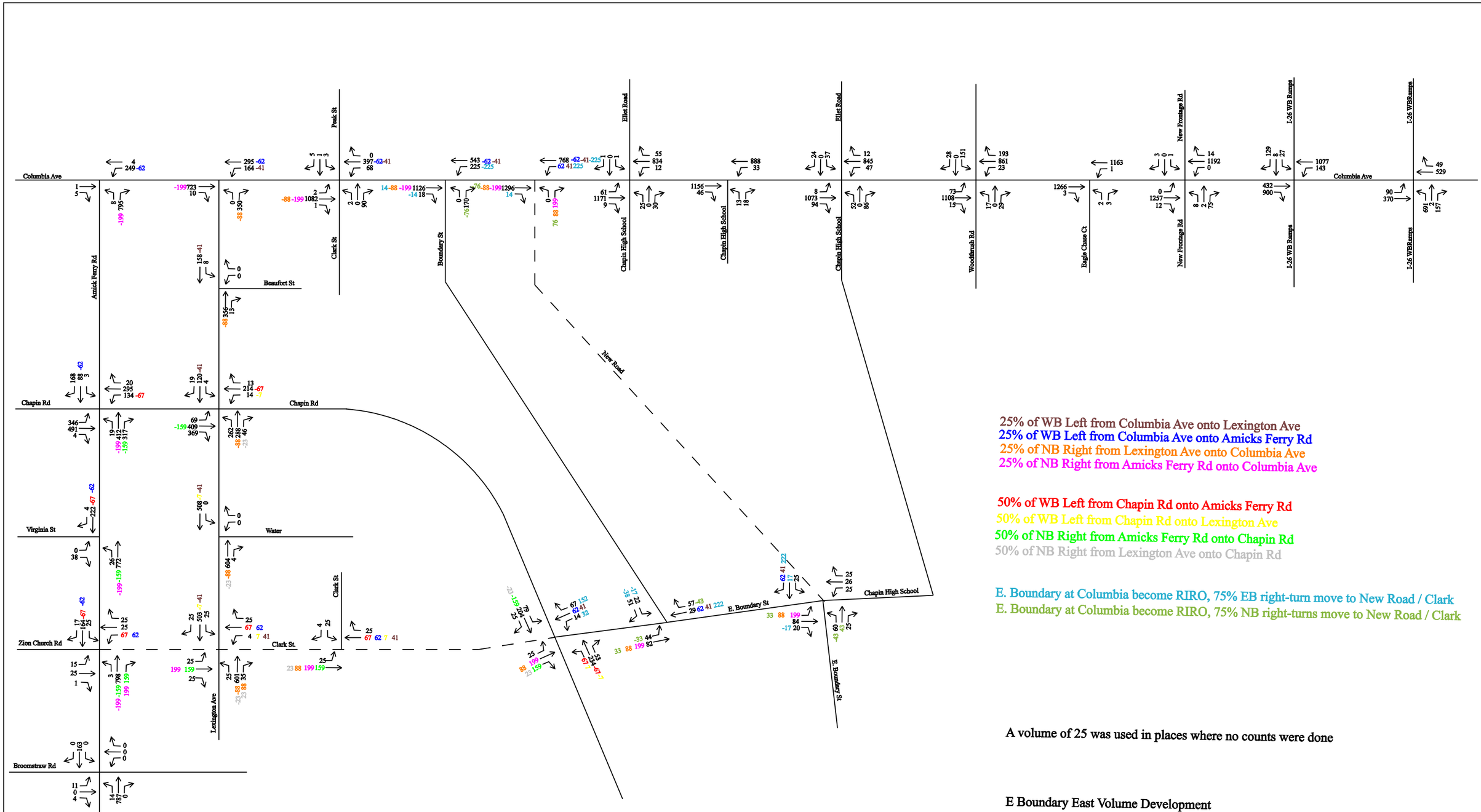
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



25% of WB Left from Columbia Ave onto Lexington Ave
25% of WB Left from Columbia Ave onto Amicks Ferry Rd
25% of NB Right from Lexington Ave onto Columbia Ave
25% of NB Right from Amicks Ferry Rd onto Columbia Ave

50% of WB Left from Chapin Rd onto Amicks Ferry Rd
50% of WB Left from Chapin Rd onto Lexington Ave
50% of NB Right from Amicks Ferry Rd onto Chapin Rd
50% of NB Right from Lexington Ave onto Chapin Rd

E. Boundary at Columbia become RIRO, 75% EB right-turn move to New Road / Clark
E. Boundary at Columbia become RIRO, 75% NB right-turns move to New Road / Clark

A volume of 25 was used in places where no counts were done

E Boundary East Volume Development

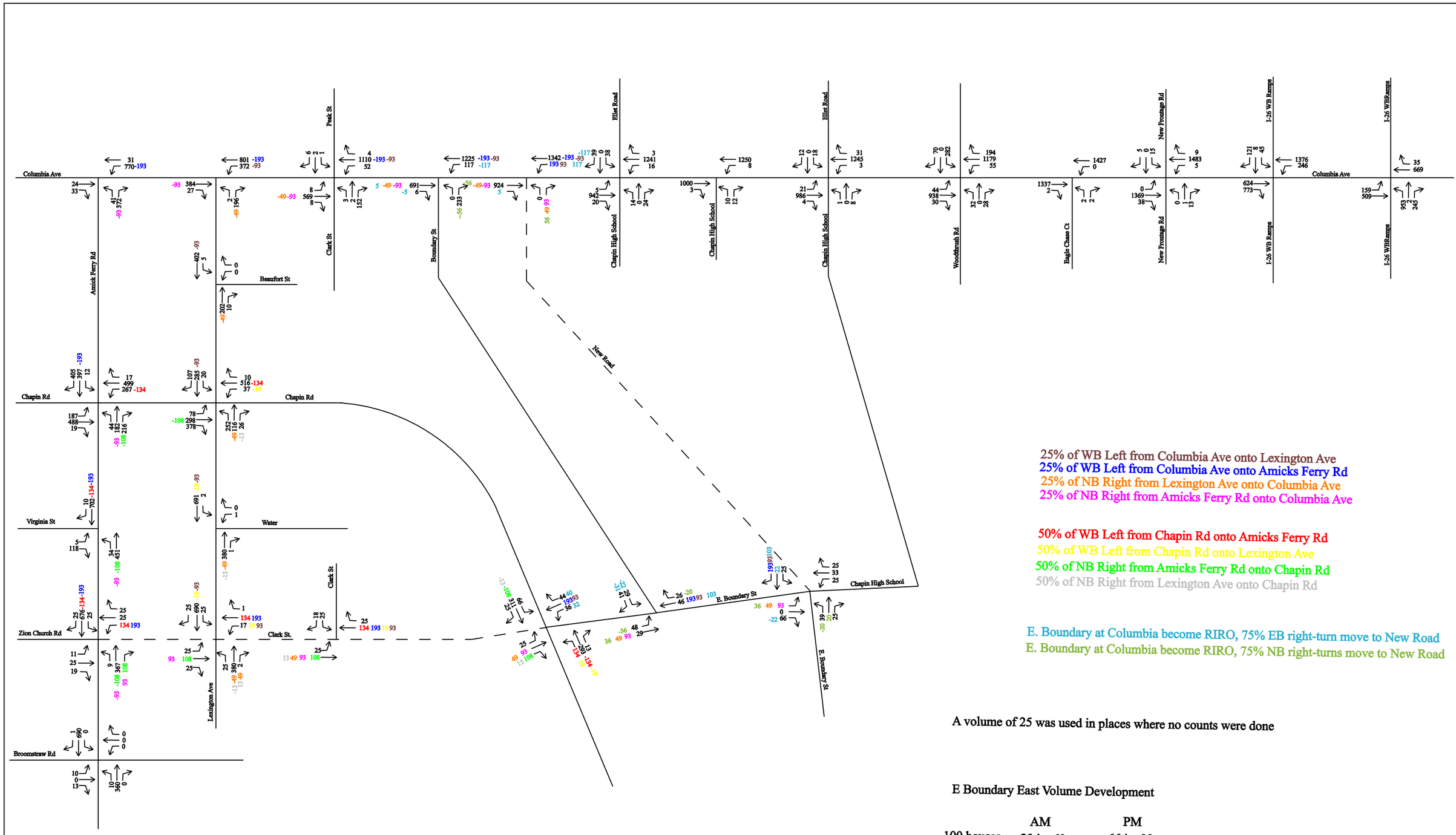
	AM	PM
100 houses	20 in, 60 out	66 in, 39 out

AECOM

2020 Alternative 9A
AM Peak Traffic Forecast Development

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

N
Not to Scale



25% of WB Left from Columbia Ave onto Lexington Ave
25% of WB Left from Columbia Ave onto Amicks Ferry Rd
25% of NB Right from Lexington Ave onto Columbia Ave
25% of NB Right from Amicks Ferry Rd onto Columbia Ave

50% of WB Left from Chapin Rd onto Amicks Ferry Rd
50% of WB Left from Chapin Rd onto Lexington Ave
50% of NB Right from Amicks Ferry Rd onto Chapin Rd
50% of NB Right from Lexington Ave onto Chapin Rd

E. Boundary at Columbia become RIRO, 75% EB right-turn move to New Road
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A volume of 25 was used in places where no counts were done

E Boundary East Volume Development

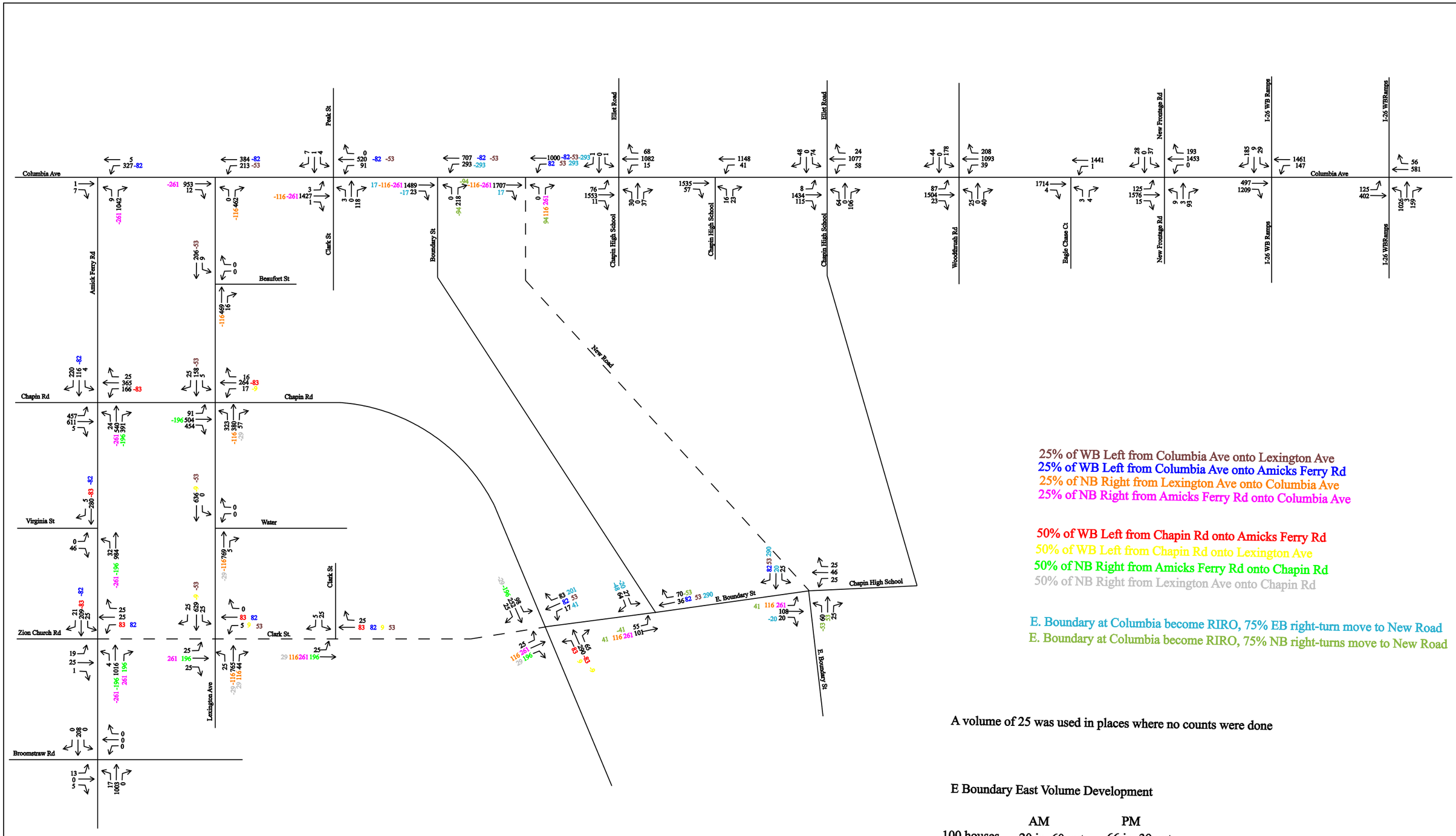
	AM	PM
100 houses	20 in, 60 out	66 in, 39 out

AECOM

2020 Alternative 9A
PM Peak Traffic Forecast Development

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

N
Not to Scale



25% of WB Left from Columbia Ave onto Lexington Ave
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25% of NB Right from Lexington Ave onto Columbia Ave
25% of NB Right from Amicks Ferry Rd onto Columbia Ave

50% of WB Left from Chapin Rd onto Amicks Ferry Rd
50% of WB Left from Chapin Rd onto Lexington Ave
50% of NB Right from Amicks Ferry Rd onto Chapin Rd
50% of NB Right from Lexington Ave onto Chapin Rd

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A volume of 25 was used in places where no counts were done

E Boundary East Volume Development

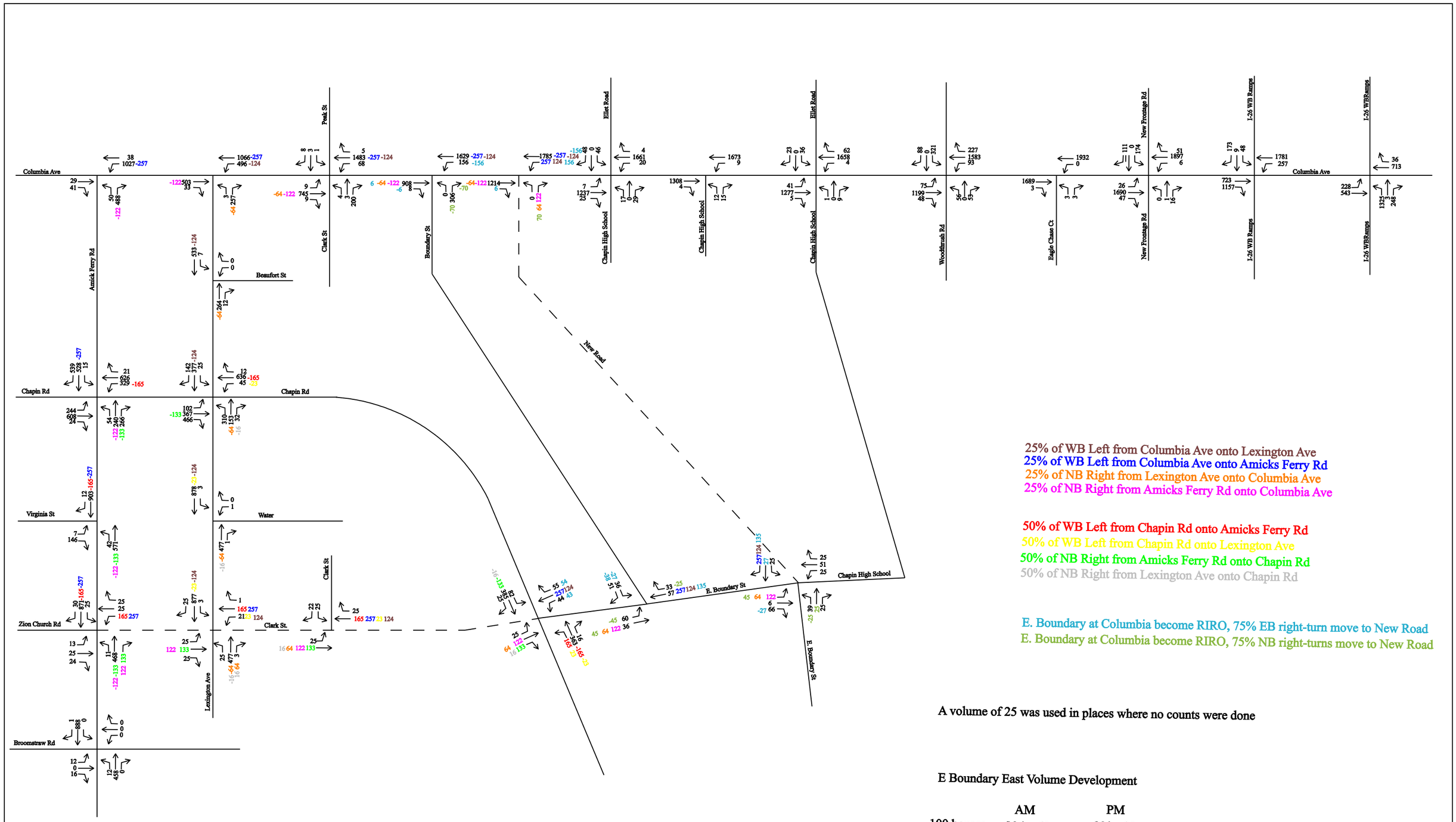
	AM	PM
100 houses	20 in, 60 out	66 in, 39 out

AECOM

2040 Alternative 9A
AM Peak Traffic Forecast Development

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

N
Not to Scale



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25% of NB Right from Lexington Ave onto Columbia Ave
25% of NB Right from Amicks Ferry Rd onto Columbia Ave

50% of WB Left from Chapin Rd onto Amicks Ferry Rd
50% of WB Left from Chapin Rd onto Lexington Ave
50% of NB Right from Amicks Ferry Rd onto Chapin Rd
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A volume of 25 was used in places where no counts were done

E Boundary East Volume Development

	AM	PM
100 houses	20 in, 60 out	66 in, 39 out

AECOM

2040 Alternative 9A
PM Peak Traffic Forecast Development

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

N
Not to Scale

Final Traffic Projection Figures

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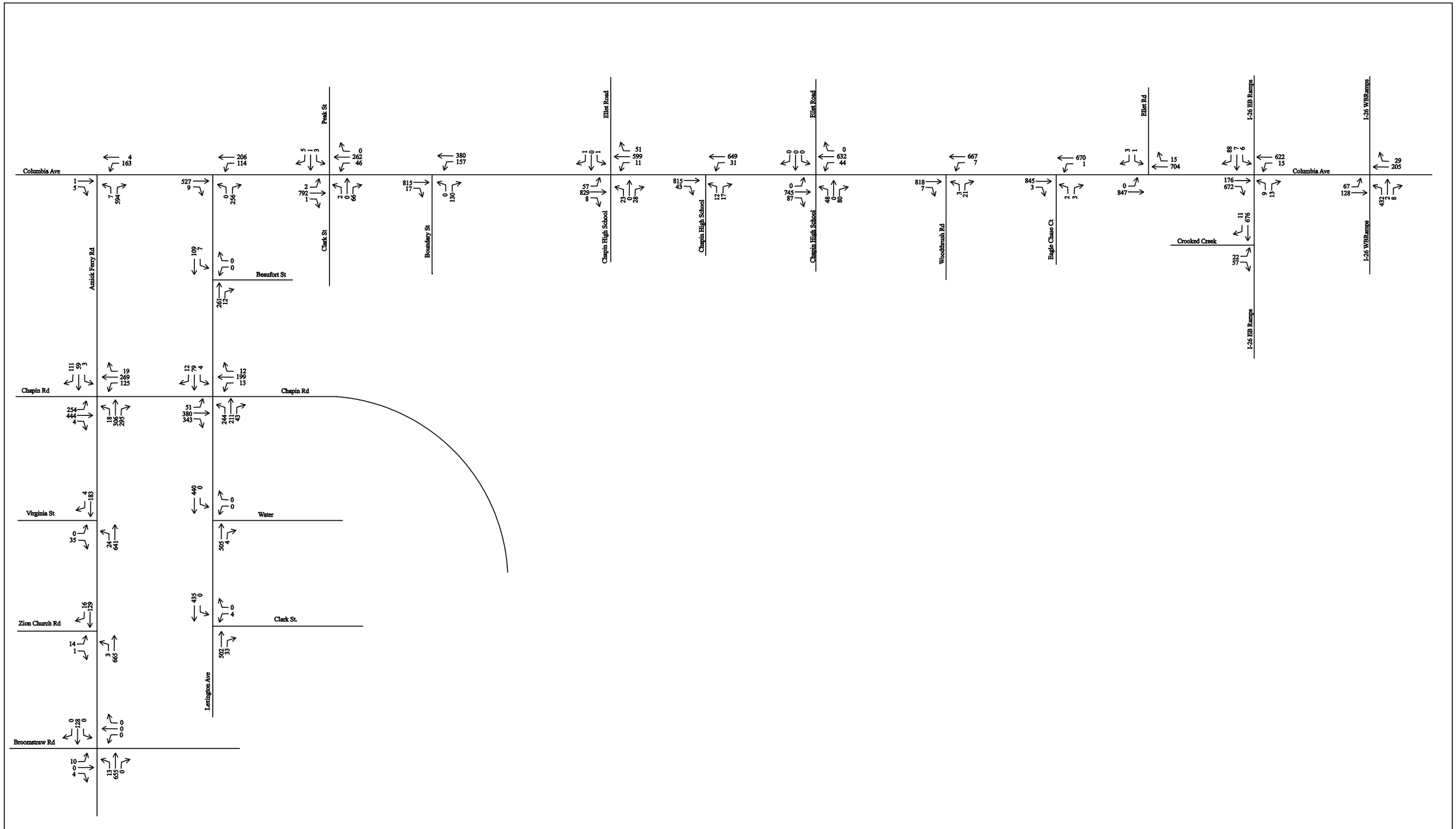
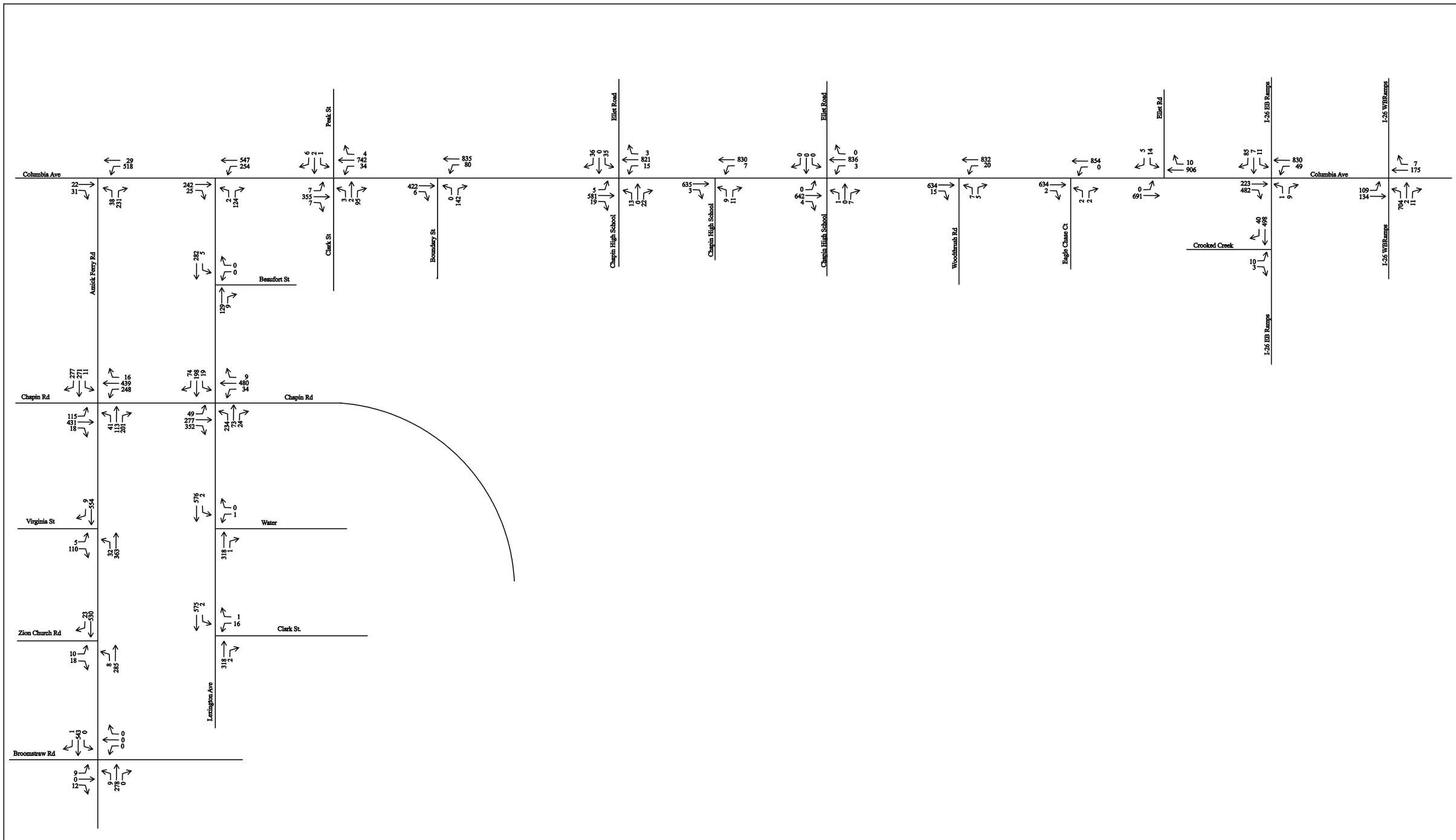


2014 Existing AM Peak Traffic Volumes

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2014 Existing PM Peak Traffic Volumes

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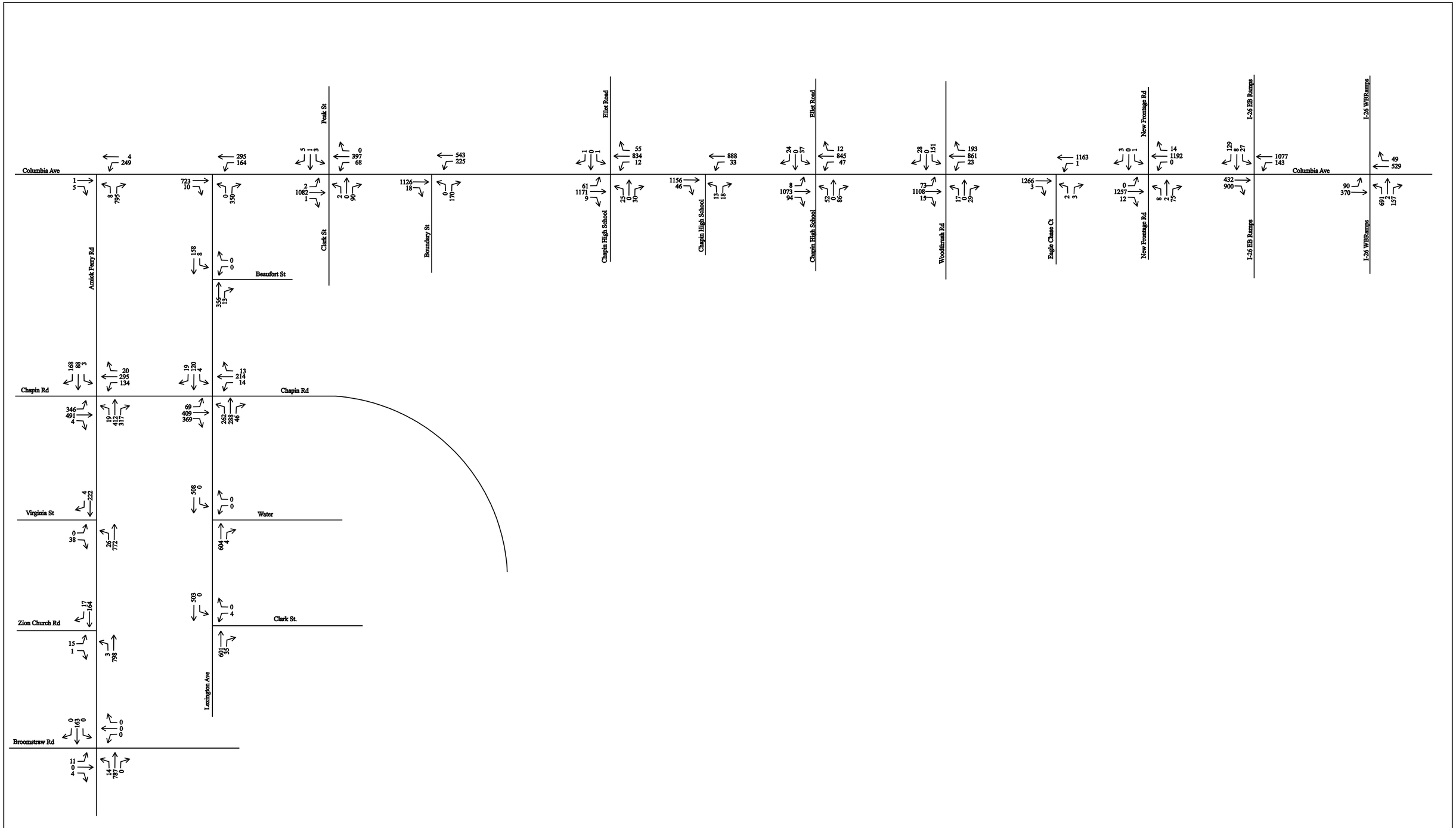
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2020 No-Build
AM Peak Traffic Forecast

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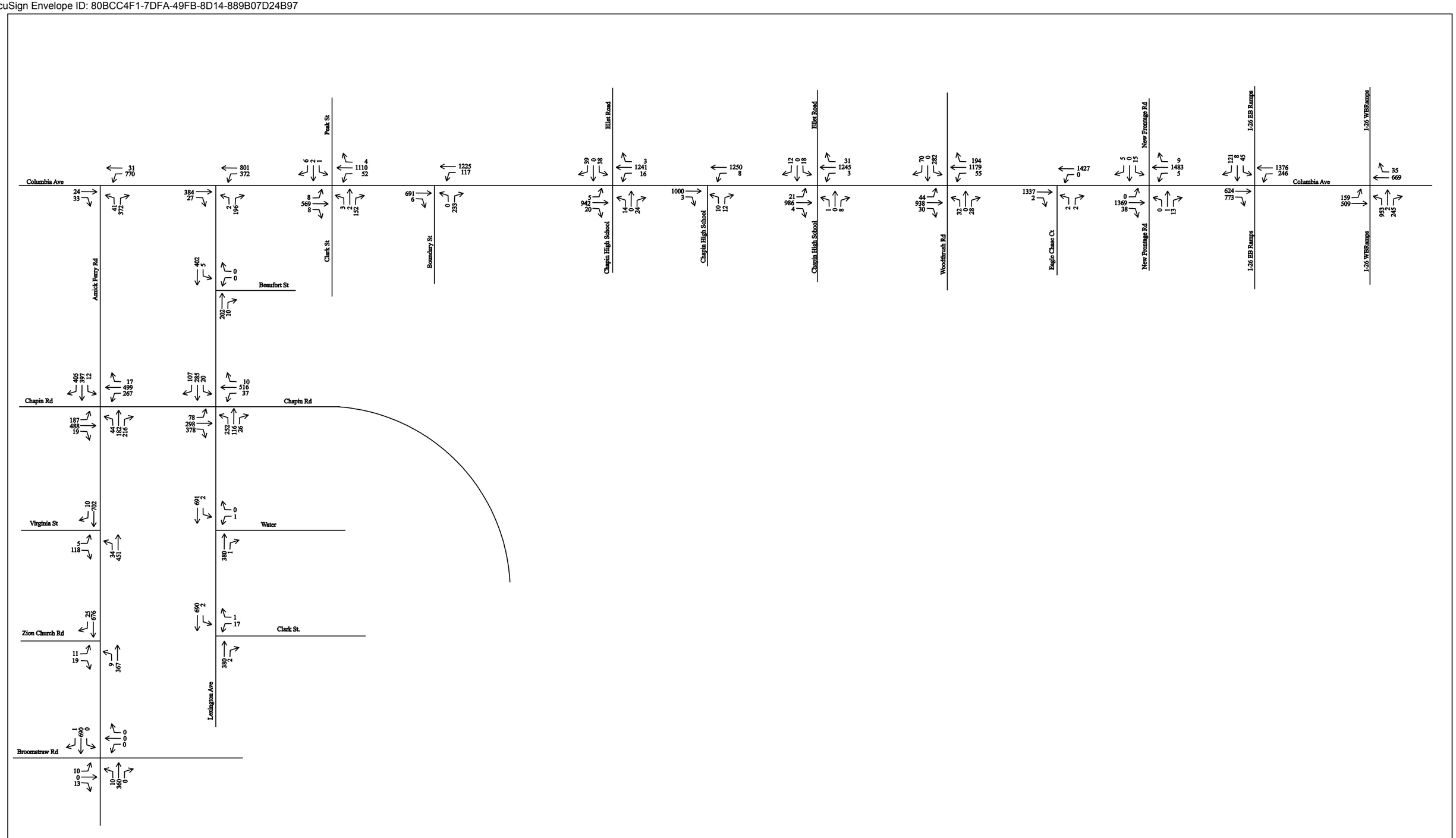
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2020 No-Build
PM Peak Traffic Forecast

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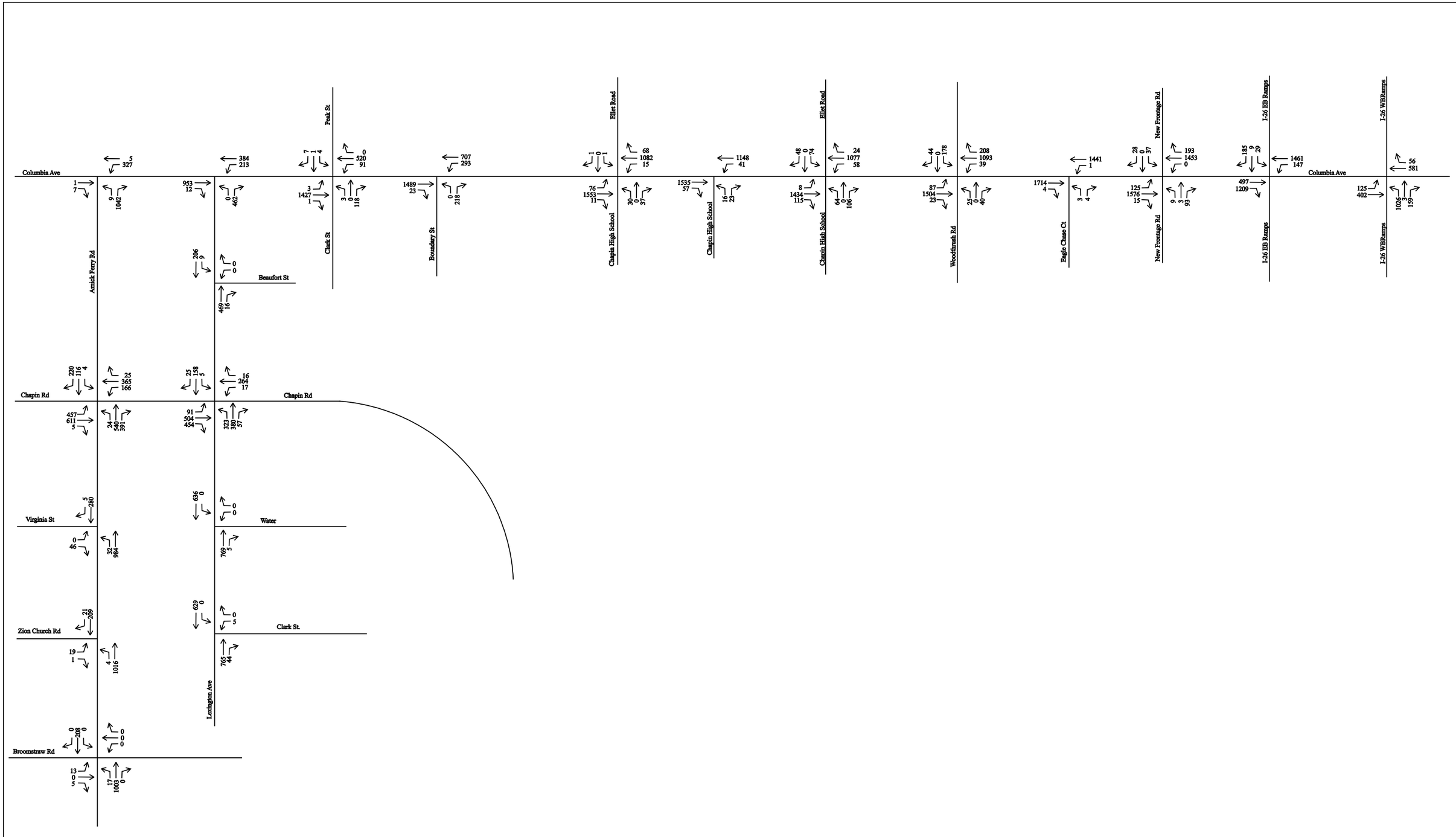
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2040 No-Build
AM Peak Traffic Forecast

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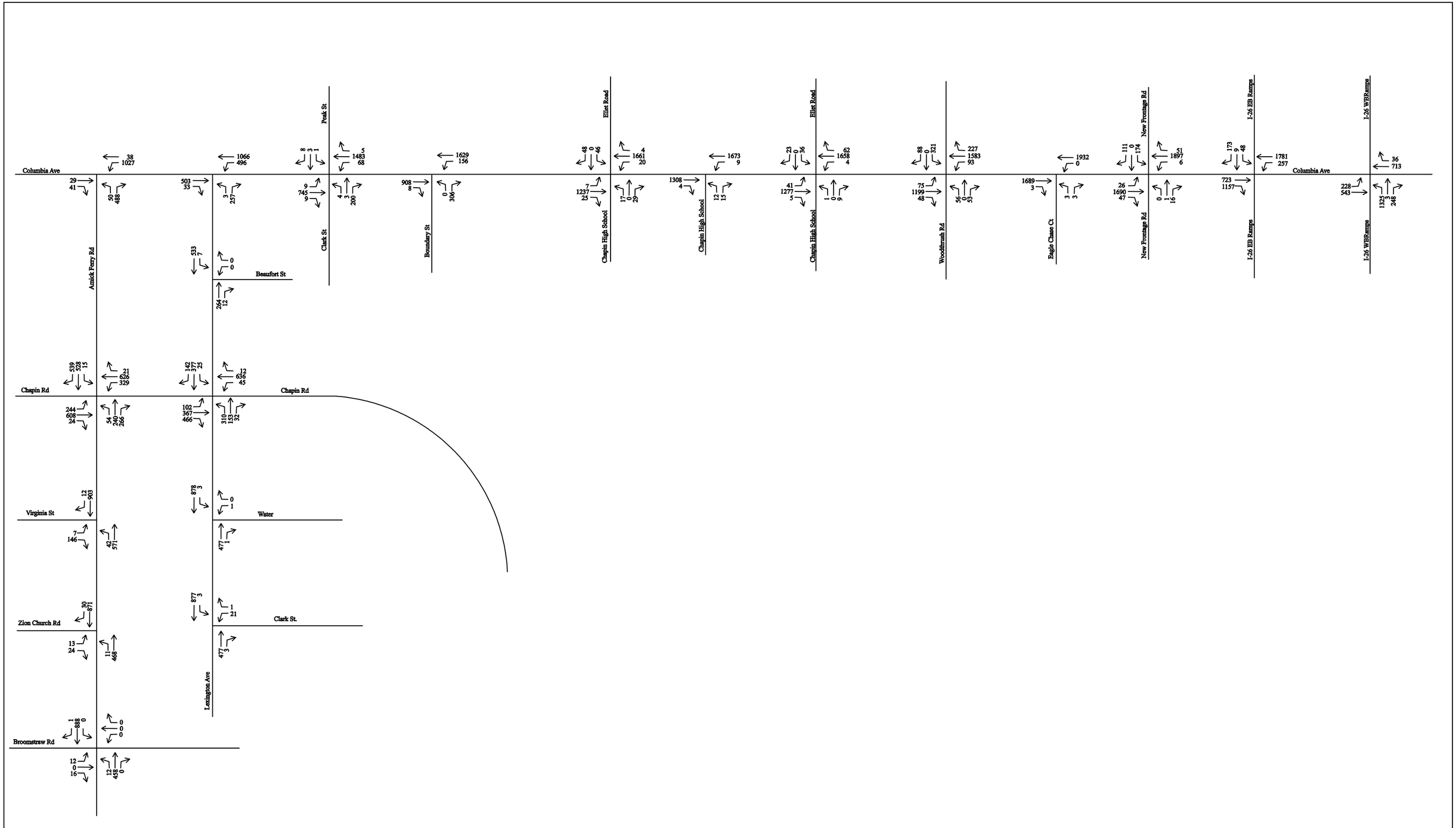
S-48 (Columbia Avenue)
Corridor Improvement Project

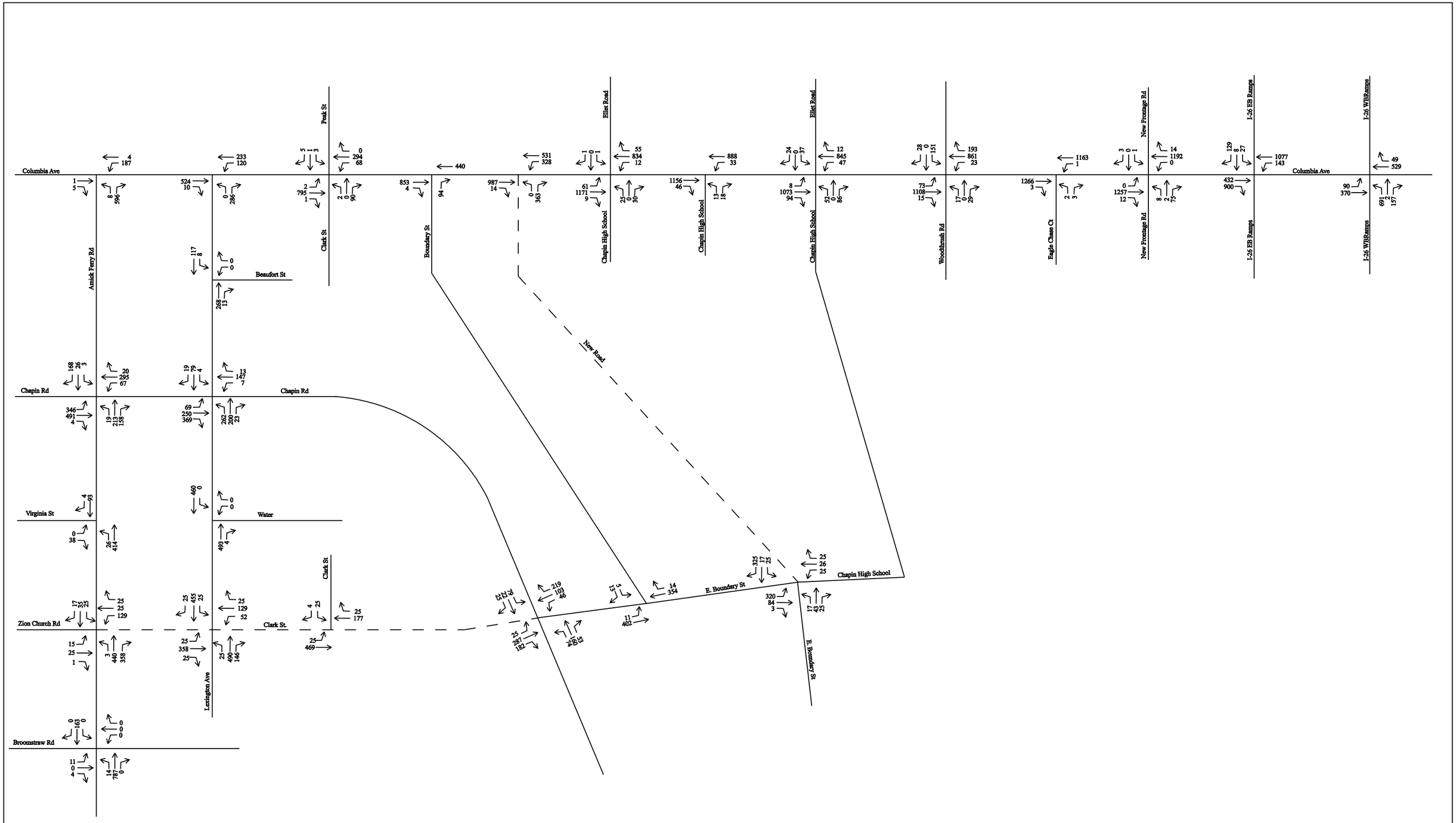
Not to Scale



2040 No-Build
PM Peak Traffic Forecast

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2020 Alternative 9A
AM Peak Traffic Forecast

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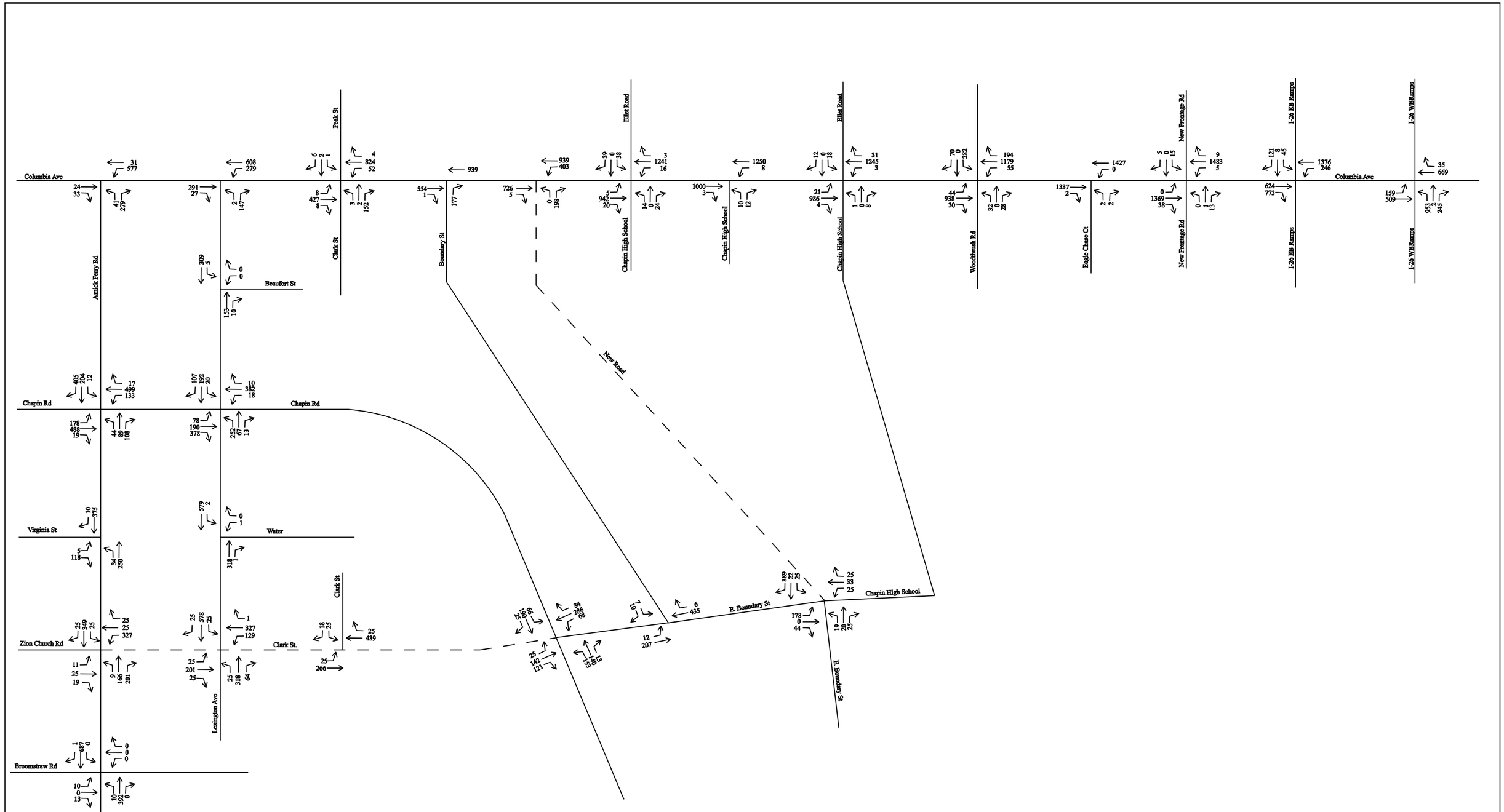
S-48 (Columbia Avenue)
Corridor Improvement Project

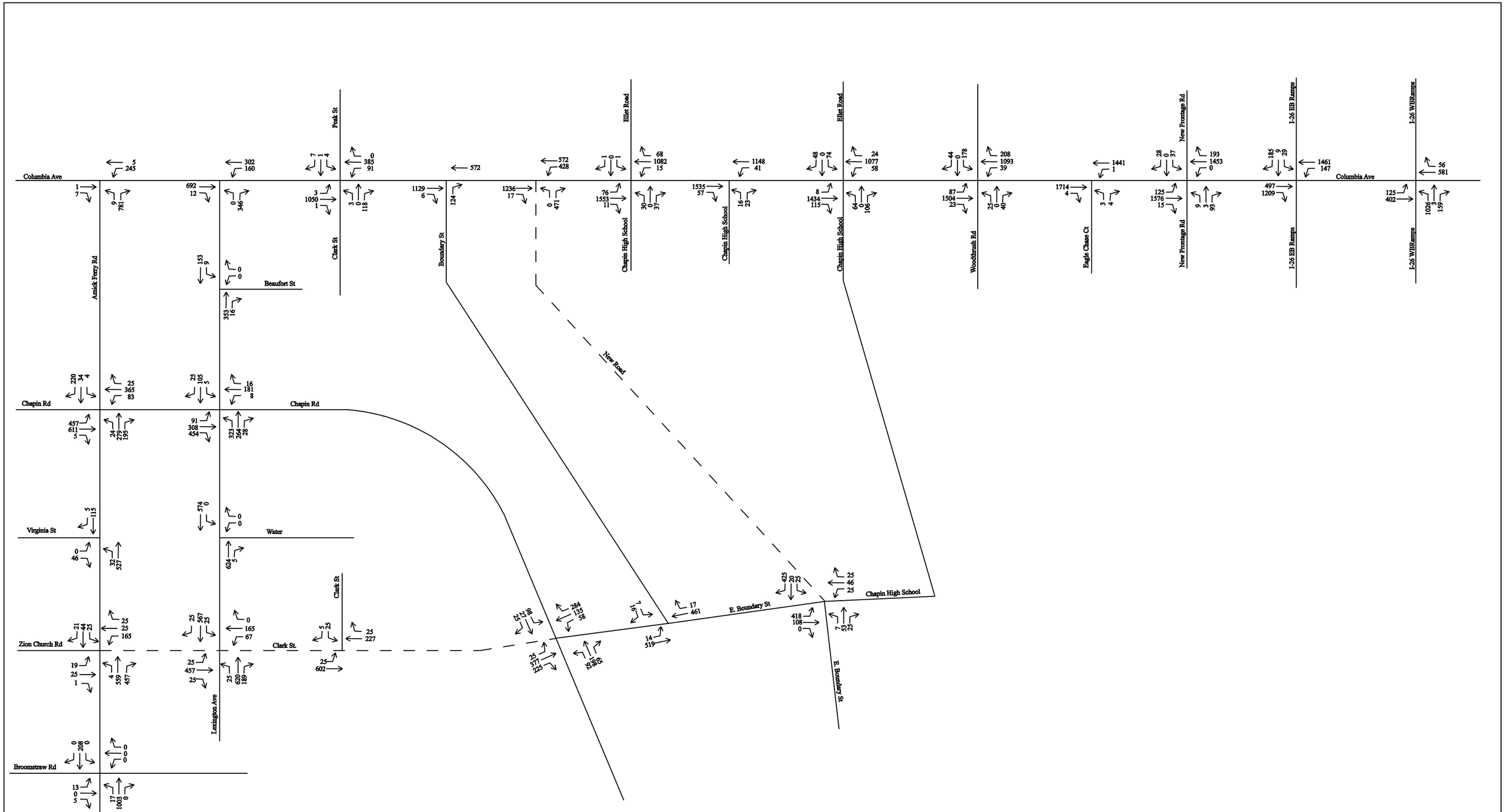
Not to Scale



2020 Alternative 9A
PM Peak Traffic Forecast

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

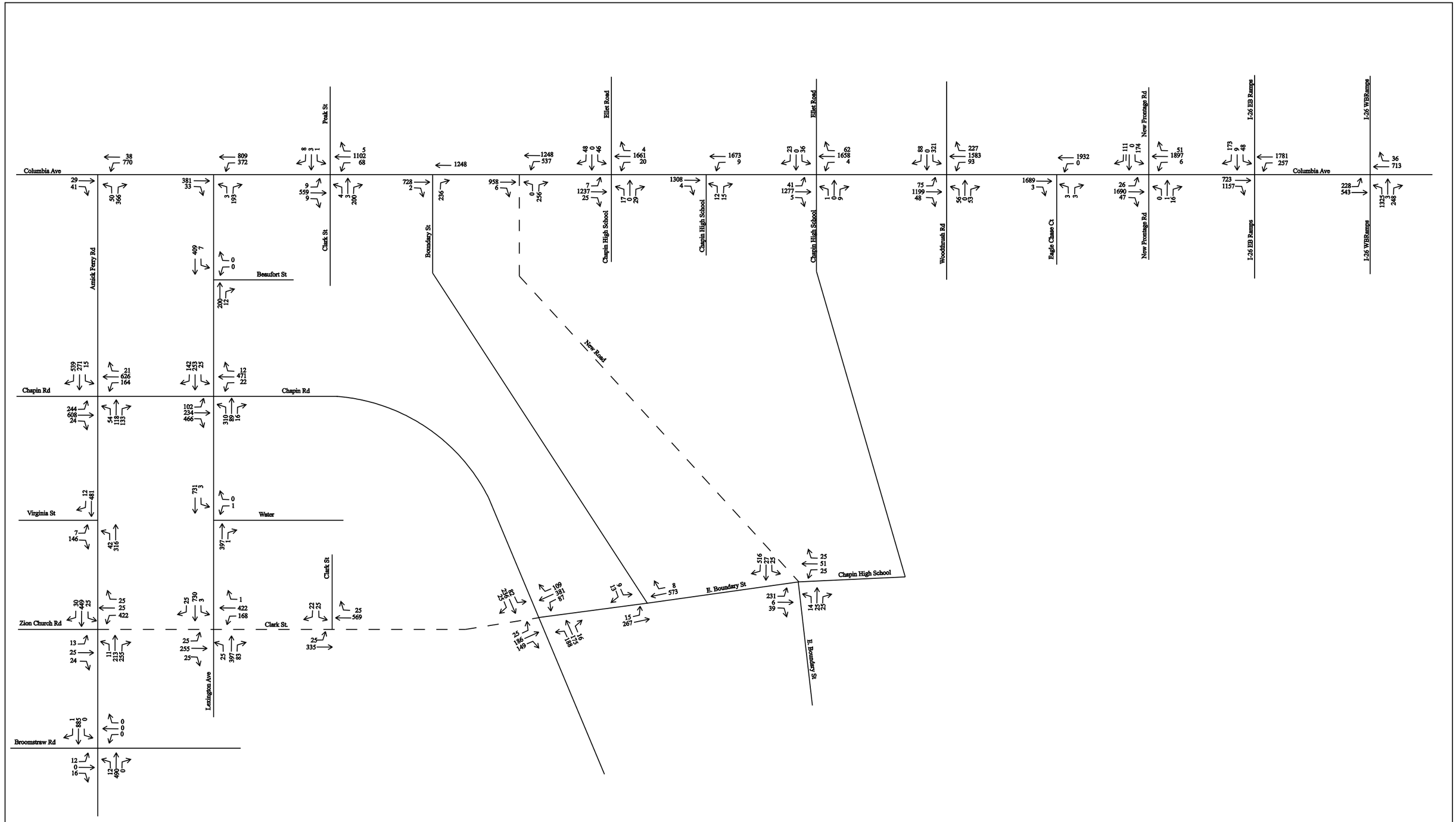
Not to Scale



2040 Alternative 9A
AM Peak Traffic Forecast

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale



2040 Alternative 9A
PM Peak Traffic Forecast

SCDOT Project ID: P042383
S-48 (Columbia Avenue)
Corridor Improvement Project

Not to Scale

APPENDIX B

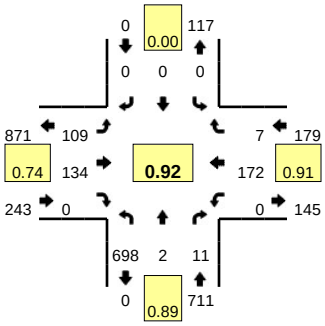
TRAFFIC COUNTS

Type of peak hour being reported: Intersection Peak

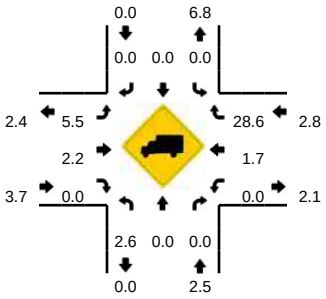
Method for determining peak hour: Total Entering Volume

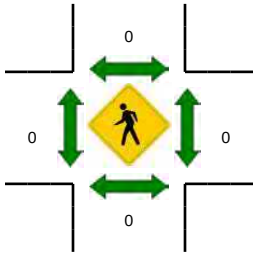
LOCATION: I-26 WB Ramps -- Columbia Ave
CITY/STATE: Chapin, SC

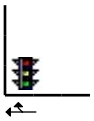
QC JOB #: 12491433
DATE: Tue, May 13 2014

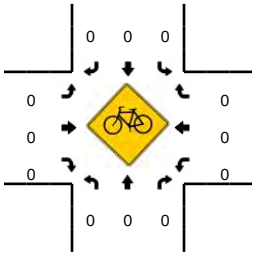


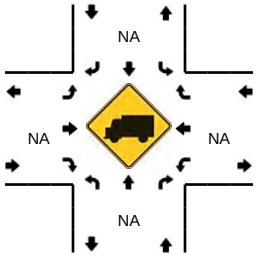
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

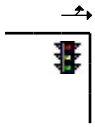


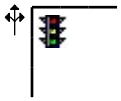


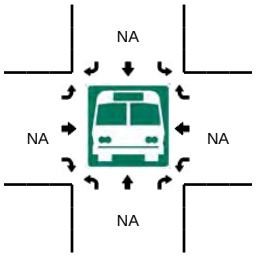












15-Min Count Period Beginning At	I-26 WB Ramps (Northbound)				I-26 WB Ramps (Southbound)				Columbia Ave (Eastbound)				Columbia Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:30 PM	75	0	1	0	0	0	0	0	17	13	0	0	0	16	0	0	122	525
12:45 PM	68	0	3	0	0	0	0	0	17	15	0	0	0	16	4	0	123	509
1:00 PM	83	1	2	0	0	0	0	0	10	21	0	0	0	17	0	0	134	498
1:15 PM	71	0	2	0	0	0	0	0	17	14	0	0	0	15	1	0	120	499
1:30 PM	82	0	3	0	0	0	0	0	18	9	0	0	0	26	0	0	138	515
1:45 PM	74	0	3	0	0	0	0	0	15	23	0	0	0	22	4	0	141	533
2:00 PM	74	2	3	0	0	0	0	0	23	24	0	0	0	14	3	0	143	542
2:15 PM	94	1	4	0	0	0	0	0	21	19	0	0	0	18	2	0	159	581
2:30 PM	89	0	1	0	0	0	0	0	18	14	0	0	0	19	1	0	142	585
2:45 PM	97	0	0	0	0	0	0	0	19	18	0	0	0	22	1	0	157	601
3:00 PM	97	0	1	0	0	0	0	0	14	23	0	0	0	23	2	0	160	618
3:15 PM	105	0	2	0	0	0	0	0	18	19	0	0	0	24	4	0	172	631
3:30 PM	90	1	2	0	0	0	0	0	16	24	0	0	0	59	4	0	196	685
3:45 PM	101	0	2	0	0	0	0	0	25	68	0	0	0	40	2	0	238	766
4:00 PM	120	0	2	0	0	0	0	0	23	60	0	0	0	22	5	0	232	838
4:15 PM	150	0	2	0	0	0	0	0	16	30	0	0	0	32	2	0	232	898
4:30 PM	155	0	2	0	0	0	0	0	22	31	0	0	0	38	5	0	253	955
4:45 PM	166	1	2	0	0	0	0	0	27	37	0	0	0	39	1	0	273	990
5:00 PM	177	1	4	0	0	0	0	0	29	31	0	0	0	41	1	0	284	1042
5:15 PM	200	0	3	0	0	0	0	0	24	35	0	0	0	44	1	0	307	1117
5:30 PM	155	0	2	0	0	0	0	0	28	31	0	1	0	48	4	0	269	1133
5:45 PM	172	3	2	0	0	0	0	0	22	32	0	0	0	39	1	0	271	1131
6:00 PM	142	0	2	0	0	0	0	0	16	23	0	0	0	33	1	0	217	1064
6:15 PM	147	0	4	0	0	0	0	0	16	17	0	0	0	24	0	0	208	965

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	800	0	12	0	0	0	0	0	96	140	0	0	0	176	4	0	1228
Heavy Trucks	8	0	0		0	0	0		4	0	0		0	8	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

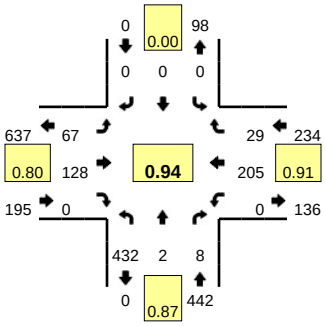
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

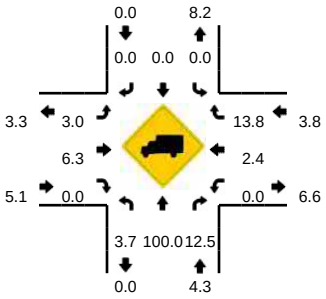
Method for determining peak hour: Total Entering Volume

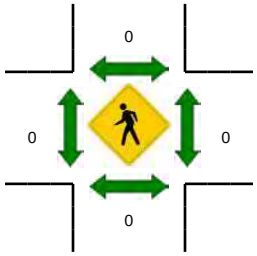
LOCATION: I-26 WB Ramps -- Columbia Ave
CITY/STATE: Chapin, SC

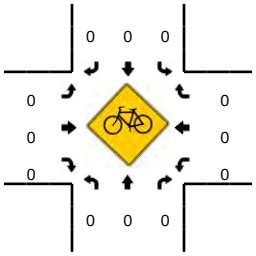
QC JOB #: 12491434
DATE: Tue, May 13 2014

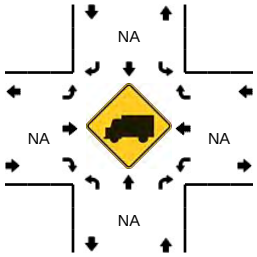


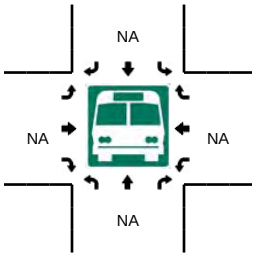
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM











15-Min Count Period Beginning At	I-26 WB Ramps (Northbound)				I-26 WB Ramps (Southbound)				Columbia Ave (Eastbound)				Columbia Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	56	1	2	0	0	0	0	0	16	15	0	0	0	18	3	0	111	
6:45 AM	76	1	1	0	0	0	0	0	6	19	0	0	0	34	6	0	143	
7:00 AM	48	0	0	0	0	0	0	0	18	16	0	0	0	23	8	0	113	
7:15 AM	85	2	1	0	0	0	0	0	12	14	0	0	0	40	9	0	163	530
7:30 AM	103	0	1	0	0	0	0	0	25	22	0	0	0	52	14	0	217	636
7:45 AM	125	1	1	0	0	0	0	0	18	25	0	0	0	53	8	0	231	724
8:00 AM	106	1	4	0	0	0	0	0	16	28	0	0	0	61	4	0	220	831
8:15 AM	98	0	2	0	0	0	0	0	8	53	0	0	0	39	3	0	203	871
8:30 AM	90	0	3	0	0	0	0	0	19	24	0	0	0	28	3	0	167	821
8:45 AM	84	0	0	0	0	0	0	0	22	11	0	0	0	25	5	0	147	737
9:00 AM	77	1	1	0	0	0	0	0	17	15	0	0	0	13	5	0	129	646
9:15 AM	70	1	1	0	0	0	0	0	18	9	0	0	0	13	2	0	114	557
9:30 AM	71	0	0	0	0	0	0	0	20	7	0	0	0	17	4	0	119	509
9:45 AM	91	0	0	0	0	0	0	0	20	11	0	0	0	27	3	0	152	514
10:00 AM	53	0	0	0	0	0	0	0	16	15	0	0	0	11	0	0	95	480
10:15 AM	45	0	0	0	0	0	0	0	16	16	0	0	0	12	0	1	90	456
10:30 AM	63	0	1	0	0	0	0	0	13	8	0	0	0	20	4	0	109	446
10:45 AM	55	0	2	0	0	0	0	0	15	22	0	0	0	20	11	0	125	419
11:00 AM	60	1	2	0	0	0	0	0	10	10	0	0	0	15	3	0	101	425
11:15 AM	68	0	0	0	0	0	0	0	19	18	0	0	0	45	0	0	150	485
11:30 AM	50	0	1	0	0	0	0	0	11	27	0	0	0	24	2	0	115	491
11:45 AM	66	4	1	0	0	0	0	0	16	27	0	0	0	23	2	0	139	505
12:00 PM	79	0	0	0	0	0	0	0	26	24	0	0	0	15	1	0	145	549
12:15 PM	59	0	3	0	0	0	0	0	19	27	0	0	0	11	0	0	119	518

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	500	4	4	0	0	0	0	0	72	100	0	0	0	212	32	0	924
Heavy Trucks	28	4	0		0	0	0		4	0	0		0	4	4		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/19/2014 10:34 AM

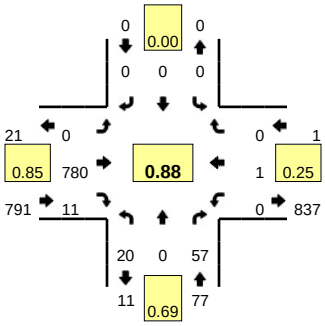
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

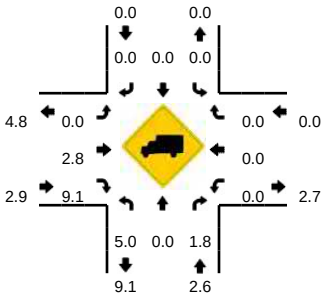
Method for determining peak hour: Total Entering Volume

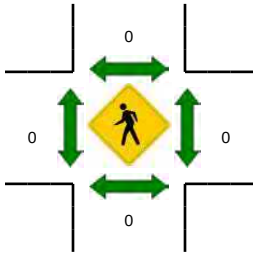
LOCATION: Crooked Creek Rd -- I-26 EB Ramps
CITY/STATE: Chapin, SC

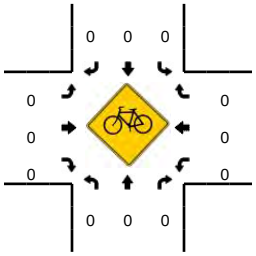
QC JOB #: 12491448
DATE: Tue, May 13 2014

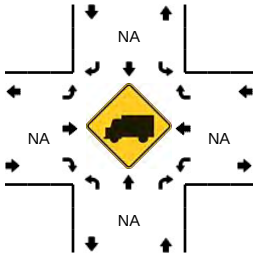


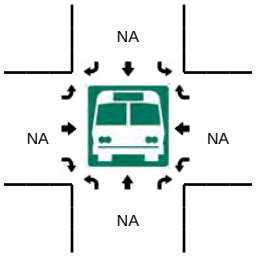
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM











15-Min Count Period Beginning At	Crooked Creek Rd (Northbound)				Crooked Creek Rd (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	3	0	0	0	0	0	0	0	0	134	0	0	0	0	0	0	137	
6:45 AM	3	0	3	0	0	0	0	0	0	152	4	0	0	0	0	0	162	
7:00 AM	2	0	10	0	0	0	0	0	0	233	1	0	0	1	0	0	247	
7:15 AM	4	0	9	0	0	0	0	0	0	182	1	0	0	0	0	0	196	742
7:30 AM	7	0	14	0	0	0	0	0	0	200	7	0	0	0	0	0	228	833
7:45 AM	7	0	24	0	0	0	0	0	0	165	2	0	0	0	0	0	198	869
8:00 AM	6	0	14	0	0	0	0	0	0	152	6	0	0	0	0	0	178	800
8:15 AM	3	0	2	0	0	0	0	0	0	147	4	0	0	0	0	0	156	760
8:30 AM	3	0	1	0	0	0	0	0	0	116	5	0	0	0	0	0	125	657
8:45 AM	1	0	0	0	0	0	0	0	0	104	8	0	0	0	0	0	113	572
9:00 AM	1	0	4	0	0	0	0	0	0	97	3	0	0	0	0	0	105	499
9:15 AM	2	0	1	0	0	0	0	0	0	107	1	0	0	0	0	0	111	454
9:30 AM	2	0	2	0	0	0	0	0	0	102	2	0	0	0	0	0	108	437
9:45 AM	2	0	1	0	0	0	0	0	0	95	2	0	0	0	0	0	100	424
10:00 AM	4	0	2	0	0	0	0	0	0	88	2	0	0	0	0	0	96	415
10:15 AM	1	0	3	0	0	0	0	0	0	71	2	0	0	0	0	0	77	381
10:30 AM	1	0	4	0	0	0	0	0	0	59	2	0	0	0	0	0	66	339
10:45 AM	4	0	0	0	0	0	0	0	0	69	3	0	0	0	0	0	76	315
11:00 AM	2	0	0	0	0	0	0	0	0	88	4	0	0	0	0	0	94	313
11:15 AM	3	0	1	0	0	0	0	0	0	84	2	0	0	0	0	0	90	326
11:30 AM	1	0	0	0	0	0	0	0	0	71	4	0	0	0	0	0	76	336
11:45 AM	1	0	1	0	0	0	0	0	0	77	4	0	0	0	0	0	83	343
12:00 PM	4	0	1	0	0	0	0	0	0	70	5	0	0	0	0	0	80	329
12:15 PM	3	0	2	0	0	0	0	0	0	85	2	0	0	0	0	0	92	331

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	0	40	0	0	0	0	0	0	932	4	0	0	4	0	0	988
Heavy Trucks	0	0	0		0	0	0		0	20	0		0	0	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/19/2014 9:26 AM

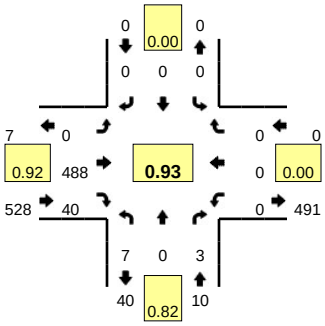
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

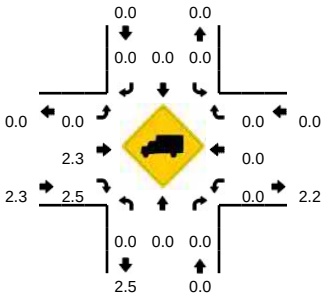
Method for determining peak hour: Total Entering Volume

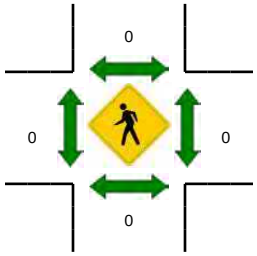
LOCATION: Crooked Creek Rd -- I-26 EB Ramp
CITY/STATE: Chapin, SC

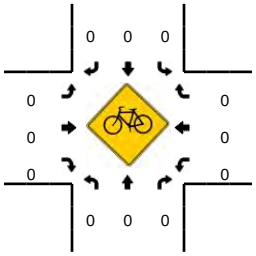
QC JOB #: 12491449
DATE: Tue, May 13 2014

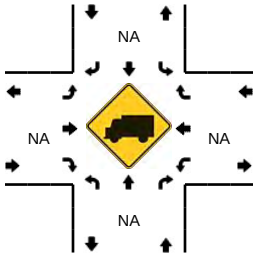


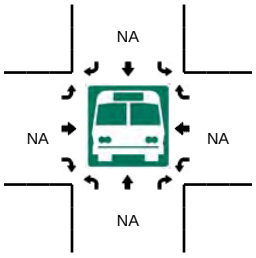
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM











15-Min Count Period Beginning At	Crooked Creek Rd (Northbound)				Crooked Creek Rd (Southbound)				I-26 EB Ramp (Eastbound)				I-26 EB Ramp (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:30 PM	1	0	0	0	0	0	0	0	0	77	2	0	0	0	0	0	80	
12:45 PM	2	0	0	0	0	0	0	0	0	72	4	0	0	0	0	0	78	
1:00 PM	3	0	1	0	0	0	0	0	0	74	5	0	0	0	0	0	83	
1:15 PM	0	0	2	0	0	0	0	0	0	74	2	0	0	0	0	0	78	319
1:30 PM	0	0	1	0	0	0	0	0	0	75	4	0	0	0	0	0	80	319
1:45 PM	0	0	1	0	0	0	0	0	0	63	5	0	0	0	0	0	69	310
2:00 PM	1	0	1	0	0	0	0	0	0	71	5	0	0	0	0	0	78	305
2:15 PM	2	0	0	0	0	0	0	0	0	72	6	0	0	0	0	0	80	307
2:30 PM	3	0	0	0	0	0	0	0	0	64	5	0	0	0	0	0	72	299
2:45 PM	3	0	1	0	0	0	0	0	0	66	4	0	0	0	0	0	74	304
3:00 PM	0	0	2	0	0	0	0	0	0	80	6	0	0	0	0	0	88	314
3:15 PM	0	0	0	0	0	0	0	0	0	69	3	0	0	0	0	0	72	306
3:30 PM	0	0	1	0	0	0	0	0	0	72	4	0	0	0	0	0	77	311
3:45 PM	3	0	3	0	0	0	0	0	0	111	14	0	0	0	0	0	131	368
4:00 PM	6	0	0	0	0	0	0	0	0	119	7	0	0	0	0	0	132	412
4:15 PM	6	0	1	0	0	0	0	0	0	68	8	0	0	0	0	0	83	423
4:30 PM	4	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	106	452
4:45 PM	2	0	1	0	0	0	0	0	0	88	7	0	0	0	0	0	98	419
5:00 PM	1	0	0	0	0	0	0	0	0	139	4	0	0	0	0	0	144	431
5:15 PM	3	0	0	0	0	0	0	0	0	121	9	0	0	0	0	0	133	481
5:30 PM	0	0	3	0	0	0	0	0	0	115	9	0	0	0	0	0	127	502
5:45 PM	3	0	0	0	0	0	0	0	0	113	18	0	0	0	0	0	134	538
6:00 PM	3	0	5	0	0	0	0	0	0	96	7	0	0	0	0	0	111	505
6:15 PM	1	0	1	0	0	0	0	0	0	79	6	0	0	0	0	0	87	459

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	0	0	0	556	16	0	0	0	0	0	576
Heavy Trucks	0	0	0		0	0	0		0	20	0		0	0	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/19/2014 9:26 AM

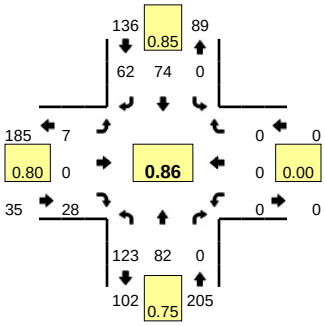
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

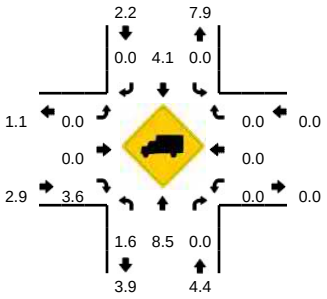
Method for determining peak hour: Total Entering Volume

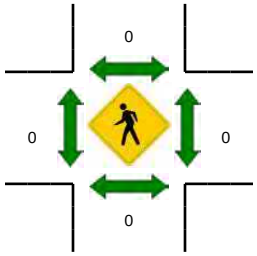
LOCATION: SC Hwy 202 -- I-26 EB Ramps
CITY/STATE: Little Mountain, SC

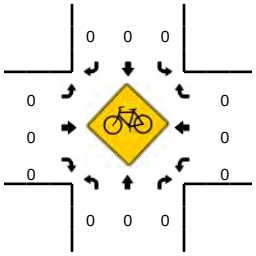
QC JOB #: 12491432
DATE: Tue, May 13 2014

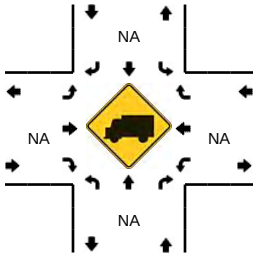


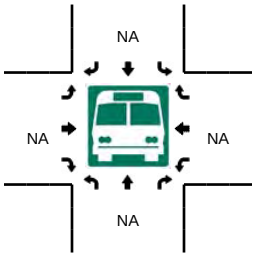
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM











15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	33	9	0	0	0	14	14	0	2	0	9	0	0	0	0	0	81	
7:15 AM	30	18	0	0	0	24	16	0	1	0	5	0	0	0	0	0	94	
7:30 AM	39	29	0	0	0	17	17	0	0	0	7	0	0	0	0	0	109	
7:45 AM	21	26	0	0	0	19	15	0	4	0	7	0	0	0	0	0	92	376
8:00 AM	23	19	0	0	0	13	13	0	2	0	1	1	0	0	0	0	72	367
8:15 AM	16	10	0	0	0	9	5	0	2	0	3	0	0	0	0	0	45	318
8:30 AM	10	13	0	0	0	11	9	0	4	0	4	0	0	0	0	0	51	260
8:45 AM	7	3	0	0	0	4	6	0	0	0	4	0	0	0	0	0	24	192

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	156	116	0	0	0	68	68	0	0	0	28	0	0	0	0	0	436
Heavy Trucks	0	12	0		0	0	0		0	0	0		0	0	0		12
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

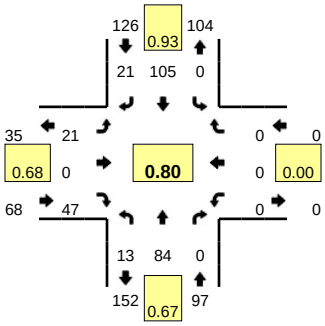
Type of peak hour being reported: Intersection Peak

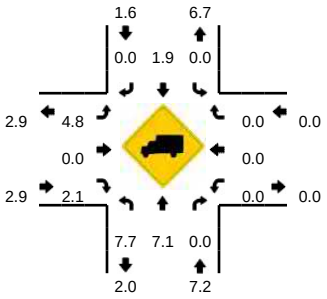
Method for determining peak hour: Total Entering Volume

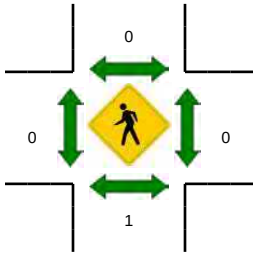
LOCATION: SC Hwy 202 -- I-26 EB Ramps
CITY/STATE: Little Mountain, SC

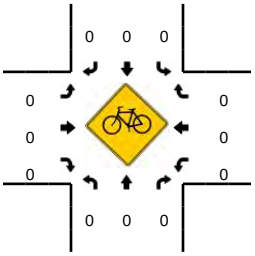
QC JOB #: 12491442
DATE: Tue, May 13 2014

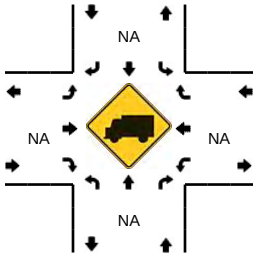
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

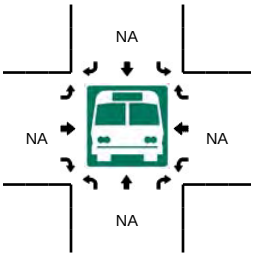












15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	12	0	0	0	16	5	0	2	0	10	0	0	0	0	0	49	
4:15 PM	8	19	0	0	0	25	3	0	6	0	13	0	0	0	0	0	74	
4:30 PM	5	14	0	0	0	27	6	0	1	0	13	0	0	0	0	0	66	
4:45 PM	5	13	0	0	0	33	2	0	1	0	8	0	0	0	0	0	62	251
5:00 PM	7	16	0	0	0	27	3	0	1	0	9	0	0	0	0	0	63	265
5:15 PM	3	33	0	0	0	26	4	0	6	0	18	1	0	0	0	0	91	282
5:30 PM	2	14	0	0	0	25	10	0	4	0	8	0	0	0	0	0	63	279
5:45 PM	1	21	0	0	0	27	4	0	9	0	12	0	0	0	0	0	74	291

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	132	0	0	0	104	16	0	24	0	72	4	0	0	0	0	364
Heavy Trucks	0	4	0		0	0	0		4	0	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: SC Hwy 202 -- I-26 WB Ramps/Meadow Brook Rd

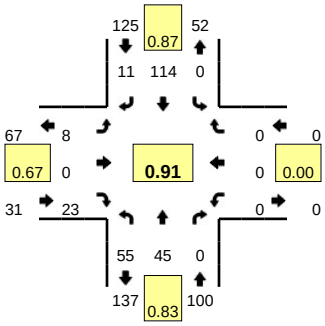
CITY/STATE: Pomaria, SC

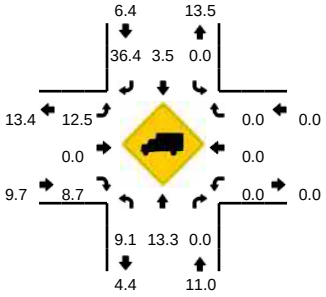
QC JOB #: 12491446

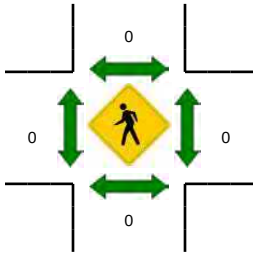
DATE: Tue, May 13 2014

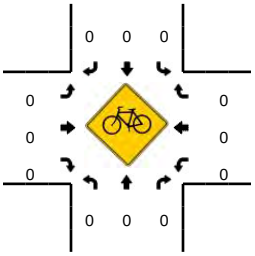
Peak-Hour: 7:15 AM -- 8:15 AM

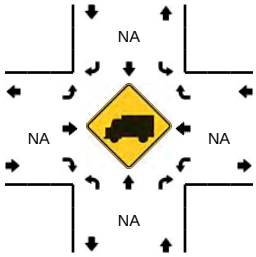
Peak 15-Min: 7:30 AM -- 7:45 AM

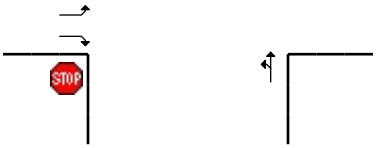


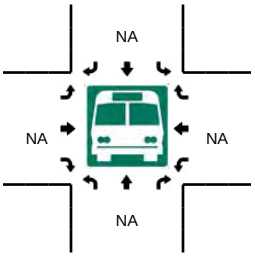












15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 WB Ramps/Meadow Brook Rd (Eastbound)				I-26 WB Ramps/Meadow Brook Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	7	3	0	0	0	23	1	0	2	0	5	0	0	0	0	0	41	
7:15 AM	10	10	0	0	0	30	6	0	2	0	10	0	0	0	0	0	68	
7:30 AM	20	10	0	0	0	30	2	0	1	0	7	0	0	0	0	0	70	
7:45 AM	16	13	0	0	0	31	2	0	2	0	3	0	0	0	0	0	67	246
8:00 AM	9	12	0	0	0	23	1	0	2	0	3	1	0	0	0	0	51	256
8:15 AM	7	5	0	0	0	10	2	0	2	0	4	0	0	0	0	0	30	218
8:30 AM	7	11	0	0	0	20	1	0	3	0	0	1	0	0	0	0	43	191
8:45 AM	1	1	0	0	0	10	0	0	0	0	1	0	0	0	0	0	13	137

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	80	40	0	0	0	120	8	0	4	0	28	0	0	0	0	0	280
Heavy Trucks	8	4	0		0	0	4		0	0	0		0	0	0		16
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 1

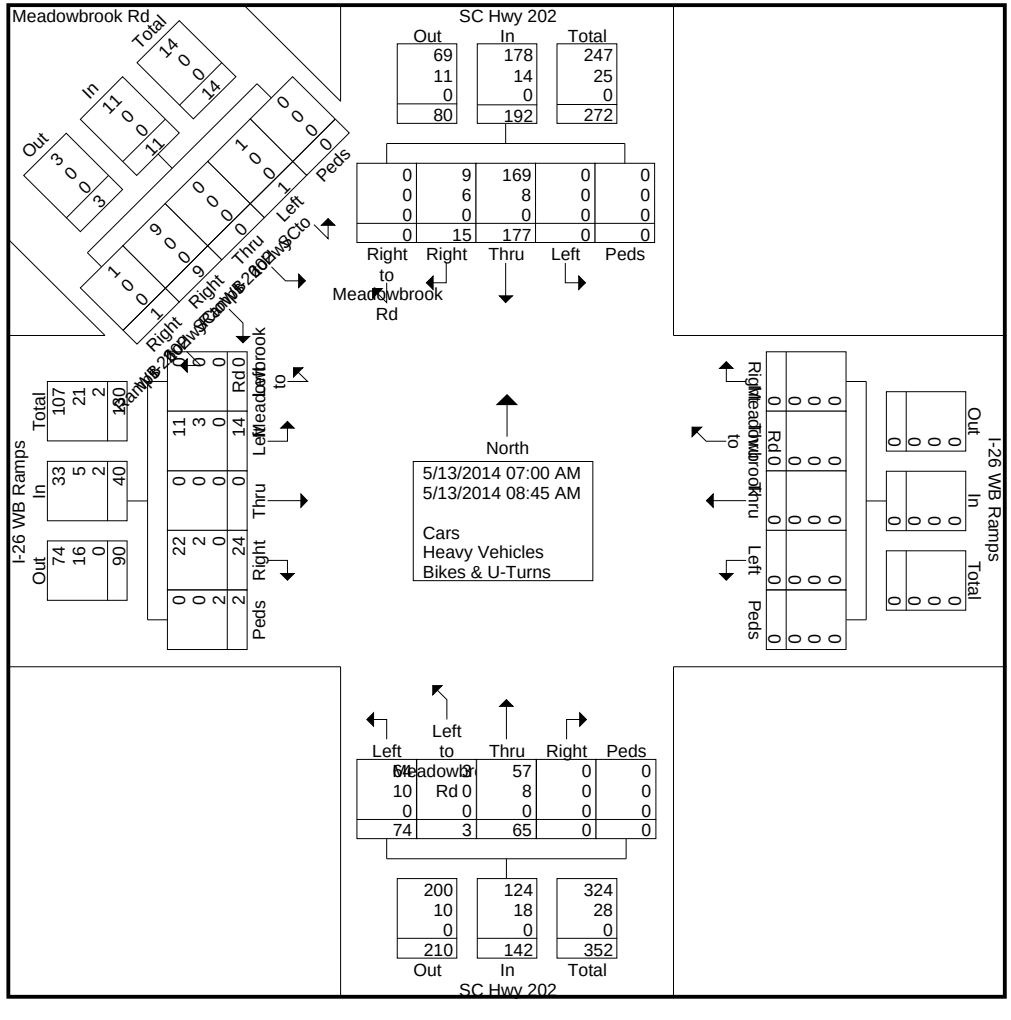
Groups Printed- Cars - Heavy Vehicles - Turns

	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						
Start Time	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		
07:00 AM	0	23	1	0	0	24	0	0	0	0	0	0	7	0	3	0	0	10	0	2	0	2	0	4	0	0	3	0	0	3	41
07:15 AM	0	30	6	0	0	36	0	0	0	0	0	0	10	0	10	0	0	20	0	2	0	7	0	9	0	0	3	0	0	3	68
07:30 AM	0	30	2	0	0	32	0	0	0	0	0	0	19	1	10	0	0	30	0	1	0	6	0	7	0	0	1	0	0	1	70
07:45 AM	0	31	2	0	0	33	0	0	0	0	0	0	16	0	13	0	0	29	0	2	0	2	0	4	0	0	1	0	0	1	67
Total	0	114	11	0	0	125	0	0	0	0	0	0	52	1	36	0	0	89	0	7	0	17	0	24	0	0	8	0	0	8	246
08:00 AM	0	23	1	0	0	24	0	0	0	0	0	0	8	1	12	0	0	21	0	2	0	3	1	6	0	0	0	1	0	1	52
08:15 AM	0	10	2	0	0	12	0	0	0	0	0	0	7	0	5	0	0	12	0	2	0	4	0	6	1	0	0	0	0	1	31
08:30 AM	0	20	1	0	0	21	0	0	0	0	0	0	7	0	11	0	0	18	0	3	0	0	1	4	0	0	0	0	0	0	43
08:45 AM	0	10	0	0	0	10	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	13
Total	0	63	4	0	0	67	0	0	0	0	0	0	22	2	29	0	0	53	0	7	0	7	2	16	1	0	1	1	0	3	139
Grand Total	0	177	15	0	0	192	0	0	0	0	0	0	74	3	65	0	0	142	0	14	0	24	2	40	1	0	9	1	0	11	385
Apprch %	0	92.2	7.8	0	0		0	0	0	0	0		52.1	2.1	45.8	0	0		0	35	0	60	5		9.1	0	81.8	9.1	0		
Total %	0	46	3.9	0	0	49.9	0	0	0	0	0	0	19.2	0.8	16.9	0	0	36.9	0	3.6	0	6.2	0.5	10.4	0.3	0	2.3	0.3	0	2.9	
Cars	0	169	9	0	0	178	0	0	0	0	0	0	64	3	57	0	0	124	0	11	0	22	0	33	1	0	9	1	0	11	346
% Cars	0	95.5	60	0	0	92.7	0	0	0	0	0	0	86.5	100	87.7	0	0	87.3	0	78.6	0	91.7	0	82.5	100	0	100	100	0	100	89.9
Heavy Vehicles																															
% Heavy Vehicles	0	4.5	40	0	0	7.3	0	0	0	0	0	0	13.5	0	12.3	0	0	12.7	0	21.4	0	8.3	0	12.5	0	0	0	0	0	0	9.6
Bikes & U-Turns																															
% Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0.5

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 2



Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

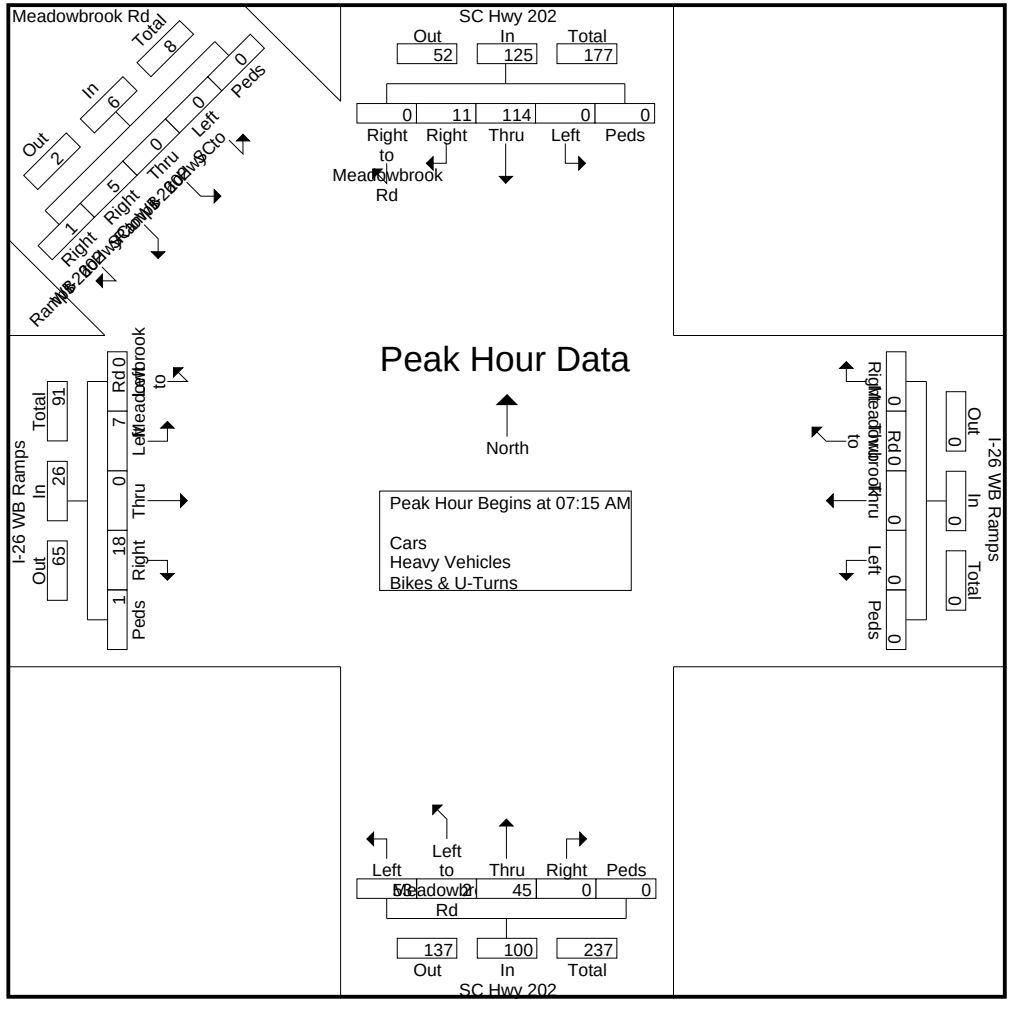
File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 3

	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						
Start Time	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:15 AM																															
07:15 AM	0	30	**6**	0	0	**36**	0	0	0	0	0	0	10	0	10	0	0	20	0	**2**	0	**7**	0	**9**	0	0	**3**	0	0	**3**	68
07:30 AM	0	30	2	0	0	32	0	0	0	0	0	0	**19**	**1**	10	0	0	**30**	0	1	0	6	0	7	0	0	1	0	0	1	**70**
07:45 AM	0	**31**	2	0	0	33	0	0	0	0	0	0	16	0	**13**	0	0	29	0	2	0	2	0	4	0	0	1	0	0	1	67
08:00 AM	0	23	1	0	0	24	0	0	0	0	0	0	8	1	12	0	0	21	0	2	0	3	**1**	6	0	0	0	**1**	0	1	52
Total Volume	0	114	11	0	0	125	0	0	0	0	0	0	53	2	45	0	0	100	0	7	0	18	1	26	0	0	5	1	0	6	257
% App. Total	0	91.2	8.8	0	0		0	0	0	0	0		53	2	45	0	0		0	26.9	0	69.2	3.8		0	0	83.3	16.7	0		
PHF	.000	.919	.458	.000	.000	.868	.000	.000	.000	.000	.000	.000	.697	.500	.865	.000	.000	.833	.000	.875	.000	.643	.250	.722	.000	.000	.417	.250	.000	.500	.918

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 4



Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

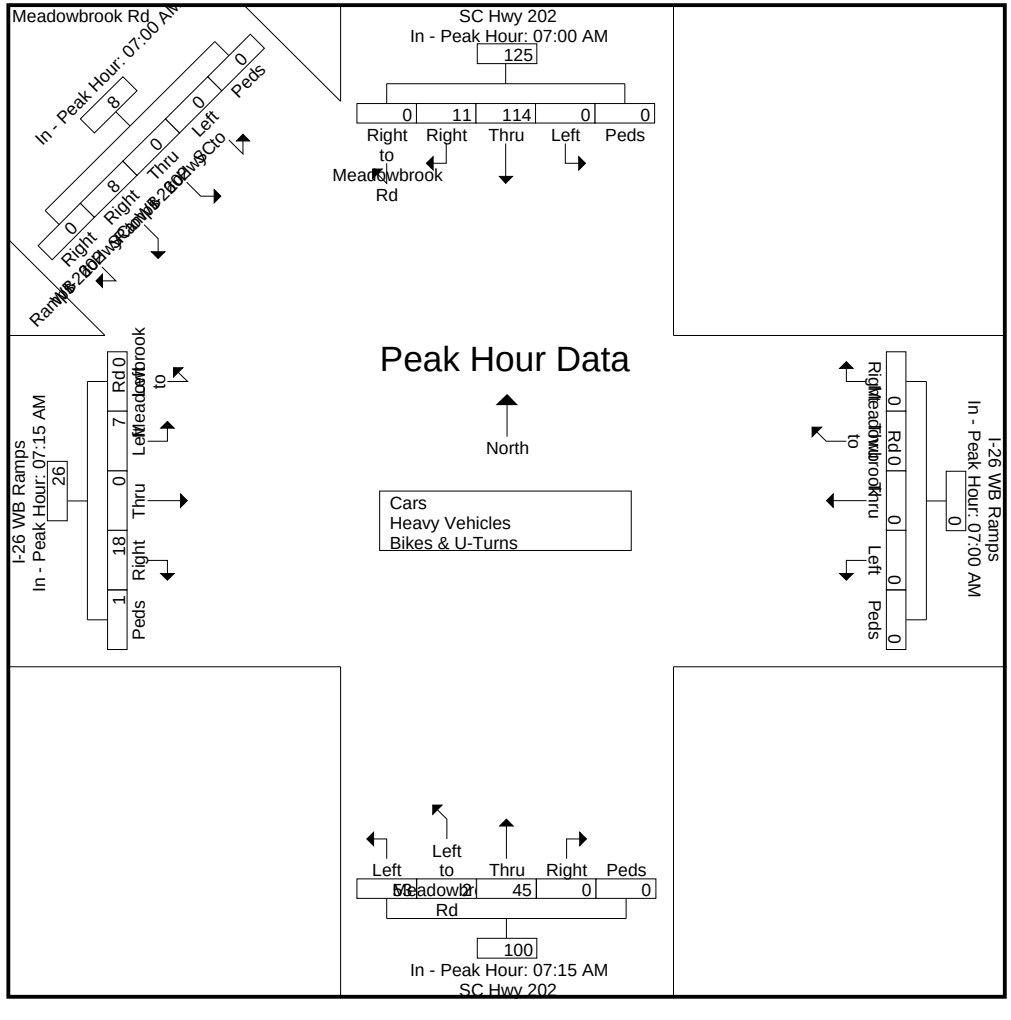
File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 5

	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						
Start Time	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Each Approach Begins at:																															
	07:00 AM						07:00 AM						07:15 AM						07:15 AM						07:00 AM						
+0 mins.	0	23	1	0	0	24	0	0	0	0	0	0	10	0	10	0	0	20	0	**2**	0	**7**	0	**9**	0	0	**3**	0	0	**3**	
+15 mins.	0	30	**6**	0	0	**36**	0	0	0	0	0	0	**19**	**1**	10	0	0	**30**	0	1	0	6	0	7	0	0	3	0	0	3	
+30 mins.	0	30	2	0	0	32	0	0	0	0	0	0	16	0	**13**	0	0	29	0	2	0	2	0	4	0	0	1	0	0	1	
+45 mins.	0	**31**	2	0	0	33	0	0	0	0	0	0	8	1	12	0	0	21	0	2	0	3	**1**	6	0	0	1	0	0	1	
Total Volume	0	114	11	0	0	125	0	0	0	0	0	0	53	2	45	0	0	100	0	7	0	18	1	26	0	0	8	0	0	8	
% App. Total	0	91.2	8.8	0	0		0	0	0	0	0		53	2	45	0	0		0	26.9	0	69.2	3.8		0	0	100	0	0		
PHF	.000	.919	.458	.000	.000	.868	.000	.000	.000	.000	.000	.000	.697	.500	.865	.000	.000	.833	.000	.875	.000	.643	.250	.722	.000	.000	.667	.000	.000	.667	

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491446 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491446
Start Date : 5/13/2014
Page No : 6



Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: SC Hwy 202 -- I-26 WB Ramps/Meadow Brook Rd

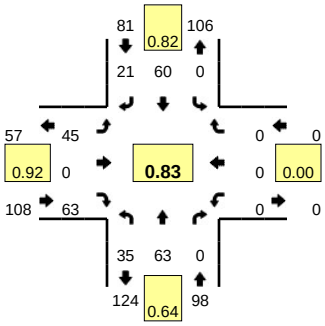
CITY/STATE: Pomaria, SC

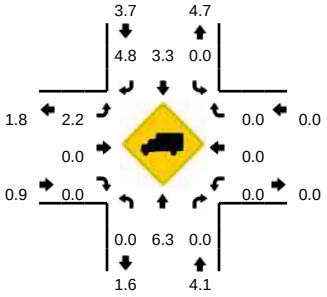
QC JOB #: 12491447

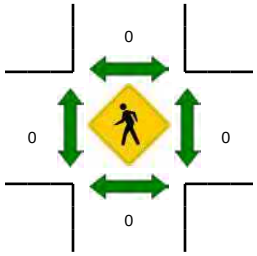
DATE: Tue, May 13 2014

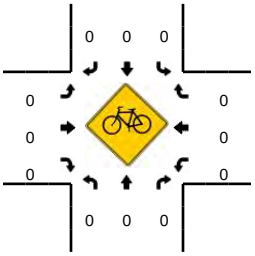
Peak-Hour: 5:00 PM -- 6:00 PM

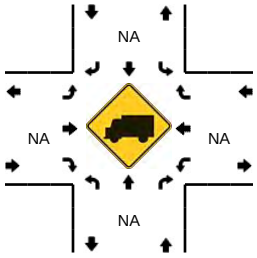
Peak 15-Min: 5:15 PM -- 5:30 PM

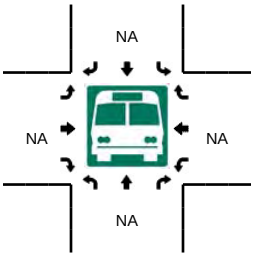












15-Min Count Period Beginning At	SC Hwy 202 (Northbound)				SC Hwy 202 (Southbound)				I-26 WB Ramps/Meadow Brook Rd (Eastbound)				I-26 WB Ramps/Meadow Brook Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	9	0	0	0	12	2	0	4	0	9	1	0	0	0	0	42	
4:15 PM	3	21	0	0	0	13	3	0	9	0	15	1	0	0	0	0	65	
4:30 PM	7	8	0	0	0	14	5	0	10	0	19	0	0	0	0	0	63	
4:45 PM	5	9	0	0	0	12	9	0	6	0	24	0	0	0	0	0	65	235
5:00 PM	5	10	0	0	0	16	7	0	7	0	13	1	0	0	0	0	59	252
5:15 PM	13	25	0	0	0	13	5	0	13	0	17	0	0	0	0	0	86	273
5:30 PM	9	9	0	0	0	22	5	0	17	0	12	0	0	0	0	0	74	284
5:45 PM	7	19	0	1	0	9	4	0	6	0	21	1	0	0	0	0	68	287

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	100	0	0	0	52	20	0	52	0	68	0	0	0	0	0	344
Heavy Trucks	0	8	0		0	0	0		0	0	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 1

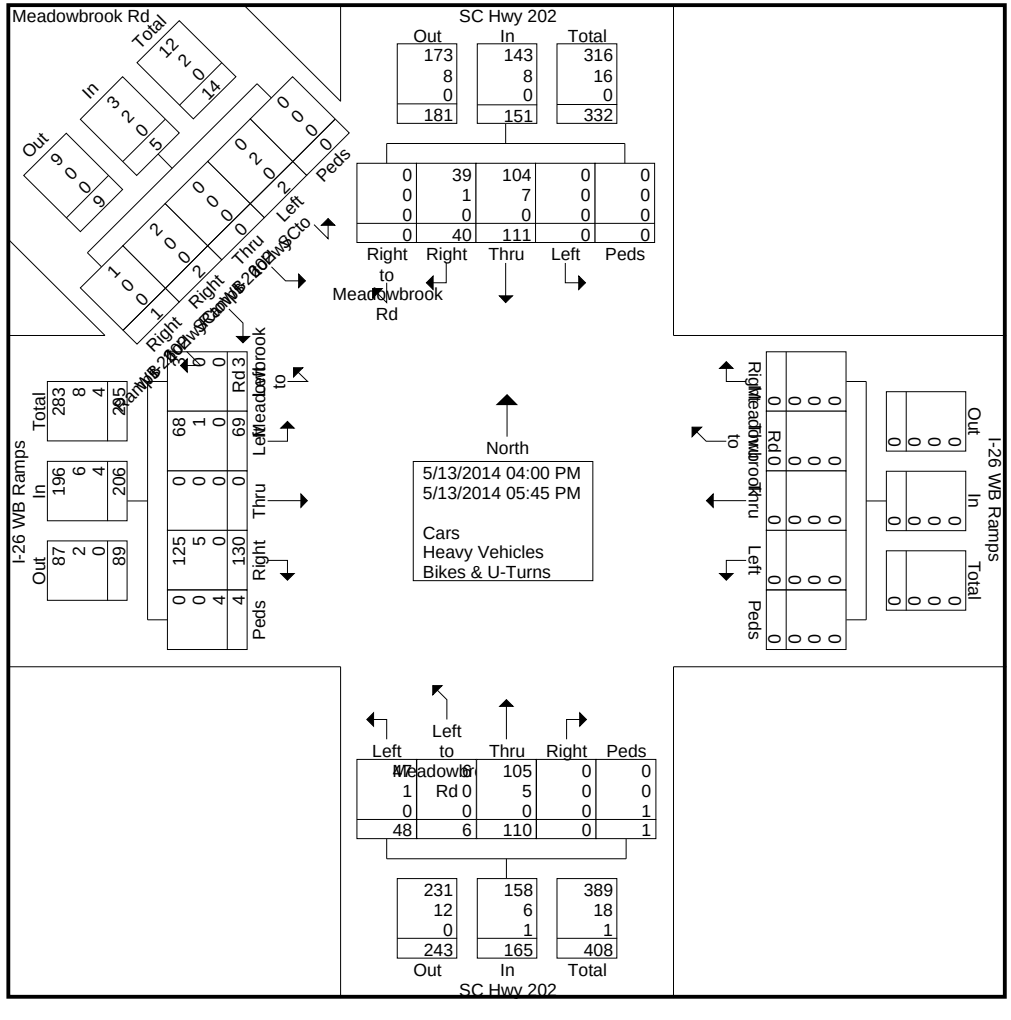
Groups Printed- Cars - Heavy Vehicles - Turns

	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						
Start Time	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		
04:00 PM	0	12	2	0	0	14	0	0	0	0	0	0	5	0	9	0	0	14	1	3	0	9	1	14	0	0	0	0	0	0	42
04:15 PM	0	13	3	0	0	16	0	0	0	0	0	0	3	0	21	0	0	24	0	9	0	15	1	25	1	0	0	0	0	1	66
04:30 PM	0	14	5	0	0	19	0	0	0	0	0	0	6	1	8	0	0	15	0	10	0	19	0	29	1	0	0	1	0	2	65
04:45 PM	0	12	9	0	0	21	0	0	0	0	0	0	5	0	9	0	0	14	0	6	0	24	0	30	0	0	0	0	0	0	65
Total	0	51	19	0	0	70	0	0	0	0	0	0	19	1	47	0	0	67	1	28	0	67	2	98	2	0	0	1	0	3	238
05:00 PM	0	16	7	0	0	23	0	0	0	0	0	0	5	0	10	0	0	15	0	7	0	13	1	21	0	0	0	0	0	0	59
05:15 PM	0	13	5	0	0	18	0	0	0	0	0	0	12	1	25	0	0	38	0	13	0	17	0	30	0	0	1	0	0	1	87
05:30 PM	0	22	5	0	0	27	0	0	0	0	0	0	5	4	9	0	0	18	0	17	0	12	0	29	0	0	1	0	0	1	75
05:45 PM	0	9	4	0	0	13	0	0	0	0	0	0	7	0	19	0	1	27	2	4	0	21	1	28	0	0	0	0	0	0	68
Total	0	60	21	0	0	81	0	0	0	0	0	0	29	5	63	0	1	98	2	41	0	63	2	108	0	0	2	0	0	2	289
Grand Total	0	111	40	0	0	151	0	0	0	0	0	0	48	6	110	0	1	165	3	69	0	130	4	206	2	0	2	1	0	5	527
Apprch %	0	73.5	26.5	0	0		0	0	0	0	0		29.1	3.6	66.7	0	0.6		1.5	33.5	0	63.1	1.9		40	0	40	20	0		
Total %	0	21.1	7.6	0	0	28.7	0	0	0	0	0	0	9.1	1.1	20.9	0	0.2	31.3	0.6	13.1	0	24.7	0.8	39.1	0.4	0	0.4	0.2	0	0.9	
Cars	0	104	39	0	0	143	0	0	0	0	0	0	47	6	105	0	0	158	3	68	0	125	0	196	0	0	2	1	0	3	500
% Cars	0	93.7	97.5	0	0	94.7	0	0	0	0	0	0	97.9	100	95.5	0	0	95.8	100	98.6	0	96.2	0	95.1	0	0	100	100	0	60	94.9
Heavy Vehicles																															
% Heavy Vehicles	0	6.3	2.5	0	0	5.3	0	0	0	0	0	0	2.1	0	4.5	0	0	3.6	0	1.4	0	3.8	0	2.9	100	0	0	0	0	40	4.2
Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	4	4	0	0	0	0	0	0	5
% Bikes & U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.6	0	0	0	0	100	1.9	0	0	0	0	0	0	0.9

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 2



Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

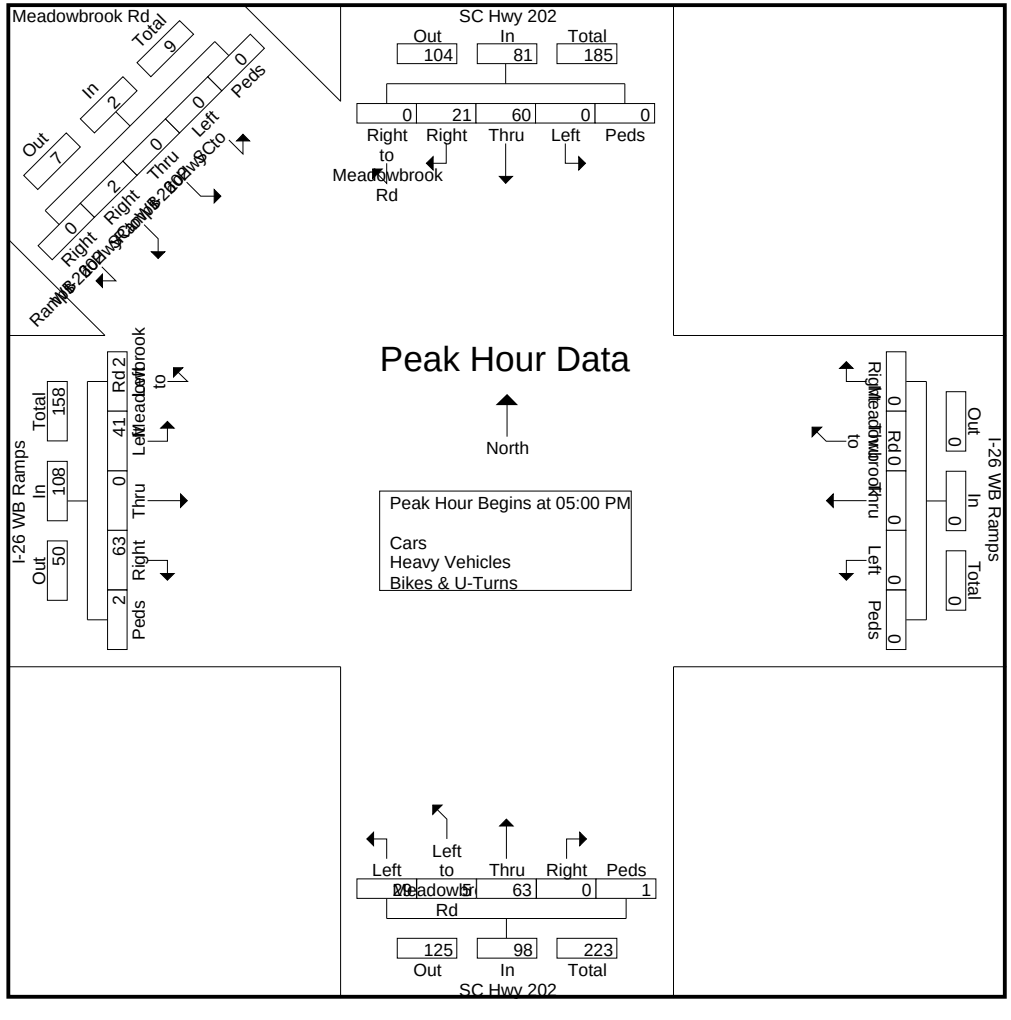
File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 3

	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						
Start Time	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	16	**7**	0	0	23	0	0	0	0	0	0	5	0	10	0	0	15	0	7	0	13	**1**	21	0	0	0	0	0	0	59
05:15 PM	0	13	5	0	0	18	0	0	0	0	0	0	**12**	1	**25**	0	0	**38**	0	13	0	17	0	**30**	0	0	**1**	0	0	**1**	**87**
05:30 PM	0	**22**	5	0	0	**27**	0	0	0	0	0	0	5	**4**	9	0	0	18	0	**17**	0	12	0	29	0	0	1	0	0	1	75
05:45 PM	0	9	4	0	0	13	0	0	0	0	0	0	7	0	19	0	**1**	27	**2**	4	0	**21**	1	28	0	0	0	0	0	0	68
Total Volume	0	60	21	0	0	81	0	0	0	0	0	0	29	5	63	0	1	98	2	41	0	63	2	108	0	0	2	0	0	2	289
% App. Total	0	74.1	25.9	0	0		0	0	0	0	0		29.6	5.1	64.3	0	1		1.9	38	0	58.3	1.9		0	0	100	0	0		
PHF	.000	.682	.750	.000	.000	.750	.000	.000	.000	.000	.000	.000	.604	.313	.630	.000	.250	.645	.250	.603	.000	.750	.500	.900	.000	.000	.500	.000	.000	.500	.830

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 4



Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

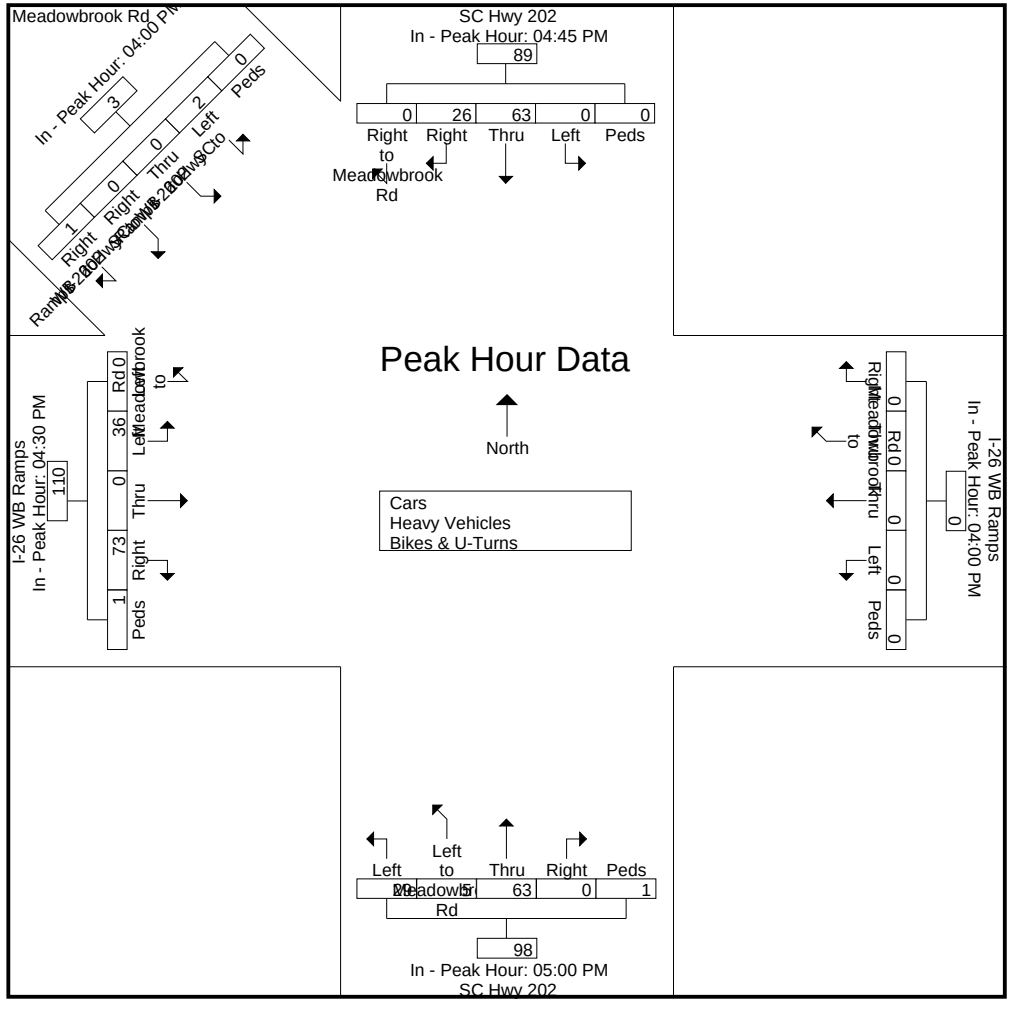
File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 5

	SC Hwy 202 From North						I-26 WB Ramps From East						SC Hwy 202 From South						I-26 WB Ramps From West						Meadowbrook Rd From Northwest						
Start Time	Left	Thru	Right	Right to Meadowbrook Rd	Peds	App. Total	Left	Thru	Thru to Meadowbrook Rd	Right	Peds	App. Total	Left	Left to Meadowbrook Rd	Thru	Right	Peds	App. Total	Left to Meadowbrook Rd	Left	Thru	Right	Peds	App. Total	Left to SC Hwy 202	Thru to I-26 WB Ramps	Right to SC Hwy 202	Right to I-26 WB Ramps	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Each Approach Begins at:																															
	04:45 PM						04:00 PM						05:00 PM						04:30 PM						04:00 PM						
+0 mins.	0	12	**9**	0	0	21	0	0	0	0	0	0	5	0	10	0	0	15	0	10	0	19	0	29	0	0	0	0	0	0	
+15 mins.	0	16	7	0	0	23	0	0	0	0	0	0	**12**	1	**25**	0	0	**38**	0	6	0	**24**	0	**30**	**1**	0	0	0	0	1	
+30 mins.	0	13	5	0	0	18	0	0	0	0	0	0	5	**4**	9	0	0	18	0	7	0	13	**1**	21	1	0	0	**1**	0	**2**	
+45 mins.	0	**22**	5	0	0	**27**	0	0	0	0	0	0	7	0	19	0	**1**	27	0	**13**	0	17	0	30	0	0	0	0	0	0	
Total Volume	0	63	26	0	0	89	0	0	0	0	0	0	29	5	63	0	1	98	0	36	0	73	1	110	2	0	0	1	0	3	
% App. Total	0	70.8	29.2	0	0		0	0	0	0	0		29.6	5.1	64.3	0	1		0	32.7	0	66.4	0.9		66.7	0	0	33.3	0		
PHF	.000	.716	.722	.000	.000	.824	.000	.000	.000	.000	.000	.000	.604	.313	.630	.000	.250	.645	.000	.692	.000	.760	.250	.917	.500	.000	.000	.250	.000	.375	

Quality Counts, LLC

920 Blairhill Rd Ste B106
Charlotte, NC 28217

File Name : 12491447 - SC Hwy 202 & I-26 WB Ramps-Meadowbrook Rd
Site Code : 12491447
Start Date : 5/13/2014
Page No : 6



Type of peak hour being reported: Intersection Peak

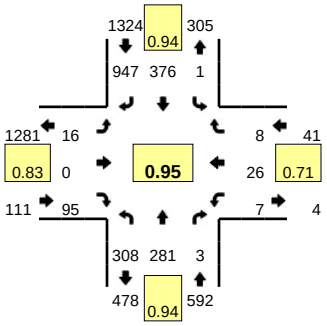
Method for determining peak hour: Total Entering Volume

LOCATION: US 176/Broad River Rd -- I-26 EB Ramps

QC JOB #: 12491427

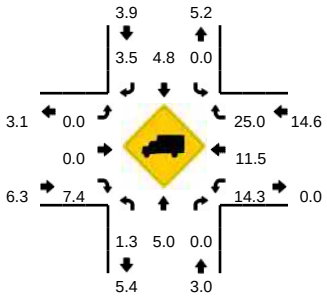
CITY/STATE: Irmo, SC

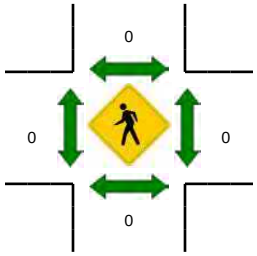
DATE: Tue, May 13 2014

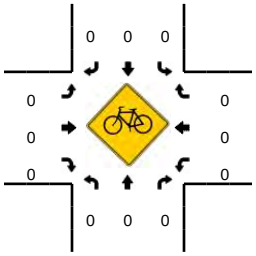


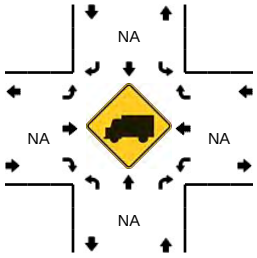
Peak-Hour: 7:00 AM -- 8:00 AM

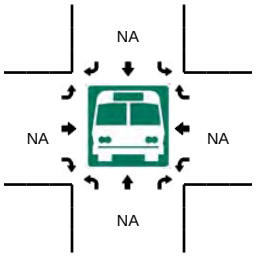
Peak 15-Min: 7:15 AM -- 7:30 AM











15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	84	47	0	0	1	81	261	0	4	0	16	0	0	11	1	0	506	
7:15 AM	92	66	0	0	0	88	264	0	1	0	25	0	3	3	3	0	545	
7:30 AM	70	79	0	0	0	138	216	0	4	0	28	0	2	3	2	0	542	
7:45 AM	62	89	3	0	0	69	206	0	7	0	26	0	2	9	2	0	475	2068
8:00 AM	51	65	11	0	0	58	161	0	10	0	15	0	0	9	8	0	388	1950
8:15 AM	38	82	5	0	0	51	152	0	7	0	32	0	1	1	3	0	372	1777
8:30 AM	33	45	5	0	0	71	150	0	7	1	15	0	4	7	2	0	340	1575
8:45 AM	27	37	5	0	0	67	124	0	9	2	13	1	2	5	5	0	297	1397

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	368	264	0	0	0	352	1056	0	4	0	100	0	12	12	12	0	2180
Heavy Trucks	4	12	0		0	4	28		0	0	8		4	0	4		64
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

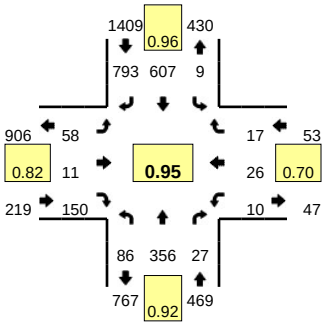
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

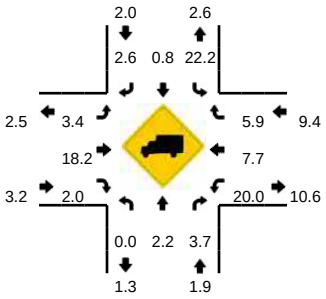
Method for determining peak hour: Total Entering Volume

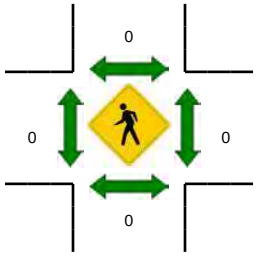
LOCATION: US 176/Broad River Rd -- I-26 EB Ramps
CITY/STATE: Irmo, SC

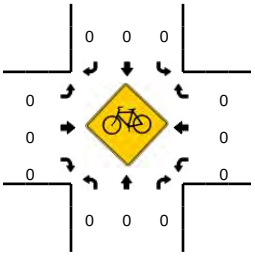
QC JOB #: 12491428
DATE: Tue, May 13 2014

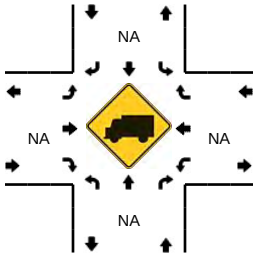


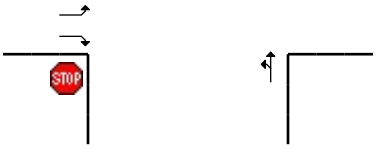
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

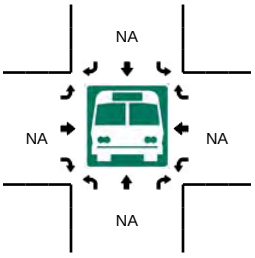












15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 EB Ramps (Eastbound)				I-26 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	23	74	5	0	1	116	99	0	17	2	35	0	1	6	4	0	383	
4:15 PM	19	83	9	0	1	119	113	0	11	3	32	0	3	0	8	0	401	
4:30 PM	20	89	4	0	2	134	131	0	8	3	26	0	3	5	0	0	425	
4:45 PM	20	109	7	0	0	150	156	0	12	3	26	0	2	11	1	0	497	1706
5:00 PM	19	95	3	0	2	158	179	0	11	4	33	0	3	9	3	0	519	1842
5:15 PM	30	97	10	0	3	165	188	0	16	4	47	0	0	5	3	0	568	2009
5:30 PM	18	78	8	0	1	143	224	0	18	0	39	1	4	4	3	0	541	2125
5:45 PM	19	86	6	0	3	141	202	0	12	3	31	0	3	8	8	0	522	2150

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	120	388	40	0	12	660	752	0	64	16	188	0	0	20	12	0	2272
Heavy Trucks	0	4	0		4	8	12		0	4	0		0	0	0		32
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/27/2014 8:30 AM

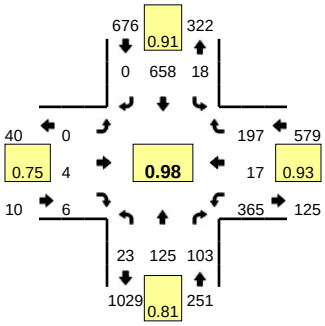
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

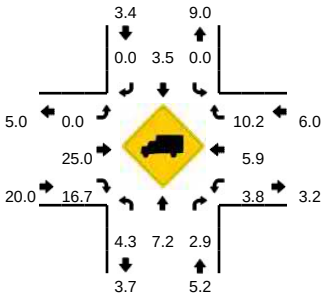
Method for determining peak hour: Total Entering Volume

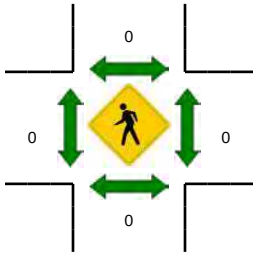
LOCATION: US 176/Broad River Rd -- I-26 WB Ramps
CITY/STATE: Irmo, SC

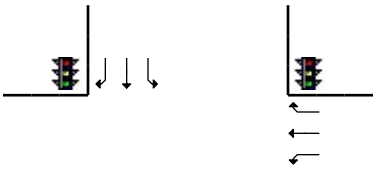
QC JOB #: 12491430
DATE: Thu, Jun 26 2014

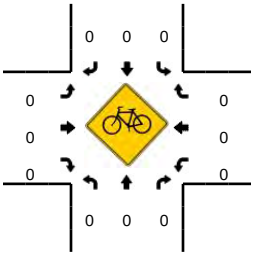


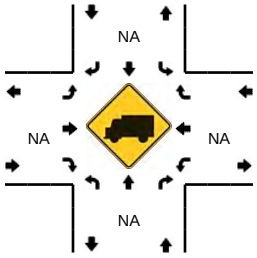
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

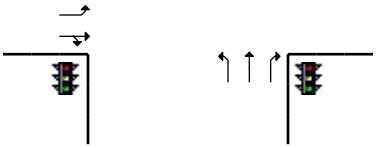


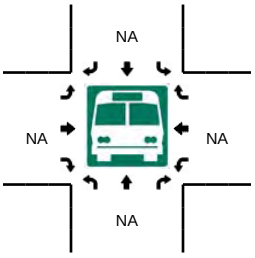












15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 WB Ramps (Eastbound)				I-26 WB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	26	17	0	7	179	0	0	0	1	1	0	87	2	43	0	368	
7:15 AM	4	16	31	0	5	168	0	0	0	0	3	0	93	6	57	0	383	
7:30 AM	9	38	36	0	4	151	0	0	0	1	0	0	98	3	47	0	387	
7:45 AM	5	45	19	0	2	160	0	0	0	2	2	0	87	6	50	0	378	1516
8:00 AM	3	32	25	0	6	131	0	0	1	1	5	0	88	5	33	1	331	1479
8:15 AM	4	30	22	0	4	131	0	0	0	0	3	0	104	3	21	0	322	1418
8:30 AM	7	29	22	0	3	125	0	0	0	1	6	0	91	4	27	0	315	1346
8:45 AM	7	34	31	0	3	120	0	0	0	0	4	0	86	2	44	1	332	1300

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	152	144	0	16	604	0	0	0	4	0	0	392	12	188	0	1548
Heavy Trucks	0	8	4		0	16	0		0	4	0		44	4	8		88
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/30/2014 8:44 AM

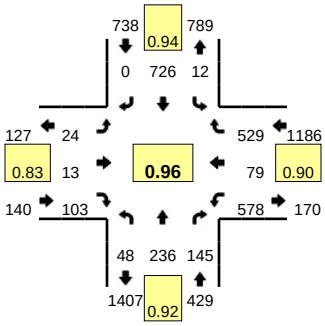
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

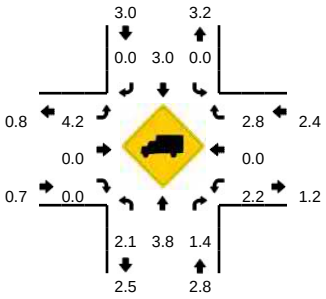
Method for determining peak hour: Total Entering Volume

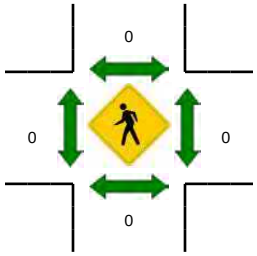
LOCATION: US 176/Broad River Rd -- I-26 WB Ramps
CITY/STATE: Irmo, SC

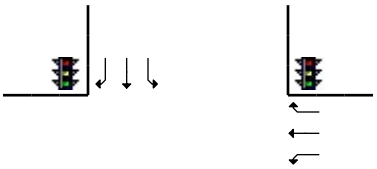
QC JOB #: 12491431
DATE: Wed, Jun 25 2014

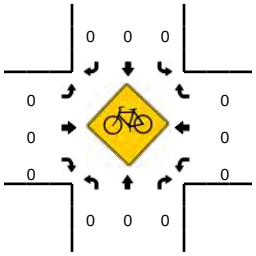


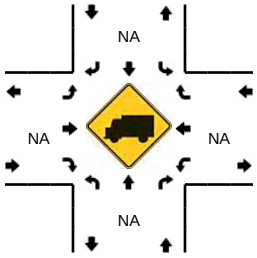
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

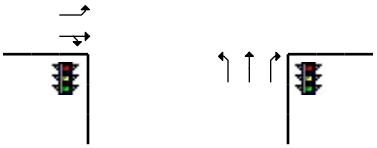


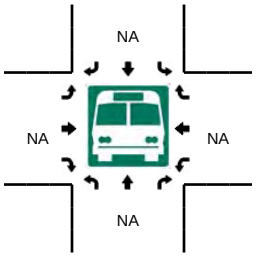












15-Min Count Period Beginning At	US 176/Broad River Rd (Northbound)				US 176/Broad River Rd (Southbound)				I-26 WB Ramps (Eastbound)				I-26 WB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	41	27	0	2	95	0	0	2	2	6	0	100	12	74	0	372	
4:15 PM	16	30	33	0	9	105	0	0	4	2	10	0	116	13	99	0	437	
4:30 PM	5	40	23	0	5	122	0	0	0	1	7	0	118	15	112	0	448	
4:45 PM	13	53	30	0	3	194	0	0	2	3	10	0	128	14	97	1	548	1805
5:00 PM	10	55	37	0	4	185	0	0	1	5	26	0	110	18	116	0	567	2000
5:15 PM	9	55	29	0	3	181	0	0	7	4	31	0	151	25	155	0	650	2213
5:30 PM	16	62	39	0	1	172	0	0	10	2	26	0	160	17	133	0	638	2403
5:45 PM	13	64	40	0	4	188	0	0	6	2	20	0	157	19	125	0	638	2493

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	36	220	116	0	12	724	0	0	28	16	124	0	604	100	620	0	2600
Heavy Trucks	4	4	0		0	28	0		0	0	0		16	0	20		72
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/30/2014 8:44 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

APPENDIX C

CRASH DATA

Crash Summary

I- 26 (26 E) from MPT 90.557 to MPT 91.670

LEXINGTON County

01/01/2012 - 05/31/2015 (3.4 years)

Length = 1.113 miles

AADT = 43,975

Functional Class = Rural -- Principal Arterial - Interstate

Crashes by Injury Class

Fatality Crashes	1
Injury Crashes	8
PDO Crashes	31
Total Crashes	**40**

Crashes by Manner Of Collision

Rear End	14
Angle	2
Sideswipe	4
Head On	0
Run Off Road	15
Other	5
Total Crashes	**40**

Special Contributing Factors

Animal	2
Bicycle	0
Pedestrian	1

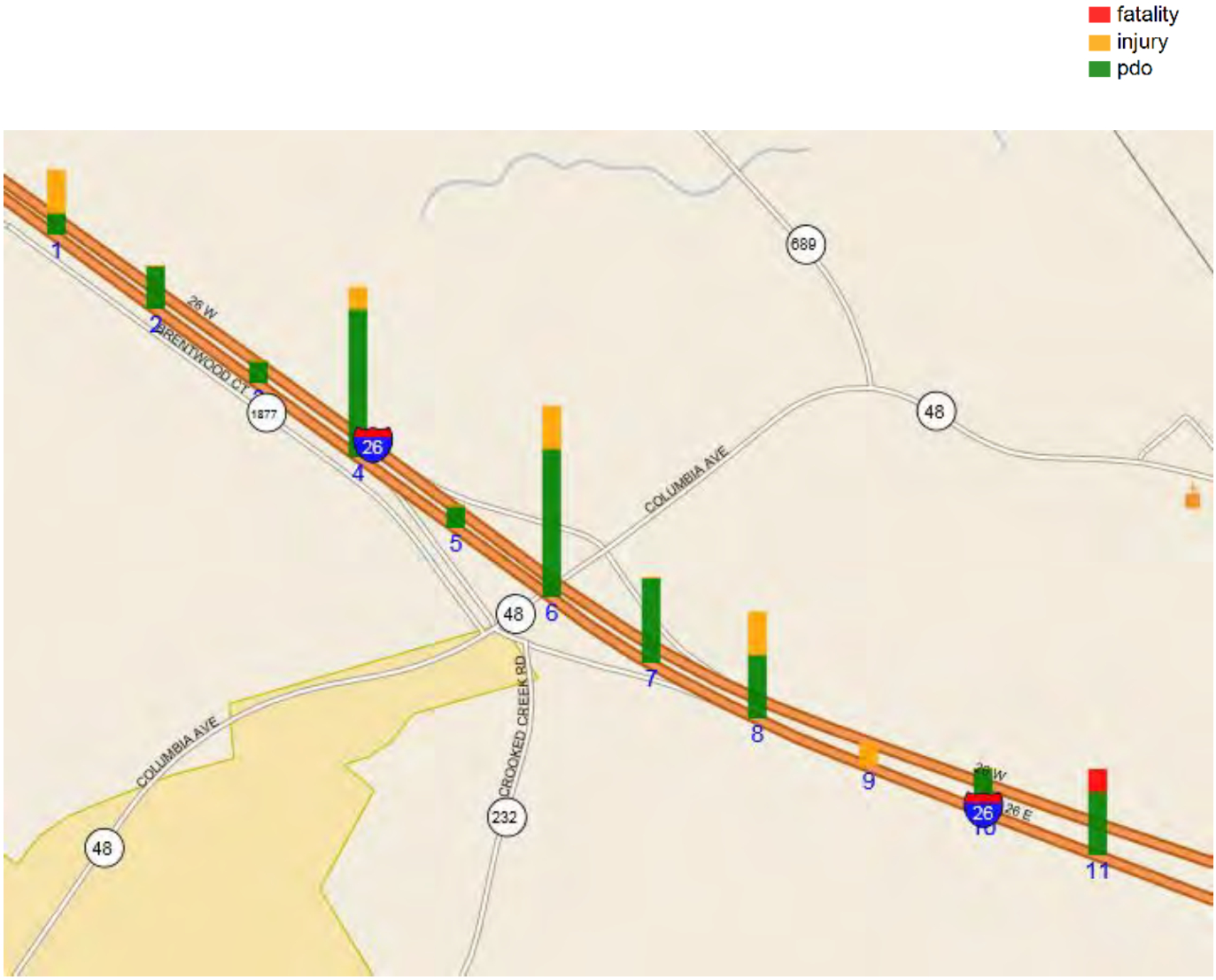
I- 26 (26 E) from MPT 90.557 to MPT 91.670

LEXINGTON County

01/01/2012 - 05/31/2015 (3.4 years)

Length = 1.113 miles AADT = 43,975

Functional Class = Rural -- Principal Arterial - Interstate



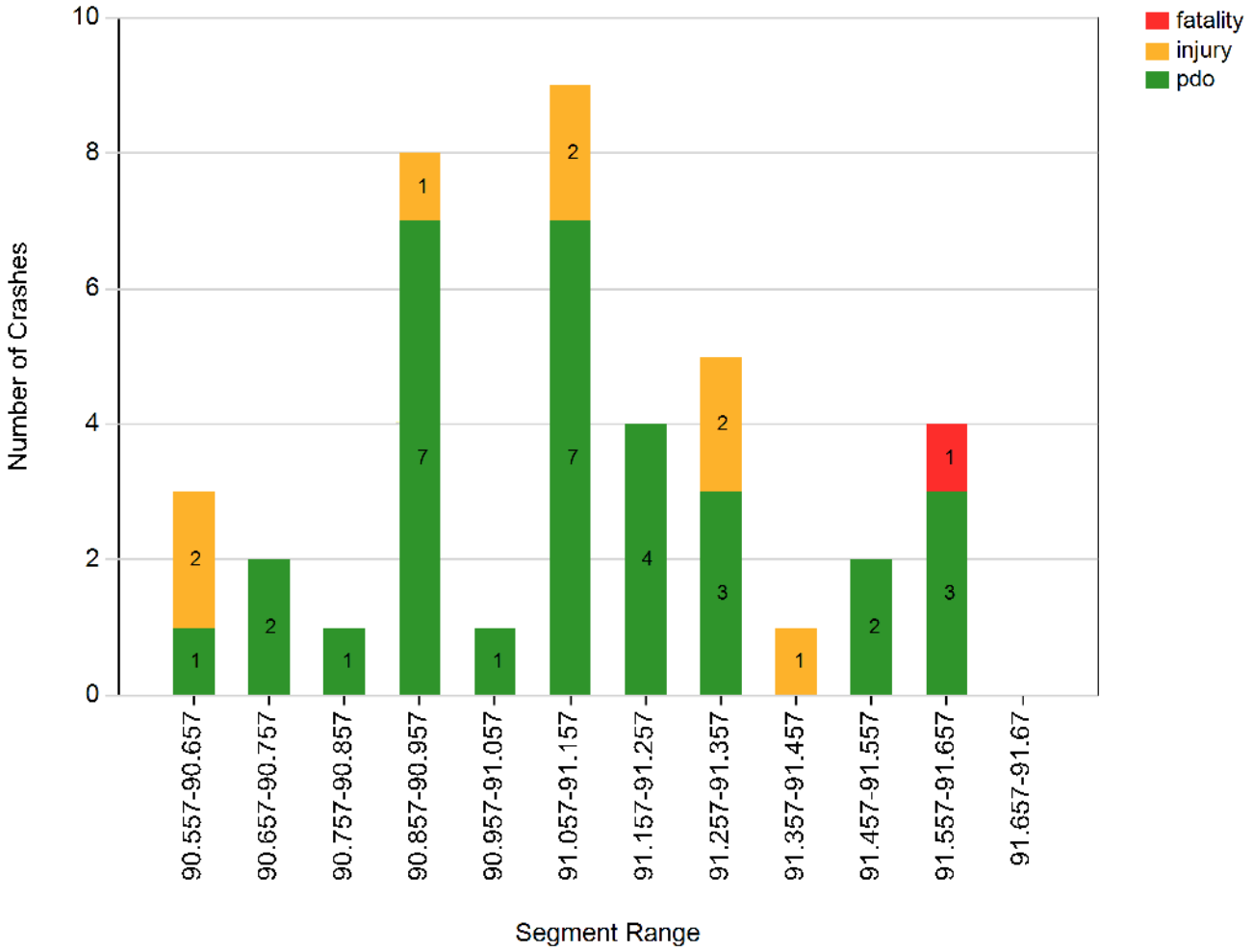
I- 26 (26 E) from MPT 90.557 to MPT 91.670

LEXINGTON County

01/01/2012 - 05/31/2015 (3.4 years)

Length = 1.113 miles AADT = 43,975

Functional Class = Rural -- Principal Arterial - Interstate



Section Crashes

MPT 90.557 to 90.657 (Stack #1)

Total Crashes: 3 Light: 3 Dark: 0 Dry: 1 Wet: 2 Fatalities: 0 Injuries: 2 PDO: 1

1	13535244	90.573	INJ1	DAY		WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	12573088	90.583	INJ0	DAY		DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
3	13532800	90.642	INJ1	DAY		WET	MOTOR VEHICLE (STOPPED)	REAR END

MPT 90.657 to 90.757 (Stack #2)

Total Crashes: 2 Light: 1 Dark: 1 Dry: 1 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 2

1	14623574	90.712	INJ0	DAY		WET	MEDIAN BARRIER	NO COLLISION W/MV
2	14606230	90.726	INJ0	DARK		DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV

MPT 90.757 to 90.857 (Stack #3)

Total Crashes: 1 Light: 0 Dark: 1 Dry: 0 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 1

1	14508930	90.773	INJ0	DARK		WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR

MPT 90.857 to 90.957 (Stack #4)

Total Crashes: 8 Light: 6 Dark: 2 Dry: 7 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 7

1	14506828	90.876	INJ0	DARK		SNOW	TREE	NO COLLISION W/MV
2	14592718	90.877	INJ0	DAY		DRY	MEDIAN BARRIER	NO COLLISION W/MV
3	13554860	90.901	INJ0	DAY		DRY	DITCH	NO COLLISION W/MV
4	14592689	90.917	INJ0	DAY		DRY	EMBANKMENT	NO COLLISION W/MV
5	12549186	90.918	INJ2	DAY		DRY	SPILL (TWO-WHEELED VEH)	NO COLLISION W/MV
6	12568711	90.920	INJ0	DAY		DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
7	12506514	90.921	INJ0	DARK		DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV
8	14505005	90.923	INJ0	DAY		DRY	OTHER MOVABLE OBJECT	NO COLLISION W/MV

MPT 90.957 to 91.057 (Stack #5)

Total Crashes: 1 Light: 1 Dark: 0 Dry: 0 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 1

1	15527428	90.994	INJ0	DAY		WET	TREE	NO COLLISION W/MV

MPT 91.057 to 91.157 (Stack #6)

Total Crashes: 9 Light: 6 Dark: 3 Dry: 7 Wet: 2 Fatalities: 0 Injuries: 2 PDO: 7

1	14580416	91.107	INJ0	DAY		DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	12576226	91.122	INJ0	DARK		DRY	MOTOR VEHICLE (STOPPED)	NO COLLISION W/MV
3	13509164	91.123	INJ0	DAY		WET	MOTOR VEHICLE (STOPPED)	REAR END
4	14620354	91.126	INJ0	DARK		DRY	MOTOR VEHICLE (STOPPED)	REAR END

Section Crashes

5	14560207	91.134	INJ1	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	15545968	91.138	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
7	13621256	91.141	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
8	12522173	91.151	INJ2	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
9	13028770	91.151	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 91.157 to 91.257 (Stack #7)

Total Crashes: 4 Light: 2 Dark: 2 Dry: 3 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 4

1	14512428	91.169	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
2	13607832	91.170	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
3	14576684	91.196	INJ0	DAY	WET	OVERHEAD SIGN SUPPORT	NO COLLISION W/MV
4	14004663	91.220	INJ0	DARK	SNOW	MEDIAN BARRIER	NO COLLISION W/MV

MPT 91.257 to 91.357 (Stack #8)

Total Crashes: 5 Light: 4 Dark: 1 Dry: 4 Wet: 1 Fatalities: 0 Injuries: 2 PDO: 3

1	13615213	91.291	INJ2	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
2	13541303	91.301	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME DIR
3	13536711	91.310	INJ2	DAWN	WET	TREE	NO COLLISION W/MV
4	15560792	91.320	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
5	12565324	91.334	INJ0	DARK	DRY	OTHER NONCOLLISION	NO COLLISION W/MV

MPT 91.357 to 91.457 (Stack #9)

Total Crashes: 1 Light: 1 Dark: 0 Dry: 1 Wet: 0 Fatalities: 0 Injuries: 1 PDO: 0

1	14519195	91.381	INJ1	DAWN	DRY	OVERTURN/ROLLOVER	NO COLLISION W/MV

MPT 91.457 to 91.557 (Stack #10)

Total Crashes: 2 Light: 2 Dark: 0 Dry: 2 Wet: 0 Fatalities: 0 Injuries: 0 PDO: 2

1	12589179	91.496	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	13523409	91.525	INJ0	DUSK	DRY	JACKKNIFE	NO COLLISION W/MV

MPT 91.557 to 91.657 (Stack #11)

Total Crashes: 4 Light: 3 Dark: 1 Dry: 3 Wet: 1 Fatalities: 1 Injuries: 0 PDO: 3

1	14605635	91.577	INJ4	DARK	DRY	PEDESTRIAN	NO COLLISION W/MV
2	15536619	91.577	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
3	13551630	91.581	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	14541624	91.645	INJ0	DAY	DRY	EMBANKMENT	NO COLLISION W/MV

APPENDIX D

EXISTING 2014 SYNCHRO AND SIM TRAFFIC REPORTS

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	7	88	9	0	13	0	177	672	15	622	0
Future Vol, veh/h	6	7	88	9	0	13	0	177	672	15	622	0
Conflicting Peds, #/hr	0	0	0	0	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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	8	98	10	0	14	0	197	747	17	691	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1301	1667	691	1347	1294	570	-	0	0	943	0	0
Stage 1	724	724	-	570	570	-	-	-	-	-	-	-
Stage 2	577	943	-	777	724	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	138	96	445	128	163	521	0	-	-	727	-	0
Stage 1	417	430	-	506	505	-	0	-	-	-	-	0
Stage 2	502	341	-	390	430	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	130	92	445	91	157	521	-	-	-	727	-	-
Mov Cap-2 Maneuver	130	92	-	91	157	-	-	-	-	-	-	-
Stage 1	417	414	-	506	505	-	-	-	-	-	-	-
Stage 2	488	341	-	287	414	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.5	28.4	0	0.2
HCM LOS	C	D		

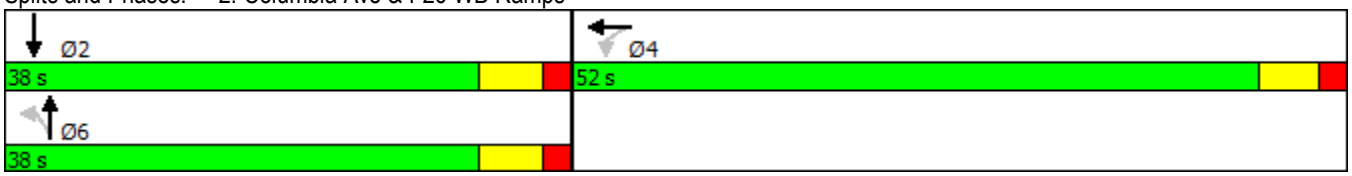
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	316	178	727	-
HCM Lane V/C Ratio	-	-	0.355	0.137	0.023	-
HCM Control Delay (s)	-	-	22.5	28.4	10.1	0
HCM Lane LOS	-	-	C	D	B	A
HCM 95th %tile Q(veh)	-	-	1.6	0.5	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	432	2	8	67	129	0	0	205	29
Future Volume (vph)	0	0	0	432	2	8	67	129	0	0	205	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1772	0	0	1831	0	0	1831	0
Flt Permitted					0.953			0.784				
Satd. Flow (perm)	0	0	0	0	1772	0	0	1460	0	0	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2						9	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	491	0	0	217	0	0	260	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				52.0	52.0		38.0	38.0			38.0	
Total Split (%)				57.8%	57.8%		42.2%	42.2%			42.2%	
Maximum Green (s)				46.0	46.0		31.7	31.7			31.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					19.7			13.6			13.6	
Actuated g/C Ratio					0.43			0.29			0.29	
v/c Ratio					0.65			0.51			0.48	
Control Delay					15.3			19.8			17.6	
Queue Delay					0.0			0.0			0.0	
Total Delay					15.3			19.8			17.6	
LOS					B			B			B	
Approach Delay					15.3			19.8			17.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B			B			B	
Queue Length 50th (ft)					88			45			52	
Queue Length 95th (ft)					211			125			137	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					1634			1053			1323	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.30			0.21			0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 46.3			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 63.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	432	2	8	67	129	0	0	205	29
Future Volume (veh/h)	0	0	0	432	2	8	67	129	0	0	205	29
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				480	2	9	74	143	0	0	228	32
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				697	3	13	206	303	0	0	441	62
Arrive On Green				0.40	0.40	0.40	0.28	0.28	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1731	7	32	291	1098	0	0	1599	224
Grp Volume(v), veh/h				491	0	0	217	0	0	0	0	260
Grp Sat Flow(s),veh/h/ln				1770	0	0	1389	0	0	0	0	1823
Q Serve(g_s), s				8.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	4.6
Cycle Q Clear(g_c), s				8.8	0.0	0.0	5.7	0.0	0.0	0.0	0.0	4.6
Prop In Lane				0.98		0.02	0.34		0.00	0.00		0.12
Lane Grp Cap(c), veh/h				713	0	0	509	0	0	0	0	503
V/C Ratio(X)				0.69	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.52
Avail Cap(c_a), veh/h				2129	0	0	1348	0	0	0	0	1511
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				9.4	0.0	0.0	11.6	0.0	0.0	0.0	0.0	11.7
Incr Delay (d2), s/veh				1.7	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.6	0.0	0.0	2.1	0.0	0.0	0.0	0.0	2.4
LnGrp Delay(d),s/veh				11.1	0.0	0.0	12.2	0.0	0.0	0.0	0.0	12.5
LnGrp LOS				B			B					B
Approach Vol, veh/h					491			217			260	
Approach Delay, s/veh					11.1			12.2			12.5	
Approach LOS					B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		16.8		21.4		16.8		
Change Period (Y+Rc), s		6.3		6.0		6.3		
Max Green Setting (Gmax), s		31.7		46.0		31.7		
Max Q Clear Time (g_c+I1), s		6.6		10.8		7.7		
Green Ext Time (p_c), s		2.9		4.7		2.9		

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

SimTraffic Simulation Summary
Existing 2014 AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3756	3731	3647	3712
Vehs Exited	3764	3730	3631	3708
Starting Vehs	102	105	86	96
Ending Vehs	94	106	102	100
Travel Distance (mi)	4252	4192	4111	4185
Travel Time (hr)	94.5	100.1	87.0	93.9
Total Delay (hr)	16.8	23.7	12.6	17.7
Total Stops	935	948	837	907
Fuel Used (gal)	160.6	160.5	153.3	158.2

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	3756	3731	3647	3712
Vehs Exited	3764	3730	3631	3708
Starting Vehs	102	105	86	96
Ending Vehs	94	106	102	100
Travel Distance (mi)	4252	4192	4111	4185
Travel Time (hr)	94.5	100.1	87.0	93.9
Total Delay (hr)	16.8	23.7	12.6	17.7
Total Stops	935	948	837	907
Fuel Used (gal)	160.6	160.5	153.3	158.2

Queuing and Blocking Report
Existing 2014 AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	284	47	51	438
Average Queue (ft)	97	16	12	86
95th Queue (ft)	265	40	37	321
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)		2	1	2
Queuing Penalty (veh)		0	6	12
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	343	193	204
Average Queue (ft)	119	78	81
95th Queue (ft)	279	157	153
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	5		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

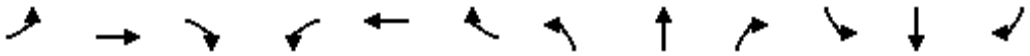
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	7	85	1	0	9	0	229	490	49	830	0
Future Vol, veh/h	11	7	85	1	0	9	0	229	490	49	830	0
Conflicting Peds, #/hr	0	0	0	0	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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	8	94	1	0	10	0	254	544	54	922	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1563	1830	922	1609	1558	527	-	0	0	799	0	0
Stage 1	1031	1031	-	527	527	-	-	-	-	-	-	-
Stage 2	532	799	-	1082	1031	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	91	76	327	84	112	551	0	-	-	824	-	0
Stage 1	281	310	-	535	528	-	0	-	-	-	-	0
Stage 2	531	398	-	263	310	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	80	66	327	49	97	551	-	-	-	824	-	-
Mov Cap-2 Maneuver	80	66	-	49	97	-	-	-	-	-	-	-
Stage 1	281	268	-	535	528	-	-	-	-	-	-	-
Stage 2	521	398	-	157	268	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	42.7	18.8	0	0.5
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	205	272	824	-
HCM Lane V/C Ratio	-	-	0.558	0.041	0.066	-
HCM Control Delay (s)	-	-	42.7	18.8	9.7	0
HCM Lane LOS	-	-	E	C	A	A
HCM 95th %tile Q(veh)	-	-	3	0.1	0.2	-

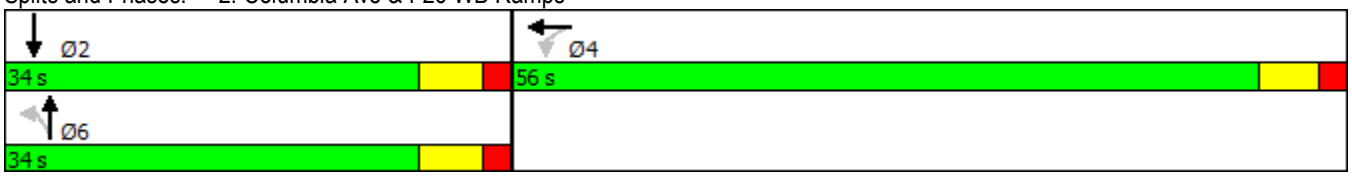


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	704	2	11	109	140	0	0	175	7
Future Volume (vph)	0	0	0	704	2	11	109	140	0	0	175	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1772	0	0	1824	0	0	1853	0
Flt Permitted					0.953			0.763				
Satd. Flow (perm)	0	0	0	0	1772	0	0	1421	0	0	1853	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1						2	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	796	0	0	277	0	0	202	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				56.0	56.0		34.0	34.0			34.0	
Total Split (%)				62.2%	62.2%		37.8%	37.8%			37.8%	
Maximum Green (s)				50.0	50.0		27.7	27.7			27.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					38.1			19.9			19.9	
Actuated g/C Ratio					0.54			0.28			0.28	
v/c Ratio					0.84			0.70			0.39	
Control Delay					24.2			35.3			24.9	
Queue Delay					0.0			0.0			0.0	
Total Delay					24.2			35.3			24.9	
LOS					C			D			C	
Approach Delay					24.2			35.3			24.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					C			D			C	
Queue Length 50th (ft)					274			111			73	
Queue Length 95th (ft)					519			217			147	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					1290			594			776	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.62			0.47			0.26	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 71.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	704	2	11	109	140	0	0	175	7
Future Volume (veh/h)	0	0	0	704	2	11	109	140	0	0	175	7
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				782	2	12	121	156	0	0	194	8
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				929	2	14	202	229	0	0	497	20
Arrive On Green				0.53	0.53	0.53	0.28	0.28	0.00	0.00	0.28	0.28
Sat Flow, veh/h				1740	4	27	443	821	0	0	1777	73
Grp Volume(v), veh/h				796	0	0	277	0	0	0	0	202
Grp Sat Flow(s),veh/h/ln				1771	0	0	1264	0	0	0	0	1850
Q Serve(g_s), s				25.1	0.0	0.0	8.4	0.0	0.0	0.0	0.0	5.8
Cycle Q Clear(g_c), s				25.1	0.0	0.0	14.3	0.0	0.0	0.0	0.0	5.8
Prop In Lane				0.98		0.02	0.44		0.00	0.00		0.04
Lane Grp Cap(c), veh/h				945	0	0	432	0	0	0	0	517
V/C Ratio(X)				0.84	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.39
Avail Cap(c_a), veh/h				1343	0	0	640	0	0	0	0	777
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				13.0	0.0	0.0	22.8	0.0	0.0	0.0	0.0	19.2
Incr Delay (d2), s/veh				4.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				13.3	0.0	0.0	4.9	0.0	0.0	0.0	0.0	3.0
LnGrp Delay(d),s/veh				17.2	0.0	0.0	24.4	0.0	0.0	0.0	0.0	19.7
LnGrp LOS				B			C					B
Approach Vol, veh/h					796			277			202	
Approach Delay, s/veh					17.2			24.4			19.7	
Approach LOS					B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		24.7		41.2		24.7		
Change Period (Y+Rc), s		6.3		6.0		6.3		
Max Green Setting (Gmax), s		27.7		50.0		27.7		
Max Q Clear Time (g_c+I1), s		7.8		27.1		16.3		
Green Ext Time (p_c), s		2.8		8.1		2.2		

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

SimTraffic Simulation Summary
Existing 2014 PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4185	4108	4180	4157
Vehs Exited	4182	4112	4211	4168
Starting Vehs	110	111	108	113
Ending Vehs	113	107	77	96
Travel Distance (mi)	4855	4746	4877	4826
Travel Time (hr)	112.3	114.1	111.0	112.5
Total Delay (hr)	24.8	27.4	22.9	25.0
Total Stops	1154	1303	1116	1191
Fuel Used (gal)	180.7	179.3	182.6	180.9

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	4185	4108	4180	4157
Vehs Exited	4182	4112	4211	4168
Starting Vehs	110	111	108	113
Ending Vehs	113	107	77	96
Travel Distance (mi)	4855	4746	4877	4826
Travel Time (hr)	112.3	114.1	111.0	112.5
Total Delay (hr)	24.8	27.4	22.9	25.0
Total Stops	1154	1303	1116	1191
Fuel Used (gal)	180.7	179.3	182.6	180.9

Queuing and Blocking Report
Existing 2014 PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	293	32	57	519
Average Queue (ft)	87	5	10	197
95th Queue (ft)	223	23	35	522
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)		0	1	4
Queuing Penalty (veh)		0	4	33
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	696	252	222
Average Queue (ft)	256	110	91
95th Queue (ft)	529	198	175
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	5		
Queuing Penalty (veh)	33		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

APPENDIX E

EXISTING 2014 HCS REPORTS

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1199	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	333	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	706	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	706	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	9.4	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1349	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	375	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	794	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	794	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	10.6	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1981	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	550	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1167	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1167	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	2	
Density, D	15.6	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	East of US176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3315	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	921	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1952	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1952	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	30.0	pc/mi/ln
Level of service, LOS	D	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	East of US 176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1476	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	410	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	869	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	869	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.6	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1195	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	332	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	704	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	704	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	9.4	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	851	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	236	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	501	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	501	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	6.7	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	891	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	248	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	525	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	525	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	7.0	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1440	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	400	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	848	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	848	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.3	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1406	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	391	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	828	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	828	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.0+	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1804	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	501	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1062	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1062	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	East of US176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2404	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	668	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1416	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	2	
Density, D	19.4	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	East of US 176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3049	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	847	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1796	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1796	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	2	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1870	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	519	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1101	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1101	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	2	
Density, D	14.7	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1271	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	353	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	748	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	748	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	10.0	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1215	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	338	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	716	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	716	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	9.5	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC-202 EB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1164	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	185	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	35	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1164	185	35	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	323	51	10	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1371	212	40	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1371 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1583	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1371 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1583	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.320	
Space mean speed in ramp influence area,	S_R = 64.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1248	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	733	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	101	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1248	733	101	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	347	204	28	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1470	839	116	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1470 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2309	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1470 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2309	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.225	
Space mean speed in ramp influence area,	S_R = 67.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.6	mph

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Phone: Fax:
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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US176 EB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1869	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1446	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	112	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1869	1446	112	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	519	402	31	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

	.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2201	1655	126	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2201 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3856	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2201 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3856	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.430	
Space mean speed in ramp influence area,	S_R = 60.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 60.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1028	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	167	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	448	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1028	167	448	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	286	46	124	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1211	191	513	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1211 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1402	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1211 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1402	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 7.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.266	
Space mean speed in ramp influence area,	S_R = 66.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 66.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	753	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	98	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	442	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	753	98	442	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	209	27	123	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	887	112	506	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 887 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	999	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 887 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	999	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 5.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.221	
Space mean speed in ramp influence area,	S_R = 67.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.7	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC-202 WB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	826	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	65	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	25	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	826	65	25	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	229	18	7	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	973	74	29	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 973 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1047	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 973 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1047	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.285	
Space mean speed in ramp influence area,	S_R = 65.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.6	mph

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Merge Analysis

Analyst:	AECOM
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Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC-202 EB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1372	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	34	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	68	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1372	34	68	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	381	9	19	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1616	39	78	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1616 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1655	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1616 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1655	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.321	
Space mean speed in ramp influence area,	S_R = 64.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1303	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	501	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	103	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1303	501	103	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	362	139	29	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1535	573	118	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1535 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2108	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1535 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2108	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.218	
Space mean speed in ramp influence area,	S_R = 67.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.8	mph

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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US176 EB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1590	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	814	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	214	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1590	814	214	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	442	226	59	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

	.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1873	932	240	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1873 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2805	4800	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1873 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2805	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 17.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.310	
Space mean speed in ramp influence area,	S_R = 64.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1737	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	133	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1312	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1737	133	1312	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	483	37	364	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2046	152	1502	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2046 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2198	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2046 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2198	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.285	
Space mean speed in ramp influence area,	S_R = 65.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.6	mph

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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1153	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	118	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	717	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1153	118	717	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	320	33	199	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1358	135	821	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1358 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1493	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1358 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1493	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.228	
Space mean speed in ramp influence area,	S_R = 67.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.5	mph

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Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC-202 WB On-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1165	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	50	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	106	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1165	50	106	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	324	14	29	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1372	57	121	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1372 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1429	4800	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1372 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1429	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A$ = 13.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.290	
Space mean speed in ramp influence area,	S_R = 65.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.4	mph

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Phone: Fax:
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Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC 202 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1199	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	35	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	185	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1199	35	185	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	333	10	51	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1412	40	212	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1412 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1412	4800	No
$v_{FO} = v_F - v_R$	1372	4800	No
v_R	40	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1412 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1412	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_{12}$ = 12.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.302

Space mean speed in ramp influence area, S_R = 65.0 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 65.0 mph

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Phone: Fax:
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Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1349	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	101	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	733	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1349	101	733	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	375	28	204	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1589	116	839	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1589 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1589	4800	No
$v_{FO} = v - v_R$	1473	4800	No
v_R	116	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1589 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1589	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 9.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.308	
Space mean speed in ramp influence area,	S_R = 64.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US 176 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1981	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	112	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1446	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1981	112	1446	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	550	31	402	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2333	128	1655	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2333 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2333	4800	No
$v_{FO} = v_F - v_R$	2205	4800	No
v_R	128	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 2333 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2333	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 15.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.310

Space mean speed in ramp influence area, S_R = 64.8 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1476	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	448	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	167	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1476	448	167	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	410	124	46	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1738	513	191	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1738 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1738	4800	No
$v_{FO} = v - v_R$	1225	4800	No
v_R	513	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1738 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1738	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_{12}$ = 8.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.344	
Space mean speed in ramp influence area,	S_R = 63.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1195	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	442	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	98	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1195	442	98	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	332	123	27	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1407	506	112	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1407 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1407	4800	No
$v_{FO} = v_F - v_R$	901	4800	No
v_R	506	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1407 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1407	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 5.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.344	
Space mean speed in ramp influence area,	S_R = 63.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC 202 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	851	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	25	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	65	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	851	25	65	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	236	7	18	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1002	29	74	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1002 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1002	4800	No
$v_{FO} = v_F - v_R$	973	4800	No
v_R	29	1900	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 1002 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1002	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 9.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.561	
Space mean speed in ramp influence area,	S_R = 56.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 56.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC 202 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1440	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	68	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	34	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1440	68	34	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	400	19	9	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1696	78	39	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1696 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1696	4800	No
$v_{FO} = v - v_R$	1618	4800	No
v_R	78	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1696 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1696	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 15.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.305	
Space mean speed in ramp influence area,	S_R = 64.9	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1406	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	103	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	501	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1406	103	501	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	391	29	139	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1656	118	573	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1656 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1656	4800	No
$v_{FO} = v_F - v_R$	1538	4800	No
v_R	118	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1656 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1656	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 9.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.309

Space mean speed in ramp influence area, S_R = 64.8 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.8 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US 176 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1804	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	214	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	814	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1804	214	814	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	501	59	226	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2125	245	932	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2125 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2125	4800	No
$v_{FO} = v_F - v_R$	1880	4800	No
v_R	245	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2125 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2125	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 13.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.320

Space mean speed in ramp influence area, S_R = 64.4 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3049	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1312	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	133	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3049	1312	133	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	847	364	37	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3591	1502	152	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3591 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3591	4800	No
$v_{FO} = v - v_R$	2089	4800	No
v_R	1502	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3591 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3591	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 24.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.433

Space mean speed in ramp influence area, S_R = 60.7 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 60.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1870	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	717	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	118	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1870	717	118	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	519	199	33	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2202	821	135	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2202 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2202	4800	No
$v_{FO} = v_F - v_R$	1381	4800	No
v_R	821	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2202 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2202	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 12.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.372

Space mean speed in ramp influence area, S_R = 62.7 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 62.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC 202 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2014
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1271	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	106	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	50	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1271	106	50	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	353	29	14	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1497	121	57	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1497 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1497	4800	No
$v_{FO} = v_F - v_R$	1376	4800	No
v_R	121	1900	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1497 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1497	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 13.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.569

Space mean speed in ramp influence area, S_R = 56.2 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 56.2 mph

APPENDIX F

NO-BUILD 2020 SYNCHRO AND SIM TRAFFIC REPORTS

Intersection	
Int Delay, s/veh	0.9

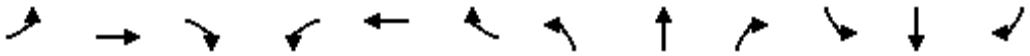
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	8	129	10	0	14	0	434	900	143	1077	0
Future Vol, veh/h	27	8	129	10	0	14	0	434	900	143	1077	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	9	143	11	0	16	0	482	1000	159	1197	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2504	2996	1197	2573	2496	982	-	0	0	1482	0	0
Stage 1	1514	1514	-	982	982	-	-	-	-	-	-	-
Stage 2	990	1482	-	1591	1514	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 19	14	226	17	29	302	0	-	-	454	-	0
Stage 1	149	182	-	300	327	-	0	-	-	-	-	0
Stage 2	297	189	-	135	182	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	0	226	-	0	302	-	-	-	454	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	149	0	-	300	327	-	-	-	-	-	-	-
Stage 2	282	189	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	2
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	-	454	-
HCM Lane V/C Ratio	-	-	-	-	0.35	-
HCM Control Delay (s)	-	-	-	-	17.1	0
HCM Lane LOS	-	-	-	-	C	A
HCM 95th %tile Q(veh)	-	-	-	-	1.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	691	2	157	90	385	0	0	529	49
Future Volume (vph)	0	0	0	691	2	157	90	385	0	0	529	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1745	0	0	1846	0	0	1842	0
Flt Permitted					0.961			0.458				
Satd. Flow (perm)	0	0	0	0	1745	0	0	853	0	0	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					11						5	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	944	0	0	528	0	0	642	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				59.0	59.0		71.0	71.0			71.0	
Total Split (%)				45.4%	45.4%		54.6%	54.6%			54.6%	
Maximum Green (s)				53.0	53.0		64.7	64.7			64.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					53.0			64.7			64.7	
Actuated g/C Ratio					0.41			0.50			0.50	
v/c Ratio					1.32			1.25			0.70	
Control Delay					185.0			159.4			30.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					185.0			159.4			30.0	
LOS					F			F			C	
Approach Delay					185.0			159.4			30.0	

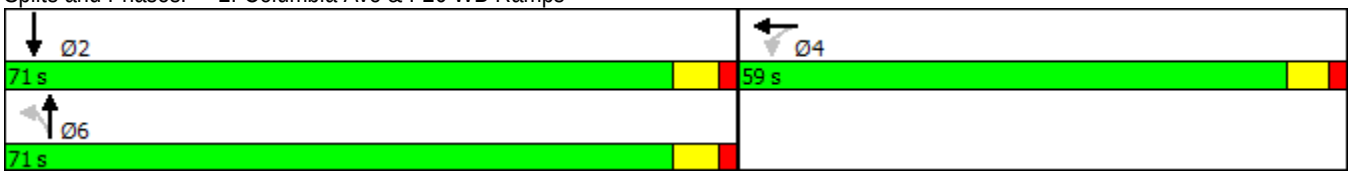
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			C	
Queue Length 50th (ft)					~1025			~555			402	
Queue Length 95th (ft)					#1282			#780			548	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					717			424			919	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.32			1.25			0.70	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.32			
Intersection Signal Delay: 131.5		Intersection LOS: F	
Intersection Capacity Utilization 119.5%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	691	2	157	90	385	0	0	529	49
Future Volume (veh/h)	0	0	0	691	2	157	90	385	0	0	529	49
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				768	2	174	100	428	0	0	588	54
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				576	1	130	97	379	0	0	837	77
Arrive On Green				0.41	0.41	0.41	0.50	0.50	0.00	0.00	0.50	0.50
Sat Flow, veh/h				1412	4	320	128	761	0	0	1681	154
Grp Volume(v), veh/h				944	0	0	528	0	0	0	0	642
Grp Sat Flow(s),veh/h/ln				1736	0	0	889	0	0	0	0	1836
Q Serve(g_s), s				53.0	0.0	0.0	29.6	0.0	0.0	0.0	0.0	35.1
Cycle Q Clear(g_c), s				53.0	0.0	0.0	64.7	0.0	0.0	0.0	0.0	35.1
Prop In Lane				0.81		0.18	0.19		0.00	0.00		0.08
Lane Grp Cap(c), veh/h				708	0	0	475	0	0	0	0	914
V/C Ratio(X)				1.33	0.00	0.00	1.11	0.00	0.00	0.00	0.00	0.70
Avail Cap(c_a), veh/h				708	0	0	475	0	0	0	0	914
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				38.5	0.0	0.0	40.9	0.0	0.0	0.0	0.0	25.2
Incr Delay (d2), s/veh				159.9	0.0	0.0	75.2	0.0	0.0	0.0	0.0	2.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				56.8	0.0	0.0	27.0	0.0	0.0	0.0	0.0	18.3
LnGrp Delay(d),s/veh				198.4	0.0	0.0	116.1	0.0	0.0	0.0	0.0	27.7
LnGrp LOS				F			F					C
Approach Vol, veh/h					944			528			642	
Approach Delay, s/veh					198.4			116.1			27.7	
Approach LOS					F			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		71.0		59.0		71.0		
Change Period (Y+Rc), s		6.3		6.0		6.3		
Max Green Setting (Gmax), s		64.7		53.0		64.7		
Max Q Clear Time (g_c+I1), s		37.1		55.0		66.7		
Green Ext Time (p_c), s		9.5		0.0		0.0		

Intersection Summary		
HCM 2010 Ctrl Delay		126.0
HCM 2010 LOS		F

SimTraffic Simulation Summary
No-Build 2020 AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2991	2611	2674	2759
Vehs Exited	2717	2371	2487	2526
Starting Vehs	249	303	325	292
Ending Vehs	523	543	512	525
Travel Distance (mi)	3020	2530	2666	2738
Travel Time (hr)	1418.0	1635.4	1594.7	1549.4
Total Delay (hr)	1363.2	1587.9	1545.1	1498.7
Total Stops	2362	2280	2178	2272
Fuel Used (gal)	432.8	466.4	461.1	453.4

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	2991	2611	2674	2759
Vehs Exited	2717	2371	2487	2526
Starting Vehs	249	303	325	292
Ending Vehs	523	543	512	525
Travel Distance (mi)	3020	2530	2666	2738
Travel Time (hr)	1418.0	1635.4	1594.7	1549.4
Total Delay (hr)	1363.2	1587.9	1545.1	1498.7
Total Stops	2362	2280	2178	2272
Fuel Used (gal)	432.8	466.4	461.1	453.4

Queuing and Blocking Report
No-Build 2020 AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	870	48	65	526
Average Queue (ft)	798	35	31	510
95th Queue (ft)	1055	51	59	517
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	82	69	3	96
Queuing Penalty (veh)	134	16	36	1172
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	680	320	873
Average Queue (ft)	666	179	861
95th Queue (ft)	679	281	870
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	100		100
Queuing Penalty (veh)	848		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	8	121	1	0	10	0	621	791	246	1376	0
Future Vol, veh/h	45	8	121	1	0	10	0	621	791	246	1376	0
Conflicting Peds, #/hr	0	0	0	0	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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	9	134	1	0	11	0	690	879	273	1529	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3211	3645	1529	3276	3205	1129	-	0	0	1569	0	0
Stage 1	2076	2076	-	1129	1129	-	-	-	-	-	-	-
Stage 2	1135	1569	-	2147	2076	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 6	~ 5	144	5	10	248	0	-	-	420	-	0
Stage 1	70	95	-	248	279	-	0	-	-	-	-	0
Stage 2	246	171	-	64	95	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	0	144	-	0	248	-	-	-	420	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	70	0	-	248	279	-	-	-	-	-	-	-
Stage 2	235	171	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	4.3
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	-	420	-
HCM Lane V/C Ratio	-	-	-	-	0.651	-
HCM Control Delay (s)	-	-	-	-	28.2	0
HCM Lane LOS	-	-	-	-	D	A
HCM 95th %tile Q(veh)	-	-	-	-	4.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

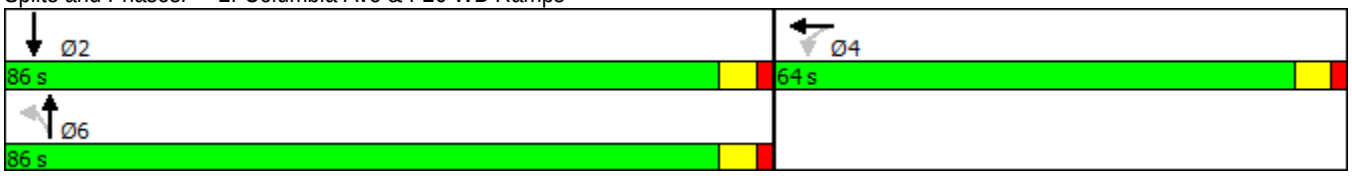
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	953	2	245	159	517	0	0	669	35
Future Volume (vph)	0	0	0	953	2	245	159	517	0	0	669	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1742	0	0	1840	0	0	1850	0
Flt Permitted					0.962			0.272				
Satd. Flow (perm)	0	0	0	0	1742	0	0	507	0	0	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10						3	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1333	0	0	751	0	0	782	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				64.0	64.0		86.0	86.0			86.0	
Total Split (%)				42.7%	42.7%		57.3%	57.3%			57.3%	
Maximum Green (s)				58.0	58.0		79.7	79.7			79.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					58.0			79.7			79.7	
Actuated g/C Ratio					0.39			0.53			0.53	
v/c Ratio					1.96			2.79			0.79	
Control Delay					465.5			834.9			35.8	
Queue Delay					0.0			0.0			0.0	
Total Delay					465.5			834.9			35.8	
LOS					F			F			D	
Approach Delay					465.5			834.9			35.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			D	
Queue Length 50th (ft)					~2026			~997			603	
Queue Length 95th (ft)					#2295			#1252			790	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					679			269			984	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.96			2.79			0.79	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 2.79
Intersection Signal Delay: 445.1 Intersection LOS: F
Intersection Capacity Utilization 156.7% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	953	2	245	159	517	0	0	669	35
Future Volume (veh/h)	0	0	0	953	2	245	159	517	0	0	669	35
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				1059	2	272	177	574	0	0	743	39
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				532	1	137	88	213	0	0	932	49
Arrive On Green				0.39	0.39	0.39	0.53	0.53	0.00	0.00	0.53	0.53
Sat Flow, veh/h				1376	3	353	110	401	0	0	1754	92
Grp Volume(v), veh/h				1333	0	0	751	0	0	0	0	782
Grp Sat Flow(s),veh/h/ln				1732	0	0	512	0	0	0	0	1846
Q Serve(g_s), s				58.0	0.0	0.0	28.1	0.0	0.0	0.0	0.0	51.6
Cycle Q Clear(g_c), s				58.0	0.0	0.0	79.7	0.0	0.0	0.0	0.0	51.6
Prop In Lane				0.79		0.20	0.24		0.00	0.00		0.05
Lane Grp Cap(c), veh/h				670	0	0	302	0	0	0	0	981
V/C Ratio(X)				1.99	0.00	0.00	2.49	0.00	0.00	0.00	0.00	0.80
Avail Cap(c_a), veh/h				670	0	0	302	0	0	0	0	981
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				46.0	0.0	0.0	57.3	0.0	0.0	0.0	0.0	28.6
Incr Delay (d2), s/veh				451.2	0.0	0.0	680.7	0.0	0.0	0.0	0.0	4.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				111.6	0.0	0.0	69.5	0.0	0.0	0.0	0.0	27.6
LnGrp Delay(d),s/veh				497.2	0.0	0.0	738.0	0.0	0.0	0.0	0.0	33.2
LnGrp LOS				F			F					C
Approach Vol, veh/h					1333			751			782	
Approach Delay, s/veh					497.2			738.0			33.2	
Approach LOS					F			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		86.0		64.0		86.0		
Change Period (Y+Rc), s		6.3		6.0		6.3		
Max Green Setting (Gmax), s		79.7		58.0		79.7		
Max Q Clear Time (g_c+I1), s		53.6		60.0		81.7		
Green Ext Time (p_c), s		14.0		0.0		0.0		

Intersection Summary		
HCM 2010 Ctrl Delay		433.7
HCM 2010 LOS		F

SimTraffic Simulation Summary
No-Build 2020 PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2216	2731	2347	2431
Vehs Exited	2050	2642	2252	2314
Starting Vehs	393	402	412	403
Ending Vehs	559	491	507	519
Travel Distance (mi)	2049	2828	2315	2397
Travel Time (hr)	2471.4	2238.0	2322.1	2343.8
Total Delay (hr)	2430.7	2186.0	2277.5	2298.1
Total Stops	1925	2105	2187	2071
Fuel Used (gal)	637.5	614.3	615.2	622.3

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	2216	2731	2347	2431
Vehs Exited	2050	2642	2252	2314
Starting Vehs	393	402	412	403
Ending Vehs	559	491	507	519
Travel Distance (mi)	2049	2828	2315	2397
Travel Time (hr)	2471.4	2238.0	2322.1	2343.8
Total Delay (hr)	2430.7	2186.0	2277.5	2298.1
Total Stops	1925	2105	2187	2071
Fuel Used (gal)	637.5	614.3	615.2	622.3

Queuing and Blocking Report
No-Build 2020 PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	876	33	61	524
Average Queue (ft)	852	8	19	509
95th Queue (ft)	942	27	50	516
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	94	0	1	96
Queuing Penalty (veh)	164	0	20	1565
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	680	488	874
Average Queue (ft)	666	281	860
95th Queue (ft)	681	440	872
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	100	0	100
Queuing Penalty (veh)	1198	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

APPENDIX G

NO-BUILD 2020 HCS REPORTS

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1385	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	385	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	816	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	816	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1546	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	429	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	910	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	910	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	12.1	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2475	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	688	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1458	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1458	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	2	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	East of US176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3909	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1086	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2302	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2302	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	56.2	mi/h
Number of lanes, N	2	
Density, D	40.9	pc/mi/ln
Level of service, LOS	E	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	East of US 176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2015	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	560	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1187	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1187	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	2	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1713	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	476	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1009	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1009	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	13.5	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1004	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	279	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	591	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	591	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	7.9	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1047	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	291	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	617	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	617	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln
Level of service, LOS	A	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1714	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	476	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1009	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1009	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	13.5	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1677	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	466	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	988	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	988	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2499	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	694	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1472	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1472	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	2	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	East of US176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3144	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	873	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1851	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1851	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	67.0	mi/h
Number of lanes, N	2	
Density, D	27.6	pc/mi/ln
Level of service, LOS	D	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	East of US 176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3790	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1053	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2232	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2232	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	58.2	mi/h
Number of lanes, N	2	
Density, D	38.4	pc/mi/ln
Level of service, LOS	E	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2523	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	701	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1486	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1486	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	2	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1519	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	422	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	895	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	895	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.9	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1459	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	405	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	859	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	859	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC-202 EB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1347	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	199	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	38	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1347	199	38	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	374	55	11	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1586	228	43	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1586 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1814	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1586 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1814	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 17.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.325	
Space mean speed in ramp influence area,	S_R = 64.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1382	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1093	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	164	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1382	1093	164	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	384	304	46	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1628	1251	188	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1628 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2879	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1628 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2879	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.255	
Space mean speed in ramp influence area,	S_R = 66.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 66.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US176 EB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2354	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1555	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	121	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2354	1555	121	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	654	432	34	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

	.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2772	1780	136	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4552	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2772 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4552	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A$ = 30.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.616	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1533	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	180	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	482	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1533	180	482	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	426	50	134	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1806	206	552	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1806 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2012	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1806 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2012	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.279	
Space mean speed in ramp influence area,	S_R = 65.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	863	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	141	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	850	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	863	141	850	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	240	39	236	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1016	161	973	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1016 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1177	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1016 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1177	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 6.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.223	
Space mean speed in ramp influence area,	S_R = 67.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC-202 WB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	977	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	70	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	27	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	977	70	27	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	271	19	8	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1151	80	31	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1151 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1231	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1151 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1231	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 11.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.287	
Space mean speed in ramp influence area,	S_R = 65.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC-202 EB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1640	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	37	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	74	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1640	37	74	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	456	10	21	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1932	42	85	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1932 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1974	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1932 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1974	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.329	
Space mean speed in ramp influence area,	S_R = 64.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1503	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	996	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	174	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1503	996	174	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	418	277	48	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1770	1140	199	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1770 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2910	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1770 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2910	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.258	
Space mean speed in ramp influence area,	S_R = 66.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 66.5	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US176 EB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2269	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	875	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	230	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2269	875	230	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	630	243	64	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

	.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2672	1001	258	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2672 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3673	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2672 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3673	4600	No

Level of Service Determination (if not F)

$D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A$ = 24.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.400	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 61.8	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2380	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	143	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1410	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2380	143	1410	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	661	40	392	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2803	164	1614	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2803 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2967	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2803 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2967	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.326	
Space mean speed in ramp influence area,	S_R = 64.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1323	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	196	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1200	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1323	196	1200	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	368	54	333	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1558	224	1373	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1558 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1782	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1558 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1782	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 11.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.234	
Space mean speed in ramp influence area,	S_R = 67.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC-202 WB On-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	54	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	114	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1405	54	114	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	390	15	32	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1655	62	130	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1655 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1717	4800	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1655 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1717	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.295	
Space mean speed in ramp influence area,	S_R = 65.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC 202 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1385	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	38	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	199	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1385	38	199	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	385	11	55	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1631	43	228	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1631 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1631	4800	No
$v_{FO} = v - v_R$	1588	4800	No
v_R	43	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1631 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1631	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 14.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.302

Space mean speed in ramp influence area, S_R = 65.0 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 65.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1546	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	164	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1093	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1546	164	1093	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	429	46	304	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1821	188	1251	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1821 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1821	4800	No
$v_{FO} = v - v_R$	1633	4800	No
v_R	188	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1821 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1821	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 11.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.315

Space mean speed in ramp influence area, S_R = 64.6 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US 176 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2475	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	121	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1555	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2475	121	1555	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	688	34	432	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2915	138	1780	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2915 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2915	4800	No
$v_{FO} = v - v_R$	2777	4800	No
v_R	138	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 2915 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2915	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 20.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.310

Space mean speed in ramp influence area, S_R = 64.8 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2015	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	482	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	180	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2015	482	180	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	560	134	50	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2373	552	206	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2373 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2373	4800	No
$v_{FO} = v_F - v_R$	1821	4800	No
v_R	552	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 2373 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2373	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 13.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.348	
Space mean speed in ramp influence area,	S_R = 63.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1713	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	850	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	141	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1713	850	141	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	236	39	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2018	973	161	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2018 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2018	4800	No
$v_{FO} = v_F - v_R$	1045	4800	No
v_R	973	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2018 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2018	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 10.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.386

Space mean speed in ramp influence area, S_R = 62.3 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 62.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC 202 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1004	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	27	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	70	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1004	27	70	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	279	8	19	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1182	31	80	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1182 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1182	4800	No
$v_{FO} = v_F - v_R$	1151	4800	No
v_R	31	1900	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1182 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1182	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 10.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.561	
Space mean speed in ramp influence area,	S_R = 56.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 56.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC 202 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1714	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	74	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	37	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1714	74	37	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	21	10	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2019	85	42	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2019 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2019	4800	No
$v_{FO} = v_F - v_R$	1934	4800	No
v_R	85	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2019 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2019	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.306

Space mean speed in ramp influence area, S_R = 64.9 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1677	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	174	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	996	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1677	174	996	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	466	48	277	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1975	199	1140	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1975 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1975	4800	No
$v_{FO} = v - v_R$	1776	4800	No
v_R	199	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1975 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1975	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 12.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.316	
Space mean speed in ramp influence area,	S_R = 64.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US 176 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2499	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	875	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2499	230	875	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	694	64	243	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2943	263	1001	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2943 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2943	4800	No
$v_{FO} = v_F - v_R$	2680	4800	No
v_R	263	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 2943 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2943	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.322

Space mean speed in ramp influence area, S_R = 64.4 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3790	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1410	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	143	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3790	1410	143	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1053	392	40	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4464	1614	164	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4464 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4464	4800	No
$v_{FO} = v - v_R$	2850	4800	No
v_R	1614	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 4464 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4464	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.443	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 60.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2523	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1200	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	196	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2523	1200	196	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	701	333	54	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2972	1373	224	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2972 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2972	4800	No
$v_{FO} = v - v_R$	1599	4800	No
v_R	1373	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2972 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 18.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.422	
Space mean speed in ramp influence area,	S_R = 61.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 61.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC 202 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2020 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1519	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	114	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	54	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1519	114	54	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	422	32	15	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1789	130	62	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1789 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1789	4800	No
$v_{FO} = v - v_R$	1659	4800	No
v_R	130	1900	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1789 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1789	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 16.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.570

Space mean speed in ramp influence area, S_R = 56.2 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 56.2 mph

APPENDIX H

NO-BUILD 2040 SYNCHRO AND SIM TRAFFIC REPORTS

Intersection	
Int Delay, s/veh	0.8

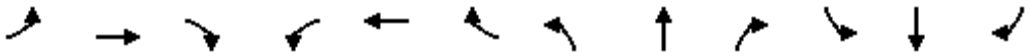
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	9	185	12	0	17	0	208	1209	147	1461	0
Future Vol, veh/h	29	9	185	12	0	17	0	208	1209	147	1461	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	10	206	13	0	19	0	231	1343	163	1623	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2862	3524	1623	2961	2853	903	-	0	0	1574	0	0
Stage 1	1950	1950	-	903	903	-	-	-	-	-	-	-
Stage 2	912	1574	-	2058	1950	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 11	~ 6	~ 127	~ 9	17	336	0	-	-	419	-	0
Stage 1	83	111	-	332	356	-	0	-	-	-	-	0
Stage 2	328	170	-	72	111	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	0	~ 127	-	0	336	-	-	-	419	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	83	0	-	332	356	-	-	-	-	-	-	-
Stage 2	310	170	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	1.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	-	419	-
HCM Lane V/C Ratio	-	-	-	-	0.39	-
HCM Control Delay (s)	-	-	-	-	19	0
HCM Lane LOS	-	-	-	-	C	A
HCM 95th %tile Q(veh)	-	-	-	-	1.8	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1026	3	159	125	129	0	0	582	56
Future Volume (vph)	0	0	0	1026	3	159	125	129	0	0	582	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1754	0	0	1818	0	0	1840	0
Flt Permitted					0.959			0.190				
Satd. Flow (perm)	0	0	0	0	1754	0	0	354	0	0	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7						4	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1320	0	0	282	0	0	709	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				73.0	73.0		77.0	77.0			77.0	
Total Split (%)				48.7%	48.7%		51.3%	51.3%			51.3%	
Maximum Green (s)				67.0	67.0		70.7	70.7			70.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					67.0			70.7			70.7	
Actuated g/C Ratio					0.45			0.47			0.47	
v/c Ratio					1.68			1.70			0.82	
Control Delay					339.4			367.1			43.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					339.4			367.1			43.0	
LOS					F			F			D	
Approach Delay					339.4			367.1			43.0	

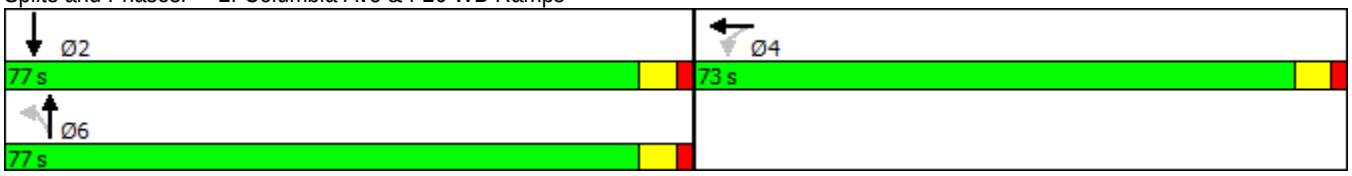
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			D	
Queue Length 50th (ft)					~1890			~399			584	
Queue Length 95th (ft)					#2161			#421			769	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					787			166			869	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.68			1.70			0.82	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.70			
Intersection Signal Delay: 251.8		Intersection LOS: F	
Intersection Capacity Utilization 129.9%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1026	3	159	125	129	0	0	582	56
Future Volume (veh/h)	0	0	0	1026	3	159	125	129	0	0	582	56
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				1140	3	177	139	143	0	0	647	62
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				674	2	105	108	100	0	0	789	76
Arrive On Green				0.45	0.45	0.45	0.47	0.47	0.00	0.00	0.47	0.47
Sat Flow, veh/h				1508	4	234	154	212	0	0	1674	160
Grp Volume(v), veh/h				1320	0	0	282	0	0	0	0	709
Grp Sat Flow(s),veh/h/ln				1746	0	0	366	0	0	0	0	1834
Q Serve(g_s), s				67.0	0.0	0.0	20.7	0.0	0.0	0.0	0.0	50.0
Cycle Q Clear(g_c), s				67.0	0.0	0.0	70.7	0.0	0.0	0.0	0.0	50.0
Prop In Lane				0.86		0.13	0.49		0.00	0.00		0.09
Lane Grp Cap(c), veh/h				780	0	0	208	0	0	0	0	865
V/C Ratio(X)				1.69	0.00	0.00	1.35	0.00	0.00	0.00	0.00	0.82
Avail Cap(c_a), veh/h				780	0	0	208	0	0	0	0	865
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				41.5	0.0	0.0	59.1	0.0	0.0	0.0	0.0	34.2
Incr Delay (d2), s/veh				317.2	0.0	0.0	187.3	0.0	0.0	0.0	0.0	6.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				101.0	0.0	0.0	19.5	0.0	0.0	0.0	0.0	26.7
LnGrp Delay(d),s/veh				358.7	0.0	0.0	246.4	0.0	0.0	0.0	0.0	40.5
LnGrp LOS				F			F					D
Approach Vol, veh/h					1320			282			709	
Approach Delay, s/veh					358.7			246.4			40.5	
Approach LOS					F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		77.0		73.0		77.0		
Change Period (Y+Rc), s		6.3		6.0		6.3		
Max Green Setting (Gmax), s		70.7		67.0		70.7		
Max Q Clear Time (g_c+I1), s		52.0		69.0		72.7		
Green Ext Time (p_c), s		7.1		0.0		0.0		

Intersection Summary		
HCM 2010 Ctrl Delay		247.4
HCM 2010 LOS		F

SimTraffic Simulation Summary
No-Build 2040 AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2588	2719	2674	2659
Vehs Exited	2569	2612	2593	2591
Starting Vehs	459	438	425	437
Ending Vehs	478	545	506	510
Travel Distance (mi)	2864	2890	2921	2891
Travel Time (hr)	2438.5	2434.2	2281.7	2384.8
Total Delay (hr)	2386.1	2381.0	2227.9	2331.7
Total Stops	2344	2247	2116	2236
Fuel Used (gal)	659.2	659.7	627.3	648.7

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	2588	2719	2674	2659
Vehs Exited	2569	2612	2593	2591
Starting Vehs	459	438	425	437
Ending Vehs	478	545	506	510
Travel Distance (mi)	2864	2890	2921	2891
Travel Time (hr)	2438.5	2434.2	2281.7	2384.8
Total Delay (hr)	2386.1	2381.0	2227.9	2331.7
Total Stops	2344	2247	2116	2236
Fuel Used (gal)	659.2	659.7	627.3	648.7

Queuing and Blocking Report
No-Build 2040 AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	870	48	70	524
Average Queue (ft)	837	34	40	511
95th Queue (ft)	985	50	64	522
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	91	62	5	87
Queuing Penalty (veh)	204	18	76	1406
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	704	193	889
Average Queue (ft)	675	81	861
95th Queue (ft)	691	161	883
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	98		87
Queuing Penalty (veh)	1166		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	9	173	1	0	12	0	711	1168	245	1793	0
Future Vol, veh/h	48	9	173	1	0	12	0	711	1168	245	1793	0
Conflicting Peds, #/hr	0	0	0	0	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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	10	192	1	0	13	0	790	1298	272	1992	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3983	4625	1992	4077	3976	1439	-	0	0	2088	0	0
Stage 1	2537	2537	-	1439	1439	-	-	-	-	-	-	-
Stage 2	1446	2088	-	2638	2537	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 2	~ 1	~ 76	~ 1	3	163	0	-	-	~ 264	-	0
Stage 1	~ 37	55	-	165	198	-	0	-	-	-	-	0
Stage 2	164	94	-	32	55	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	0	~ 76	-	0	163	-	-	-	~ 264	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 37	0	-	165	198	-	-	-	-	-	-	-
Stage 2	151	94	-	-	0	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0	12.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	-	~ 264	-
HCM Lane V/C Ratio	-	-	-	-	1.031	-
HCM Control Delay (s)	-	-	-	-	105.5	0
HCM Lane LOS	-	-	-	-	F	A
HCM 95th %tile Q(veh)	-	-	-	-	10.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1325	3	248	228	543	0	0	713	36
Future Volume (vph)	0	0	0	1325	3	248	228	543	0	0	713	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	1751	0	0	1835	0	0	1852	0
Flt Permitted					0.960			0.091				
Satd. Flow (perm)	0	0	0	0	1751	0	0	170	0	0	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8						2	
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		883			668			593			885	
Travel Time (s)		13.4			10.1			11.6			17.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1751	0	0	856	0	0	832	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Detector Phase				4	4		6	6			2	
Switch Phase												
Minimum Initial (s)				10.0	10.0		10.0	10.0			10.0	
Minimum Split (s)				22.0	22.0		22.0	22.0			22.0	
Total Split (s)				72.0	72.0		78.0	78.0			78.0	
Total Split (%)				48.0%	48.0%		52.0%	52.0%			52.0%	
Maximum Green (s)				66.0	66.0		71.7	71.7			71.7	
Yellow Time (s)				4.0	4.0		4.3	4.3			4.3	
All-Red Time (s)				2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)					0.0			0.0			0.0	
Total Lost Time (s)					6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0	4.0		3.0	3.0			3.0	
Recall Mode				None	None		Min	Min			Min	
Act Effct Green (s)					66.0			71.7			71.7	
Actuated g/C Ratio					0.44			0.48			0.48	
v/c Ratio					2.26			10.57			0.94	
Control Delay					595.1			4335.5			56.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					595.1			4335.5			56.0	
LOS					F			F			E	
Approach Delay					595.1			4335.5			56.0	

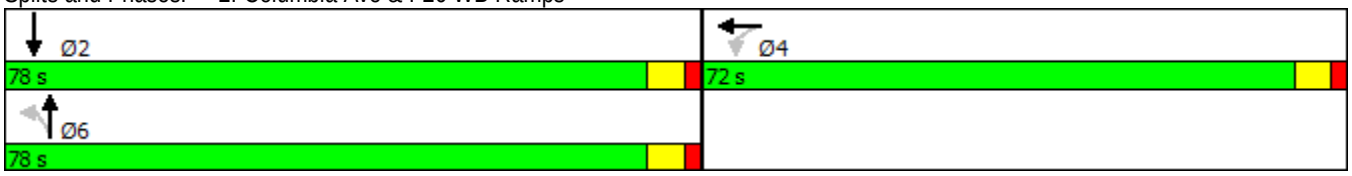
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					F			F			E	
Queue Length 50th (ft)					~2788			~1597			757	
Queue Length 95th (ft)					#3051			#1865			#1045	
Internal Link Dist (ft)		803			588			513			805	
Turn Bay Length (ft)												
Base Capacity (vph)					774			81			886	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					2.26			10.57			0.94	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 10.57			
Intersection Signal Delay: 1395.7		Intersection LOS: F	
Intersection Capacity Utilization 185.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1325	3	248	228	543	0	0	713	36
Future Volume (veh/h)	0	0	0	1325	3	248	228	543	0	0	713	36
Number				7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1900	1863	1900	1900	1863	0	0	1863	1900
Adj Flow Rate, veh/h				1472	3	276	253	603	0	0	792	40
Adj No. of Lanes				0	1	0	0	1	0	0	1	0
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				644	1	121	49	43	0	0	840	42
Arrive On Green				0.44	0.44	0.44	0.48	0.48	0.00	0.00	0.48	0.48
Sat Flow, veh/h				1464	3	274	37	89	0	0	1758	89
Grp Volume(v), veh/h				1751	0	0	856	0	0	0	0	832
Grp Sat Flow(s),veh/h/ln				1741	0	0	127	0	0	0	0	1847
Q Serve(g_s), s				66.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	64.2
Cycle Q Clear(g_c), s				66.0	0.0	0.0	71.7	0.0	0.0	0.0	0.0	64.2
Prop In Lane				0.84		0.16	0.30		0.00	0.00		0.05
Lane Grp Cap(c), veh/h				766	0	0	92	0	0	0	0	883
V/C Ratio(X)				2.29	0.00	0.00	9.34	0.00	0.00	0.00	0.00	0.94
Avail Cap(c_a), veh/h				766	0	0	92	0	0	0	0	883
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				42.0	0.0	0.0	72.5	0.0	0.0	0.0	0.0	37.2
Incr Delay (d2), s/veh				582.7	0.0	0.0	3774.8	0.0	0.0	0.0	0.0	17.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				155.7	0.0	0.0	99.9	0.0	0.0	0.0	0.0	37.0
LnGrp Delay(d),s/veh				624.7	0.0	0.0	3847.3	0.0	0.0	0.0	0.0	55.1
LnGrp LOS				F			F					E
Approach Vol, veh/h					1751			856			832	
Approach Delay, s/veh					624.7			3847.3			55.1	
Approach LOS					F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		78.0		72.0		78.0		
Change Period (Y+Rc), s		6.3		6.0		6.3		
Max Green Setting (Gmax), s		71.7		66.0		71.7		
Max Q Clear Time (g_c+I1), s		66.2		68.0		73.7		
Green Ext Time (p_c), s		4.6		0.0		0.0		

Intersection Summary		
HCM 2010 Ctrl Delay		1289.0
HCM 2010 LOS		F

SimTraffic Simulation Summary
No-Build 2040 PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	2911	2325	2458	2563
Vehs Exited	2864	2264	2432	2520
Starting Vehs	445	470	463	460
Ending Vehs	492	531	489	504
Travel Distance (mi)	3117	2359	2559	2678
Travel Time (hr)	3248.8	3755.9	3657.5	3554.1
Total Delay (hr)	3192.0	3710.8	3609.3	3504.0
Total Stops	2591	2078	2604	2426
Fuel Used (gal)	857.4	946.0	931.4	911.6

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	2911	2325	2458	2563
Vehs Exited	2864	2264	2432	2520
Starting Vehs	445	470	463	460
Ending Vehs	492	531	489	504
Travel Distance (mi)	3117	2359	2559	2678
Travel Time (hr)	3248.8	3755.9	3657.5	3554.1
Total Delay (hr)	3192.0	3710.8	3609.3	3504.0
Total Stops	2591	2078	2604	2426
Fuel Used (gal)	857.4	946.0	931.4	911.6

Queuing and Blocking Report
No-Build 2040 PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	TR	LT
Maximum Queue (ft)	882	47	55	525
Average Queue (ft)	863	10	28	510
95th Queue (ft)	942	32	56	516
Link Distance (ft)	743	38	20	508
Upstream Blk Time (%)	97	1	2	95
Queuing Penalty (veh)	224	0	41	1934
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	LTR	LT	TR
Maximum Queue (ft)	692	420	873
Average Queue (ft)	667	249	859
95th Queue (ft)	683	391	874
Link Distance (ft)	537	508	858
Upstream Blk Time (%)	100		100
Queuing Penalty (veh)	1573		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

APPENDIX I

NO-BUILD 2040 HCS REPORTS

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2003	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	556	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1180	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1180	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	2	
Density, D	15.8	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2202	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	612	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1297	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1297	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	2	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3396	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	943	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2000	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2000	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	63.9	mi/h
Number of lanes, N	2	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 EB
From/To:	East of US176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	5164	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1434	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	3041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	3041	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	28.9	mi/h
Number of lanes, N	2	
Density, D	105.3	pc/mi/ln
Level of service, LOS	F	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	East of US 176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2790	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	775	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1643	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1643	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	70.4	mi/h
Number of lanes, N	2	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2418	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	672	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1424	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1424	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	2	
Density, D	19.5	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1414	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	393	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	833	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	833	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.1	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	AM Peak
Freeway/Direction:	I-26 WB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	1467	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	408	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	864	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	864	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	2	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2415	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	671	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1422	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1422	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	2	
Density, D	19.5	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2370	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	658	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1396	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1396	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	2	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3502	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	973	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2062	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2062	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	62.5	mi/h
Number of lanes, N	2	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 EB
From/To:	East of US176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	4257	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1183	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2507	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2507	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	49.9	mi/h
Number of lanes, N	2	
Density, D	50.3	pc/mi/ln
Level of service, LOS	F	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	East of US 176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	5028	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1397	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2961	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2961	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	32.4	mi/h
Number of lanes, N	2	
Density, D	91.3	pc/mi/ln
Level of service, LOS	F	

free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and US 176
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	3467	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	963	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2042	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	2042	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	63.0	mi/h
Number of lanes, N	2	
Density, D	32.4	pc/mi/ln
Level of service, LOS	D	

free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	Between S-48 and SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2158	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	599	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1271	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1271	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	2	
Density, D	17.1	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.80

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	AECOM
Agency or Company:	AECOM
Date Performed:	6/30/2016
Analysis Time Period:	PM Peak
Freeway/Direction:	I-26 WB
From/To:	West of SC 202
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Flow Inputs and Adjustments

Volume, V	2084	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	579	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1227	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.33	ramps/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	1.3	mi/h
Free-flow speed, FFS	74.1	mi/h

LOS and Performance Measures

Flow rate, vp	1227	pc/h/ln
Free-flow speed, FFS	74.1	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	2	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

free-flow speed is less than 55 mph.

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC-202 EB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1957	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	46	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1957	245	46	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	544	68	13	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2305	280	53	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2305 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2585	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2305 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2585	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.353	
Space mean speed in ramp influence area,	S_R = 63.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1979	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1417	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	223	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1979	1417	223	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	550	394	62	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2331	1622	255	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2331 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3953	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2331 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3953	4600	No

Level of Service Determination (if not F)

$D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 26.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.389	
Space mean speed in ramp influence area,	S_R = 62.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 62.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US176 EB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3248	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1916	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	148	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3248	1916	148	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	902	532	41	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

	.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3825	2193	166	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 3825 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6018	4800	Yes

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3825 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6018	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A =$ 42.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 1.848

Space mean speed in ramp influence area, S_R = 14.0 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 14.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2196	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	222	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	594	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2196	222	594	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	610	62	165	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2586	254	680	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2586 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2840	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2586 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2840	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.317	
Space mean speed in ramp influence area,	S_R = 64.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	184	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1188	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1230	184	1188	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	342	51	330	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1449	211	1360	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1449 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1660	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1449 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1660	4600	No

Level of Service Determination (if not F)

$D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A$ = 10.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.231	
Space mean speed in ramp influence area,	S_R = 67.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 67.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC-202 WB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1381	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	86	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	33	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1381	86	33	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	384	24	9	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1627	98	38	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1627 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1725	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1627 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1725	4600	No

Level of Service Determination (if not F)

$D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.296	
Space mean speed in ramp influence area,	S_R = 65.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC-202 EB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2325	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	45	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	90	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2325	45	90	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	646	13	25	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2738	52	103	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2738 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2790	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2738 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2790	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.364	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2140	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1362	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	230	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2140	1362	230	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	594	378	64	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2520	1559	263	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2520 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4079	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2520 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4079	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A$ = 27.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.416	
Space mean speed in ramp influence area,	S_R = 61.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 61.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US176 EB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3218	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	1079	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	284	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3218	1079	284	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	894	300	79	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	1.5	
Recreational vehicle PCE, ER	2.0	2.0	1.2	

	.943	0.971	0.990	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3790	1235	319	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 3790 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5025	4800	Yes

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3790 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5025	4600	Yes

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A$ = 34.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.839	
Space mean speed in ramp influence area,	S_R = 47.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 47.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3290	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	177	vph
Length of first accel/decel lane	1425	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1738	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3290	177	1738	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	914	49	483	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3875	203	1989	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 3875 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4078	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3875 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4078	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A =$ 28.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.480	
Space mean speed in ramp influence area,	S_R = 59.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 59.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1891	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	267	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1576	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1891	267	1576	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	525	74	438	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2227	306	1804	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2227 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2533	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2227 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2533	4600	No

Level of Service Determination (if not F)

$D = 5.475 + 0.00734\ v_R + 0.0078\ v_{R12} - 0.00627\ L_A =$ 17.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.260	
Space mean speed in ramp influence area,	S_R = 66.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 66.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	6/30/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC-202 WB On-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2018	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	66	vph
Length of first accel/decel lane	525	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	140	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2018	66	140	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	561	18	39	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2377	76	160	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 2377 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2453	4800	No

v_3 or v_{av34} 0 pc/h (Equation 13-14 or 13-17)

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2377 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2453	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.319	
Space mean speed in ramp influence area,	S_R = 64.5	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC 202 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2003	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	46	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	245	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2003	46	245	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	556	13	68	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2359	53	280	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2359 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2359	4800	No
$v_{FO} = v_F - v_R$	2306	4800	No
v_R	53	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2359 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2359	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 20.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.303	
Space mean speed in ramp influence area,	S_R = 65.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2202	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	223	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1417	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2202	223	1417	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	612	62	394	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2593	255	1622	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2593 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2593	4800	No
$v_{FO} = v_F - v_R$	2338	4800	No
v_R	255	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2593 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2593	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.321	
Space mean speed in ramp influence area,	S_R = 64.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US 176 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3396	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	148	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1916	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3396	148	1916	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	943	41	532	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4000	169	2193	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4000 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4000	4800	No
$v_{FO} = v - v_F - v_R$	3831	4800	No
v_R	169	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 4000 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4000	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 29.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.313	
Space mean speed in ramp influence area,	S_R = 64.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2790	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	594	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	222	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2790	594	222	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	775	165	62	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3286	680	254	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3286 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3286	4800	No
$v_{FO} = v_F - v_R$	2606	4800	No
v_R	680	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 3286 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3286	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 21.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.359	
Space mean speed in ramp influence area,	S_R = 63.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2418	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1188	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	184	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2418	1188	184	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	672	330	51	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2848	1360	211	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2848 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2848	4800	No
$v_{FO} = v - v_F - v_R$	1488	4800	No
v_R	1360	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2848 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2848	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 17.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.420	
Space mean speed in ramp influence area,	S_R = 61.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 61.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC 202 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1414	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	33	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	86	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1414	33	86	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	393	9	24	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1665	38	98	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1665 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1665	4800	No
$v_{FO} = v - v_R$	1627	4800	No
v_R	38	1900	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 1665 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1665	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 15.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.561

Space mean speed in ramp influence area, S_R = 56.5 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 56.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	SC 202 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2415	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	90	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	45	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1050	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2415	90	45	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	671	25	13	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2844	103	52	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2844 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2844	4800	No
$v_{FO} = v_F - v_R$	2741	4800	No
v_R	103	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2844 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2844	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.307	
Space mean speed in ramp influence area,	S_R = 64.9	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	S-48 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2370	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	230	vph
Length of first accel/decel lane	975	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1362	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1725	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2370	230	1362	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	658	64	378	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2791	263	1559	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2791 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2791	4800	No
$v_{FO} = v_F - v_R$	2528	4800	No
v_R	263	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2791 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2791	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 19.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.322

Space mean speed in ramp influence area, S_R = 64.4 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.4 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 EB
Junction:	US 176 EB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3502	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	284	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1079	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3502	284	1079	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	973	79	300	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4125	325	1235	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4125 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4125	4800	No
$v_{FO} = v_F - v_R$	3800	4800	No
v_R	325	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 4125 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4125	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_{12}$ = 30.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.327	
Space mean speed in ramp influence area,	S_R = 64.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	US 176 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	5028	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1738	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	177	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	775	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5028	1738	177	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1397	483	49	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5922	1989	203	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5922 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5922	4800	Yes
$v_{FO} = v_F - v_R$	3933	4800	No
v_R	1989	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 5922 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5922	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 44.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	D_S = 0.477	
Space mean speed in ramp influence area,	S_R = 59.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 59.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3467	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1576	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	267	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1475	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3467	1576	267	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	963	438	74	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4083	1804	306	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4083 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4083	4800	No
$v_{FO} = v - v_R$	2279	4800	No
v_R	1804	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 4083 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4083	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 28.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 59.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.80

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	SC 202 WB Off-Ramp
Jurisdiction:	
Analysis Year:	2040 No-Build
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2158	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	25.0	mph
Volume on ramp	140	vph
Length of first accel/decel lane	400	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	66	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2158	140	66	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	599	39	18	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2542	160	76	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2542 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2542	4800	No
$v_{FO} = v - v_R$	2382	4800	No
v_R	160	1900	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2542 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2542	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 22.5 pc/mi/ln

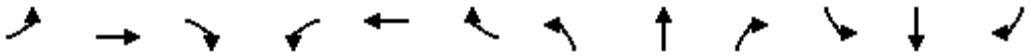
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.572	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 56.1	mph

APPENDIX J

BUILD ALT 1 2020 SYNCHRO AND SIM TRAFFIC REPORTS

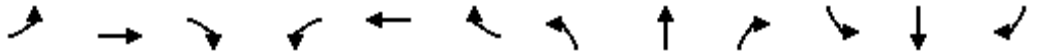


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	433	0	0	0	0	0	1077	0
Future Volume (vph)	0	0	0	0	433	0	0	0	0	0	1077	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		153			109			130			161	
Travel Time (s)		3.0			2.1			2.5			3.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	481	0	0	0	0	0	1197	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					26.0						34.0	
Total Split (%)					43.3%						56.7%	
Maximum Green (s)					20.0						28.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					13.9						34.1	
Actuated g/C Ratio					0.23						0.57	
v/c Ratio					0.59						0.41	
Control Delay					18.1						6.1	
Queue Delay					0.0						0.0	
Total Delay					18.1						6.1	
LOS					B						A	
Approach Delay					18.1						6.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B						A	
Queue Length 50th (ft)					60						42	
Queue Length 95th (ft)					59						114	
Internal Link Dist (ft)		73			29			50			81	
Turn Bay Length (ft)												
Base Capacity (vph)					1179						2893	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.41						0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 48 (80%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 9.6		Intersection LOS: A	
Intersection Capacity Utilization 46.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	433	0	0	0	0	0	1077	0
Future Volume (veh/h)	0	0	0	0	433	0	0	0	0	0	1077	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	481	0				0	1197	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	696	0				0	2373	0
Arrive On Green				0.00	0.20	0.00				0.00	0.15	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	481	0				0	1197	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	7.6	0.0				0.0	13.0	0.0
Cycle Q Clear(g_c), s				0.0	7.6	0.0				0.0	13.0	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	696	0				0	2373	0
V/C Ratio(X)				0.00	0.69	0.00				0.00	0.50	0.00
Avail Cap(c_a), veh/h				0	1180	0				0	2373	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	22.4	0.0				0.0	19.0	0.0
Incr Delay (d2), s/veh				0.0	1.2	0.0				0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	3.8	0.0				0.0	6.2	0.0
LnGrp Delay(d),s/veh				0.0	23.7	0.0				0.0	19.8	0.0
LnGrp LOS					C						B	
Approach Vol, veh/h					481						1197	
Approach Delay, s/veh					23.7						19.8	
Approach LOS					C						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				17.8		34.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				20.0		28.0		
Max Q Clear Time (g_c+I1), s				9.6		15.0		
Green Ext Time (p_c), s				2.2		6.6		

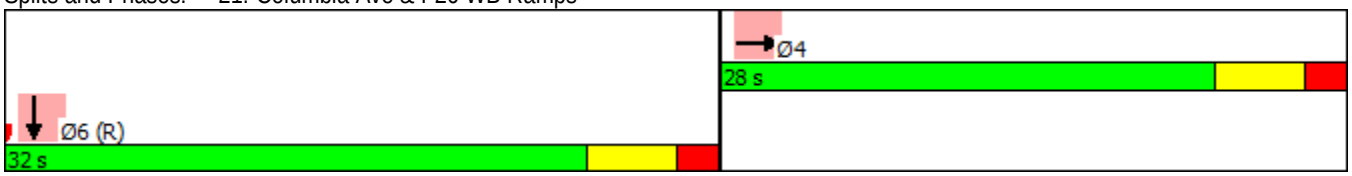
Intersection Summary	
HCM 2010 Ctrl Delay	20.9
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	0	0	0	0	0	0	0	0	529	0
Future Volume (vph)	0	370	0	0	0	0	0	0	0	0	529	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		147			115			170			129	
Travel Time (s)		2.9			2.2			3.3			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	411	0	0	0	0	0	0	0	0	588	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		28.0									32.0	
Total Split (%)		46.7%									53.3%	
Maximum Green (s)		22.0									26.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		12.6									35.4	
Actuated g/C Ratio		0.21									0.59	
v/c Ratio		0.55									0.28	
Control Delay		5.2									6.9	
Queue Delay		0.0									0.0	
Total Delay		5.2									6.9	
LOS		A									A	
Approach Delay		5.2									6.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A									A	
Queue Length 50th (ft)		4									46	
Queue Length 95th (ft)		10									85	
Internal Link Dist (ft)		67			35			90			49	
Turn Bay Length (ft)												
Base Capacity (vph)		1297									2088	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		0									7	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.32									0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 3 (5%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 6.2		Intersection LOS: A	
Intersection Capacity Utilization 34.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 21: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	370	0	0	0	0	0	0	0	0	529	0
Future Volume (veh/h)	0	370	0	0	0	0	0	0	0	0	529	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	411	0							0	588	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	625	0							0	1534	0
Arrive On Green	0.00	0.18	0.00							0.00	0.43	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	411	0							0	588	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	6.5	0.0							0.0	6.8	0.0
Cycle Q Clear(g_c), s	0.0	6.5	0.0							0.0	6.8	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	625	0							0	1534	0
V/C Ratio(X)	0.00	0.66	0.00							0.00	0.38	0.00
Avail Cap(c_a), veh/h	0	1298	0							0	1534	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	23.0	0.0							0.0	11.6	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0							0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.2	0.0							0.0	3.4	0.0
LnGrp Delay(d),s/veh	0.0	24.2	0.0							0.0	12.3	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		411									588	
Approach Delay, s/veh		24.2									12.3	
Approach LOS		C									B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				16.6		32.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				22.0		26.0		
Max Q Clear Time (g_c+I1), s				8.5		8.8		
Green Ext Time (p_c), s				2.1		3.6		

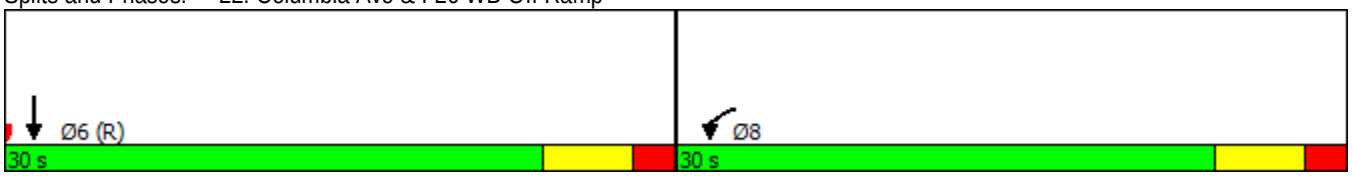
Intersection Summary	
HCM 2010 Ctrl Delay	17.2
HCM 2010 LOS	B

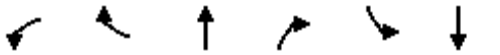
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	691	0	0	0	0	529
Future Volume (vph)	691	0	0	0	0	529
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	306					
Link Speed (mph)	30		35			35
Link Distance (ft)	161		300			170
Travel Time (s)	3.7		5.8			3.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	768	0	0	0	0	588
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		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)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	15.0					22.0
Total Split (s)	30.0					30.0
Total Split (%)	50.0%					50.0%
Maximum Green (s)	24.0					24.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	14.8					33.2
Actuated g/C Ratio	0.25					0.55
v/c Ratio	0.71					0.30
Control Delay	15.6					2.7
Queue Delay	0.0					0.2
Total Delay	15.6					2.9
LOS	B					A
Approach Delay	15.6					2.9

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B					A
Queue Length 50th (ft)	74					11
Queue Length 95th (ft)	108					15
Internal Link Dist (ft)	81		220			90
Turn Bay Length (ft)						
Base Capacity (vph)	1556					1960
Starvation Cap Reductn	0					621
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.49					0.44

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 3 (5%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 44.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 22: Columbia Ave & I-26 WB Off Ramp





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	691	0	0	0	0	529
Future Volume (veh/h)	691	0	0	0	0	529
Number	3	18			1	6
Initial Q (Qb), veh	0	0			0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	
Parking Bus, Adj	1.00	1.00			1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0			0	1863
Adj Flow Rate, veh/h	768	0			0	588
Adj No. of Lanes	2	0			0	2
Peak Hour Factor	0.90	0.90			0.90	0.90
Percent Heavy Veh, %	2	0			0	2
Cap, veh/h	0	0			0	1416
Arrive On Green	0.00	0.00			0.00	0.13
Sat Flow, veh/h	0				0	3725
Grp Volume(v), veh/h	0.0				0	588
Grp Sat Flow(s),veh/h/ln					0	1770
Q Serve(g_s), s					0.0	9.2
Cycle Q Clear(g_c), s					0.0	9.2
Prop In Lane					0.00	
Lane Grp Cap(c), veh/h					0	1416
V/C Ratio(X)					0.00	0.42
Avail Cap(c_a), veh/h					0	1416
HCM Platoon Ratio					1.00	0.33
Upstream Filter(I)					0.00	0.97
Uniform Delay (d), s/veh					0.0	19.6
Incr Delay (d2), s/veh					0.0	0.9
Initial Q Delay(d3),s/veh					0.0	0.0
%ile BackOfQ(50%),veh/ln					0.0	4.7
LnGrp Delay(d),s/veh					0.0	20.5
LnGrp LOS						C
Approach Vol, veh/h						588
Approach Delay, s/veh						20.5
Approach LOS						C

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						30.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						24.0		
Max Q Clear Time (g_c+I1), s						11.2		
Green Ext Time (p_c), s						3.1		

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

SimTraffic Simulation Summary
2020 Build AM DDI

Summary of All Intervals

Start Time	7:20
End Time	8:30
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	5184
Vehs Exited	5189
Starting Vehs	139
Ending Vehs	134
Travel Distance (mi)	5590
Travel Time (hr)	141.0
Total Delay (hr)	37.8
Total Stops	2324
Fuel Used (gal)	222.9

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Vehs Entered	5184
Vehs Exited	5189
Starting Vehs	139
Ending Vehs	134
Travel Distance (mi)	5590
Travel Time (hr)	141.0
Total Delay (hr)	37.8
Total Stops	2324
Fuel Used (gal)	222.9

Queuing and Blocking Report
2020 Build AM DDI

Intersection: 1: Columbia Ave & I-26 EB Ramps

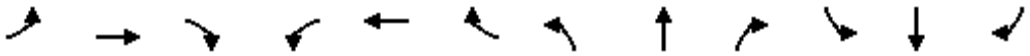
Movement	WB	WB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	144	113	98	120	55
Average Queue (ft)	102	54	54	95	16
95th Queue (ft)	144	99	100	110	46
Link Distance (ft)	57	57	13	13	13
Upstream Blk Time (%)	32	7	16	33	5
Queuing Penalty (veh)	69	14	56	120	19
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 21: Columbia Ave & I-26 WB Ramps

Movement	EB	EB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	93	92	75	153
Average Queue (ft)	48	62	24	117
95th Queue (ft)	90	108	61	170
Link Distance (ft)	13	13	16	16
Upstream Blk Time (%)	39	43	6	31
Queuing Penalty (veh)	72	79	17	81
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 22: Columbia Ave & I-26 WB Off Ramp

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	165	160	51	73
Average Queue (ft)	113	111	12	37
95th Queue (ft)	156	153	40	60
Link Distance (ft)	103	103	30	30
Upstream Blk Time (%)	8	9	5	23
Queuing Penalty (veh)	26	30	14	60
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	624	0	0	0	0	0	1376	0
Future Volume (vph)	0	0	0	0	624	0	0	0	0	0	1376	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		135			109			140			150	
Travel Time (s)		2.6			2.1			2.7			2.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	693	0	0	0	0	0	1529	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					26.0						34.0	
Total Split (%)					43.3%						56.7%	
Maximum Green (s)					20.0						28.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					17.3						30.7	
Actuated g/C Ratio					0.29						0.51	
v/c Ratio					0.68						0.59	
Control Delay					19.2						10.2	
Queue Delay					0.0						0.0	
Total Delay					19.2						10.2	
LOS					B						B	
Approach Delay					19.2						10.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B						B	
Queue Length 50th (ft)					113						125	
Queue Length 95th (ft)					84						221	
Internal Link Dist (ft)		55			29			60			70	
Turn Bay Length (ft)												
Base Capacity (vph)					1179						2598	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.59						0.59	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 48 (80%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 13.0		Intersection LOS: B	
Intersection Capacity Utilization 53.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: I-26 EB Ramps & Columbia Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	624	0	0	0	0	0	1376	0
Future Volume (veh/h)	0	0	0	0	624	0	0	0	0	0	1376	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	693	0				0	1529	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	911	0				0	2373	0
Arrive On Green				0.00	0.26	0.00				0.00	0.15	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	693	0				0	1529	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	10.8	0.0				0.0	16.9	0.0
Cycle Q Clear(g_c), s				0.0	10.8	0.0				0.0	16.9	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	911	0				0	2373	0
V/C Ratio(X)				0.00	0.76	0.00				0.00	0.64	0.00
Avail Cap(c_a), veh/h				0	1180	0				0	2373	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	20.6	0.0				0.0	20.7	0.0
Incr Delay (d2), s/veh				0.0	2.2	0.0				0.0	1.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	5.6	0.0				0.0	8.2	0.0
LnGrp Delay(d),s/veh				0.0	22.8	0.0				0.0	22.1	0.0
LnGrp LOS					C						C	
Approach Vol, veh/h					693						1529	
Approach Delay, s/veh					22.8						22.1	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				21.4		34.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				20.0		28.0		
Max Q Clear Time (g_c+I1), s				12.8		18.9		
Green Ext Time (p_c), s				2.6		6.3		

Intersection Summary	
HCM 2010 Ctrl Delay	22.3
HCM 2010 LOS	C

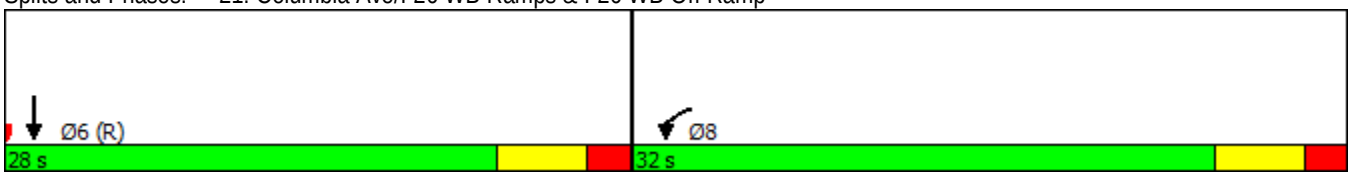
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	953	0	0	0	0	669
Future Volume (vph)	953	0	0	0	0	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	142					
Link Speed (mph)	30		35			35
Link Distance (ft)	149		327			152
Travel Time (s)	3.4		6.4			3.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1059	0	0	0	0	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		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)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	22.0					22.0
Total Split (s)	32.0					28.0
Total Split (%)	53.3%					46.7%
Maximum Green (s)	26.0					22.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	22.4					25.6
Actuated g/C Ratio	0.37					0.43
v/c Ratio	0.77					0.49
Control Delay	18.2					6.1
Queue Delay	0.0					0.2
Total Delay	18.2					6.3
LOS	B					A
Approach Delay	18.2					6.3

21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B					A
Queue Length 50th (ft)	141					24
Queue Length 95th (ft)	189					32
Internal Link Dist (ft)	69		247			72
Turn Bay Length (ft)						
Base Capacity (vph)	1568					1510
Starvation Cap Reductn	0					215
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.68					0.57

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 55.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	953	0	0	0	0	669
Future Volume (veh/h)	953	0	0	0	0	669
Number	3	18			1	6
Initial Q (Qb), veh	0	0			0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	
Parking Bus, Adj	1.00	1.00			1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0			0	1863
Adj Flow Rate, veh/h	1059	0			0	743
Adj No. of Lanes	2	0			0	2
Peak Hour Factor	0.90	0.90			0.90	0.90
Percent Heavy Veh, %	2	0			0	2
Cap, veh/h	0	0			0	1298
Arrive On Green	0.00	0.00			0.00	0.12
Sat Flow, veh/h	0				0	3725
Grp Volume(v), veh/h	0.0				0	743
Grp Sat Flow(s),veh/h/ln					0	1770
Q Serve(g_s), s					0.0	11.9
Cycle Q Clear(g_c), s					0.0	11.9
Prop In Lane					0.00	
Lane Grp Cap(c), veh/h					0	1298
V/C Ratio(X)					0.00	0.57
Avail Cap(c_a), veh/h					0	1298
HCM Platoon Ratio					1.00	0.33
Upstream Filter(I)					0.00	0.93
Uniform Delay (d), s/veh					0.0	21.9
Incr Delay (d2), s/veh					0.0	1.7
Initial Q Delay(d3),s/veh					0.0	0.0
%ile BackOfQ(50%),veh/ln					0.0	6.1
LnGrp Delay(d),s/veh					0.0	23.6
LnGrp LOS						C
Approach Vol, veh/h						743
Approach Delay, s/veh						23.6
Approach LOS						C

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						28.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						22.0		
Max Q Clear Time (g_c+I1), s						13.9		
Green Ext Time (p_c), s						3.0		

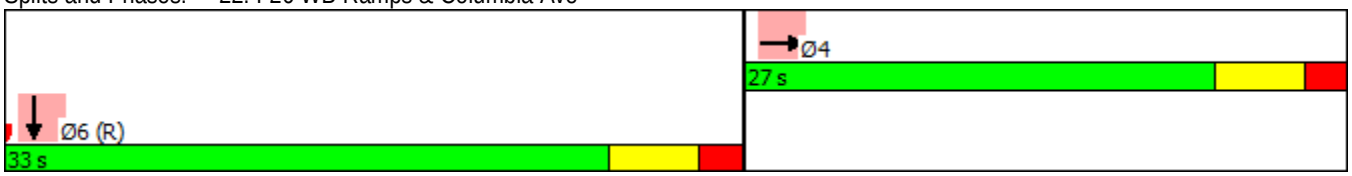
Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	510	0	0	0	0	0	0	0	0	669	0
Future Volume (vph)	0	510	0	0	0	0	0	0	0	0	669	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		159			115			152			129	
Travel Time (s)		3.1			2.2			3.0			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	567	0	0	0	0	0	0	0	0	743	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		27.0									33.0	
Total Split (%)		45.0%									55.0%	
Maximum Green (s)		21.0									27.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		15.4									32.6	
Actuated g/C Ratio		0.26									0.54	
v/c Ratio		0.63									0.39	
Control Delay		5.5									9.3	
Queue Delay		0.0									0.0	
Total Delay		5.5									9.3	
LOS		A									A	
Approach Delay		5.5									9.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A									A	
Queue Length 50th (ft)		11									74	
Queue Length 95th (ft)		9									128	
Internal Link Dist (ft)		79			35			72			49	
Turn Bay Length (ft)												
Base Capacity (vph)		1238									1924	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		0									19	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.46									0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 1 (2%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 22: I-26 WB Ramps & Columbia Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑	
Traffic Volume (veh/h)	0	510	0	0	0	0	0	0	0	0	669	0
Future Volume (veh/h)	0	510	0	0	0	0	0	0	0	0	669	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	567	0							0	743	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	796	0							0	1593	0
Arrive On Green	0.00	0.22	0.00							0.00	0.45	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	567	0							0	743	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	8.9	0.0							0.0	8.8	0.0
Cycle Q Clear(g_c), s	0.0	8.9	0.0							0.0	8.8	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	796	0							0	1593	0
V/C Ratio(X)	0.00	0.71	0.00							0.00	0.47	0.00
Avail Cap(c_a), veh/h	0	1239	0							0	1593	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	21.5	0.0							0.0	11.5	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0							0.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.5	0.0							0.0	4.4	0.0
LnGrp Delay(d),s/veh	0.0	22.7	0.0							0.0	12.5	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		567									743	
Approach Delay, s/veh		22.7									12.5	
Approach LOS		C									B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				19.5		33.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				21.0		27.0		
Max Q Clear Time (g_c+I1), s				10.9		10.8		
Green Ext Time (p_c), s				2.6		4.5		

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

SimTraffic Simulation Summary
2020 Build DDI PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6412	6287	6312	6337
Vehs Exited	6393	6283	6349	6341
Starting Vehs	206	195	226	208
Ending Vehs	225	199	189	202
Travel Distance (mi)	6935	6808	6870	6871
Travel Time (hr)	195.6	188.4	189.5	191.2
Total Delay (hr)	67.8	62.9	63.5	64.7
Total Stops	3682	3309	3448	3481
Fuel Used (gal)	286.7	279.3	281.2	282.4

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	6412	6287	6312	6337
Vehs Exited	6393	6283	6349	6341
Starting Vehs	206	195	226	208
Ending Vehs	225	199	189	202
Travel Distance (mi)	6935	6808	6870	6871
Travel Time (hr)	195.6	188.4	189.5	191.2
Total Delay (hr)	67.8	62.9	63.5	64.7
Total Stops	3682	3309	3448	3481
Fuel Used (gal)	286.7	279.3	281.2	282.4

Queuing and Blocking Report
2020 Build DDI PM

Intersection: 1: I-26 EB Ramps & Columbia Ave

Movement	WB	WB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	150	120	113	114	83
Average Queue (ft)	119	68	81	91	31
95th Queue (ft)	156	113	112	102	71
Link Distance (ft)	57	57	5	5	5
Upstream Blk Time (%)	41	13	23	39	8
Queuing Penalty (veh)	128	40	107	178	37
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 21: Columbia Ave/I-26 WB Ramps & I-26 WB Off Ramp

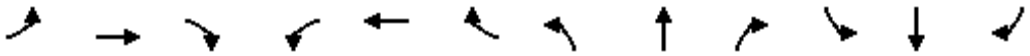
Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	153	152	50	74
Average Queue (ft)	126	130	22	39
95th Queue (ft)	154	160	46	61
Link Distance (ft)	91	91	10	10
Upstream Blk Time (%)	20	22	17	41
Queuing Penalty (veh)	96	106	55	137
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 22: I-26 WB Ramps & Columbia Ave

Movement	EB	EB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	103	113	109	165
Average Queue (ft)	55	81	51	136
95th Queue (ft)	108	128	101	178
Link Distance (ft)	22	22	16	16
Upstream Blk Time (%)	30	46	17	44
Queuing Penalty (veh)	77	118	56	149
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

APPENDIX K

BUILD ALT 2 2020 SYNCHRO AND SIM TRAFFIC REPORTS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	8	129	0	0	0	0	433	942	143	1077	0
Future Volume (vph)	27	8	129	0	0	0	0	433	942	143	1077	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.963								0.950		
Satd. Flow (prot)	0	1794	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.963								0.480		
Satd. Flow (perm)	0	1794	1583	0	0	0	0	1863	1583	894	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95						1011			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1099			740	
Travel Time (s)		13.3			3.6			21.4			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	9	143	0	0	0	0	481	1047	159	1197	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	143	0	0	0	0	481	1047	159	1197	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)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	15.0	15.0	15.0					45.0	45.0	45.0	45.0	
Total Split (%)	25.0%	25.0%	25.0%					75.0%	75.0%	75.0%	75.0%	
Maximum Green (s)	9.0	9.0	9.0					39.0	39.0	39.0	39.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		7.9	7.9					43.9	43.9	43.9	43.9	
Actuated g/C Ratio		0.13	0.13					0.73	0.73	0.73	0.73	
v/c Ratio		0.17	0.49					0.35	0.73	0.24	0.46	
Control Delay		24.4	16.3					2.6	7.7	5.3	5.3	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		24.4	16.3					2.6	7.7	5.3	5.3	
LOS		C	B					A	A	A	A	
Approach Delay		18.0						6.1			5.3	
Approach LOS		B						A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 23 (38%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 6.5		Intersection LOS: A	
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	8	129	0	0	0	0	433	942	143	1077	0
Future Volume (veh/h)	27	8	129	0	0	0	0	433	942	143	1077	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	30	9	0				0	481	0	159	1197	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	77	23	88				0	1386	1178	716	2634	0
Arrive On Green	0.06	0.06	0.00				0.00	0.74	0.00	0.74	0.74	0.00
Sat Flow, veh/h	1380	414	1583				0	1863	1583	910	3632	0
Grp Volume(v), veh/h	39	0	0				0	481	0	159	1197	0
Grp Sat Flow(s),veh/h/ln	1794	0	1583				0	1863	1583	910	1770	0
Q Serve(g_s), s	1.3	0.0	0.0				0.0	5.3	0.0	4.4	7.8	0.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0				0.0	5.3	0.0	9.7	7.8	0.0
Prop In Lane	0.77		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	100	0	88				0	1386	1178	716	2634	0
V/C Ratio(X)	0.39	0.00	0.00				0.00	0.35	0.00	0.22	0.45	0.00
Avail Cap(c_a), veh/h	269	0	237				0	1386	1178	716	2634	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.81	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.3	0.0	0.0				0.0	2.6	0.0	4.3	3.0	0.0
Incr Delay (d2), s/veh	2.5	0.0	0.0				0.0	0.6	0.0	0.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0				0.0	2.9	0.0	1.2	3.9	0.0
LnGrp Delay(d),s/veh	29.8	0.0	0.0				0.0	3.2	0.0	5.0	3.5	0.0
LnGrp LOS	C							A		A	A	
Approach Vol, veh/h		39						481			1356	
Approach Delay, s/veh		29.8						3.2			3.7	
Approach LOS		C						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		50.7		9.3		50.7		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		39.0		9.0		39.0		
Max Q Clear Time (g_c+I1), s		7.3		3.3		11.7		
Green Ext Time (p_c), s		16.5		0.0		15.2		

Intersection Summary	
HCM 2010 Ctrl Delay	4.1
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	691	0	2	157	90	370	0	0	529	49
Future Vol, veh/h	0	0	691	0	2	157	90	370	0	0	529	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	768	0	2	174	100	411	0	0	588	54

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	1199	411	588	0	-	-	-	0
Stage 1	-	611	-	-	-	-	-	-	-
Stage 2	-	588	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	4.12	-	-	-	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	2.218	-	-	-	-	-
Pot Cap-1 Maneuver	0	185	641	987	-	0	0	-	-
Stage 1	0	484	-	-	-	0	0	-	-
Stage 2	0	496	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	-	0	641	987	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	987	-	641	-	-
HCM Lane V/C Ratio	0.101	-	0.276	-	-
HCM Control Delay (s)	9.1	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.1	-	-

SimTraffic Simulation Summary
2020 Build Loop AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	5225	5258	5272	5251
Vehs Exited	5221	5265	5275	5255
Starting Vehs	131	150	145	139
Ending Vehs	135	143	142	139
Travel Distance (mi)	5855	5873	5894	5874
Travel Time (hr)	137.9	140.5	140.4	139.6
Total Delay (hr)	25.5	26.8	26.3	26.2
Total Stops	796	995	936	909
Fuel Used (gal)	223.1	225.4	227.7	225.4

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	5225	5258	5272	5251
Vehs Exited	5221	5265	5275	5255
Starting Vehs	131	150	145	139
Ending Vehs	135	143	142	139
Travel Distance (mi)	5855	5873	5894	5874
Travel Time (hr)	137.9	140.5	140.4	139.6
Total Delay (hr)	25.5	26.8	26.3	26.2
Total Stops	796	995	936	909
Fuel Used (gal)	223.1	225.4	227.7	225.4

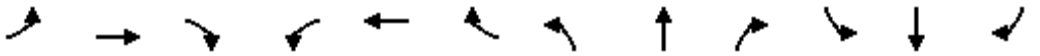
Queuing and Blocking Report
2020 Build Loop AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	NB	SB	SB	SB
Directions Served	LT	T	L	T	T
Maximum Queue (ft)	68	99	89	113	115
Average Queue (ft)	23	21	34	35	33
95th Queue (ft)	55	69	67	94	87
Link Distance (ft)		1032		690	690
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	225		150		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB
Directions Served	TR	L
Maximum Queue (ft)	71	59
Average Queue (ft)	32	24
95th Queue (ft)	53	52
Link Distance (ft)	543	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		175
Storage Blk Time (%)		
Queuing Penalty (veh)		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	8	121	0	0	0	0	624	742	246	1376	0
Future Volume (vph)	45	8	121	0	0	0	0	624	742	246	1376	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	1786	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.959								0.346		
Satd. Flow (perm)	0	1786	1583	0	0	0	0	1863	1583	645	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55						824			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1090			740	
Travel Time (s)		13.3			3.6			21.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	134	0	0	0	0	693	824	273	1529	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)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	15.0	15.0	15.0					45.0	45.0	45.0	45.0	
Total Split (%)	25.0%	25.0%	25.0%					75.0%	75.0%	75.0%	75.0%	
Maximum Green (s)	9.0	9.0	9.0					39.0	39.0	39.0	39.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		8.1	8.1					43.7	43.7	43.7	43.7	
Actuated g/C Ratio		0.14	0.14					0.73	0.73	0.73	0.73	
v/c Ratio		0.25	0.52					0.51	0.60	0.58	0.59	
Control Delay		25.6	22.6					10.3	6.6	13.0	6.7	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		25.6	22.6					10.3	6.6	13.0	6.7	
LOS		C	C					B	A	B	A	
Approach Delay		23.5						8.3			7.6	
Approach LOS		C						A			A	
Queue Length 50th (ft)		19	26					108	0	48	142	
Queue Length 95th (ft)		48	71					380	343	#176	206	
Internal Link Dist (ft)		801			159			1010			660	
Turn Bay Length (ft)										150		
Base Capacity (vph)		267	284					1357	1377	470	2578	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.22	0.47					0.51	0.60	0.58	0.59	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 32 (53%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	8	121	0	0	0	0	624	742	246	1376	0
Future Volume (veh/h)	45	8	121	0	0	0	0	624	742	246	1376	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	50	9	0				0	693	0	273	1529	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	111	20	116				0	1354	1151	645	2573	0
Arrive On Green	0.07	0.07	0.00				0.00	0.97	0.00	0.73	0.73	0.00
Sat Flow, veh/h	1514	273	1583				0	1863	1583	748	3632	0
Grp Volume(v), veh/h	59	0	0				0	693	0	273	1529	0
Grp Sat Flow(s),veh/h/ln	1787	0	1583				0	1863	1583	748	1770	0
Q Serve(g_s), s	1.9	0.0	0.0				0.0	1.5	0.0	10.3	12.5	0.0
Cycle Q Clear(g_c), s	1.9	0.0	0.0				0.0	1.5	0.0	11.7	12.5	0.0
Prop In Lane	0.85		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	130	0	116				0	1354	1151	645	2573	0
V/C Ratio(X)	0.45	0.00	0.00				0.00	0.51	0.00	0.42	0.59	0.00
Avail Cap(c_a), veh/h	268	0	237				0	1354	1151	645	2573	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.85	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.7	0.0	0.0				0.0	0.3	0.0	4.2	3.9	0.0
Incr Delay (d2), s/veh	2.4	0.0	0.0				0.0	1.2	0.0	2.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0				0.0	1.0	0.0	2.4	6.3	0.0
LnGrp Delay(d),s/veh	29.1	0.0	0.0				0.0	1.5	0.0	6.2	5.0	0.0
LnGrp LOS	C							A		A	A	
Approach Vol, veh/h		59						693			1802	
Approach Delay, s/veh		29.1						1.5			5.1	
Approach LOS		C						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		49.6		10.4		49.6		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		39.0		9.0		39.0		
Max Q Clear Time (g_c+I1), s		3.5		3.9		14.5		
Green Ext Time (p_c), s		26.1		0.1		19.5		

Intersection Summary	
HCM 2010 Ctrl Delay	4.7
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	953	0	2	245	159	510	0	0	669	35
Future Vol, veh/h	0	0	953	0	2	245	159	510	0	0	669	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1059	0	2	272	177	567	0	0	743	39

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	1663	567	743	0	-	-	-	0
Stage 1	-	920	-	-	-	-	-	-	-
Stage 2	-	743	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	4.12	-	-	-	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	2.218	-	-	-	-	-
Pot Cap-1 Maneuver	0	97	523	864	-	0	0	-	-
Stage 1	0	350	-	-	-	0	0	-	-
Stage 2	0	422	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	-	77	523	864	-	-	-	-	-
Mov Cap-2 Maneuver	-	154	-	-	-	-	-	-	-
Stage 1	-	278	-	-	-	-	-	-	-
Stage 2	-	422	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	2.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	864	-	513	-	-
HCM Lane V/C Ratio	0.204	-	0.535	-	-
HCM Control Delay (s)	10.2	-	19.8	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.8	-	3.1	-	-

SimTraffic Simulation Summary
2020 Build Loop PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	6331	6373	6113	6270
Vehs Exited	6335	6337	6152	6275
Starting Vehs	195	171	194	187
Ending Vehs	191	207	155	185
Travel Distance (mi)	7081	7118	6924	7041
Travel Time (hr)	181.2	184.6	173.4	179.7
Total Delay (hr)	44.3	46.7	40.8	43.9
Total Stops	1444	1351	1205	1333
Fuel Used (gal)	277.6	281.1	271.3	276.7

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	6331	6373	6113	6270
Vehs Exited	6335	6337	6152	6275
Starting Vehs	195	171	194	187
Ending Vehs	191	207	155	185
Travel Distance (mi)	7081	7118	6924	7041
Travel Time (hr)	181.2	184.6	173.4	179.7
Total Delay (hr)	44.3	46.7	40.8	43.9
Total Stops	1444	1351	1205	1333
Fuel Used (gal)	277.6	281.1	271.3	276.7

Queuing and Blocking Report
2020 Build Loop PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	EB	NB	SB	SB	SB
Directions Served	LT	R	T	L	T	T
Maximum Queue (ft)	102	18	172	160	140	126
Average Queue (ft)	39	1	58	76	51	52
95th Queue (ft)	81	10	142	141	117	113
Link Distance (ft)		762	1024		690	690
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	225			150		
Storage Blk Time (%)				1	0	
Queuing Penalty (veh)				4	0	

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	TR	L	R
Maximum Queue (ft)	117	114	7
Average Queue (ft)	53	44	0
95th Queue (ft)	94	80	4
Link Distance (ft)	543		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		175	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2
Jurisdiction:	
Analysis Year:	2020 Build Alt 2 Ramp
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1713	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	159	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	691	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1713	159	691	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	44	192	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2018	182	791	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2018 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2018	4800	No
$v_{FO} = v_F - v_R$	1836	4800	No
v_R	182	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2018 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2018	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 10.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.314	
Space mean speed in ramp influence area,	S_R = 64.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:	
Analysis Year:	2020 Build Alt 2 Loop
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1554	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	691	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	141	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	550	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1554	691	141	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	432	192	39	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1830	791	161	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1830 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1830	4800	No
$v_{FO} = v_F - v_R$	1039	4800	No
v_R	791	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1830 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1830	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 9.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.369

Space mean speed in ramp influence area, S_R = 62.8 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 62.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2
Jurisdiction:	
Analysis Year:	2020 Build Alt 2 Ramp
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2523	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	247	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	953	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2523	247	953	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	701	69	265	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2972	283	1091	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2972 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2972	4800	No
$v_{FO} = v_F - v_R$	2689	4800	No
v_R	283	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2972 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 18.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.323

Space mean speed in ramp influence area, S_R = 64.3 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:	
Analysis Year:	2020 Build Alt 2 Loop
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2276	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	953	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	196	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	550	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2276	953	196	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	632	265	54	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2681	1091	224	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2681 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2681	4800	No
$v_{FO} = v_F - v_R$	1590	4800	No
v_R	1091	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2681 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2681	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 16.3 pc/mi/ln

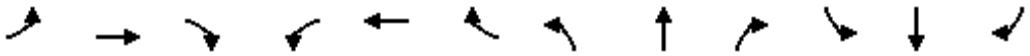
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.396	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 61.9	mph

APPENDIX L

BUILD ALT 1 2040 SYNCHRO AND SIM TRAFFIC REPORTS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	498	0	0	0	0	0	1461	0
Future Volume (vph)	0	0	0	0	498	0	0	0	0	0	1461	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		153			109			130			161	
Travel Time (s)		3.0			2.1			2.5			3.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	553	0	0	0	0	0	1623	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					27.0						43.0	
Total Split (%)					38.6%						61.4%	
Maximum Green (s)					21.0						37.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					16.5						41.5	
Actuated g/C Ratio					0.24						0.59	
v/c Ratio					0.66						0.54	
Control Delay					21.8						7.6	
Queue Delay					0.0						0.0	
Total Delay					21.8						7.6	
LOS					C						A	
Approach Delay					21.8						7.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					C						A	
Queue Length 50th (ft)					102						43	
Queue Length 95th (ft)					119						238	
Internal Link Dist (ft)		73			29			50			81	
Turn Bay Length (ft)												
Base Capacity (vph)					1061						3011	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.52						0.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 55 (79%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 58.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	498	0	0	0	0	0	1461	0
Future Volume (veh/h)	0	0	0	0	498	0	0	0	0	0	1461	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	553	0				0	1623	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	738	0				0	2688	0
Arrive On Green				0.00	0.21	0.00				0.00	0.17	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	553	0				0	1623	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	10.3	0.0				0.0	20.6	0.0
Cycle Q Clear(g_c), s				0.0	10.3	0.0				0.0	20.6	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	738	0				0	2688	0
V/C Ratio(X)				0.00	0.75	0.00				0.00	0.60	0.00
Avail Cap(c_a), veh/h				0	1062	0				0	2688	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	26.0	0.0				0.0	22.1	0.0
Incr Delay (d2), s/veh				0.0	1.8	0.0				0.0	1.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	5.2	0.0				0.0	9.9	0.0
LnGrp Delay(d),s/veh				0.0	27.8	0.0				0.0	23.1	0.0
LnGrp LOS					C						C	
Approach Vol, veh/h					553						1623	
Approach Delay, s/veh					27.8						23.1	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				20.6		43.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				21.0		37.0		
Max Q Clear Time (g_c+I1), s				12.3		22.6		
Green Ext Time (p_c), s				2.3		9.4		

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

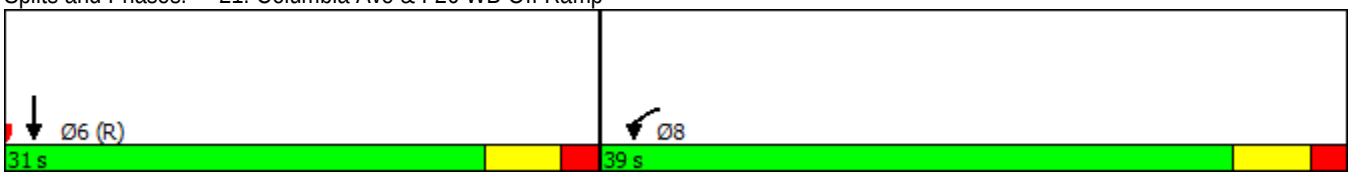
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1026	0	0	0	0	582
Future Volume (vph)	1026	0	0	0	0	582
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	191					
Link Speed (mph)	30		35			35
Link Distance (ft)	161		300			170
Travel Time (s)	3.7		5.8			3.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1140	0	0	0	0	647
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		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)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	22.0					22.0
Total Split (s)	39.0					31.0
Total Split (%)	55.7%					44.3%
Maximum Green (s)	33.0					25.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	27.3					30.7
Actuated g/C Ratio	0.39					0.44
v/c Ratio	0.78					0.42
Control Delay	19.3					8.9
Queue Delay	0.0					0.4
Total Delay	19.3					9.3
LOS	B					A
Approach Delay	19.3					9.3

21: Columbia Ave & I-26 WB Off Ramp

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B					A
Queue Length 50th (ft)	178					97
Queue Length 95th (ft)	215					160
Internal Link Dist (ft)	81		220			90
Turn Bay Length (ft)						
Base Capacity (vph)	1719					1553
Starvation Cap Reductn	0					451
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.66					0.59

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 9 (13%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 55.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 21: Columbia Ave & I-26 WB Off Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1026	0	0	0	0	582
Future Volume (veh/h)	1026	0	0	0	0	582
Number	3	18			1	6
Initial Q (Qb), veh	0	0			0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	
Parking Bus, Adj	1.00	1.00			1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0			0	1863
Adj Flow Rate, veh/h	1140	0			0	647
Adj No. of Lanes	2	0			0	2
Peak Hour Factor	0.90	0.90			0.90	0.90
Percent Heavy Veh, %	2	0			0	2
Cap, veh/h	0	0			0	1264
Arrive On Green	0.00	0.00			0.00	0.12
Sat Flow, veh/h	0				0	3725
Grp Volume(v), veh/h	0.0				0	647
Grp Sat Flow(s),veh/h/ln					0	1770
Q Serve(g_s), s					0.0	12.0
Cycle Q Clear(g_c), s					0.0	12.0
Prop In Lane					0.00	
Lane Grp Cap(c), veh/h					0	1264
V/C Ratio(X)					0.00	0.51
Avail Cap(c_a), veh/h					0	1264
HCM Platoon Ratio					1.00	0.33
Upstream Filter(I)					0.00	0.97
Uniform Delay (d), s/veh					0.0	25.1
Incr Delay (d2), s/veh					0.0	1.4
Initial Q Delay(d3),s/veh					0.0	0.0
%ile BackOfQ(50%),veh/ln					0.0	6.1
LnGrp Delay(d),s/veh					0.0	26.6
LnGrp LOS						C
Approach Vol, veh/h						647
Approach Delay, s/veh						26.6
Approach LOS						C

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						31.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						25.0		
Max Q Clear Time (g_c+I1), s						14.0		
Green Ext Time (p_c), s						3.2		

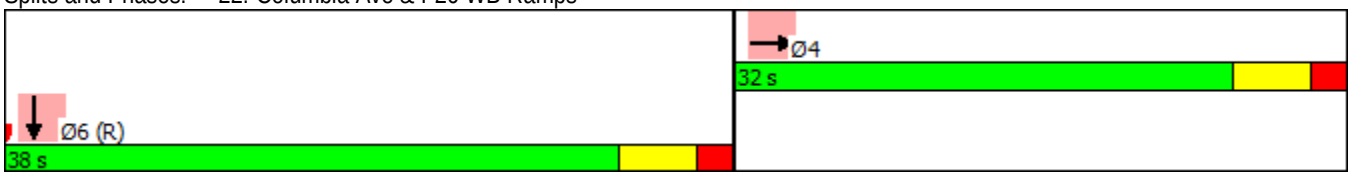
Intersection Summary	
HCM 2010 Ctrl Delay	26.6
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	402	0	0	0	0	0	0	0	0	582	0
Future Volume (vph)	0	402	0	0	0	0	0	0	0	0	582	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		147			115			170			129	
Travel Time (s)		2.9			2.2			3.3			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	447	0	0	0	0	0	0	0	0	647	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		32.0									38.0	
Total Split (%)		45.7%									54.3%	
Maximum Green (s)		26.0									32.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		14.5									43.5	
Actuated g/C Ratio		0.21									0.62	
v/c Ratio		0.61									0.29	
Control Delay		6.1									7.1	
Queue Delay		0.0									0.1	
Total Delay		6.1									7.2	
LOS		A									A	
Approach Delay		6.1									7.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A									A	
Queue Length 50th (ft)		4									58	
Queue Length 95th (ft)		5									101	
Internal Link Dist (ft)		67			35			90			49	
Turn Bay Length (ft)												
Base Capacity (vph)		1314									2199	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		0									439	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.34									0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 5 (7%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 37.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 22: Columbia Ave & I-26 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	402	0	0	0	0	0	0	0	0	582	0
Future Volume (veh/h)	0	402	0	0	0	0	0	0	0	0	582	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	447	0							0	647	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	646	0							0	1618	0
Arrive On Green	0.00	0.18	0.00							0.00	0.46	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	447	0							0	647	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	8.3	0.0							0.0	8.5	0.0
Cycle Q Clear(g_c), s	0.0	8.3	0.0							0.0	8.5	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	646	0							0	1618	0
V/C Ratio(X)	0.00	0.69	0.00							0.00	0.40	0.00
Avail Cap(c_a), veh/h	0	1315	0							0	1618	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	26.8	0.0							0.0	12.6	0.0
Incr Delay (d2), s/veh	0.0	1.3	0.0							0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	0.0							0.0	4.3	0.0
LnGrp Delay(d),s/veh	0.0	28.1	0.0							0.0	13.4	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		447									647	
Approach Delay, s/veh		28.1									13.4	
Approach LOS		C									B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				18.8		38.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				26.0		32.0		
Max Q Clear Time (g_c+I1), s				10.3		10.5		
Green Ext Time (p_c), s				2.5		4.3		

Intersection Summary	
HCM 2010 Ctrl Delay	19.4
HCM 2010 LOS	B

SimTraffic Simulation Summary
2040 Build DDI AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	7063	7226	7216	7169
Vehs Exited	7023	7148	7084	7085
Starting Vehs	248	289	256	261
Ending Vehs	288	367	388	343
Travel Distance (mi)	7643	7805	7774	7741
Travel Time (hr)	266.1	346.3	275.9	296.1
Total Delay (hr)	125.2	203.6	133.2	154.0
Total Stops	7425	9634	6909	7988
Fuel Used (gal)	307.1	328.7	314.1	316.6

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	7063	7226	7216	7169
Vehs Exited	7023	7148	7084	7085
Starting Vehs	248	289	256	261
Ending Vehs	288	367	388	343
Travel Distance (mi)	7643	7805	7774	7741
Travel Time (hr)	266.1	346.3	275.9	296.1
Total Delay (hr)	125.2	203.6	133.2	154.0
Total Stops	7425	9634	6909	7988
Fuel Used (gal)	307.1	328.7	314.1	316.6

Queuing and Blocking Report
2040 Build DDI AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

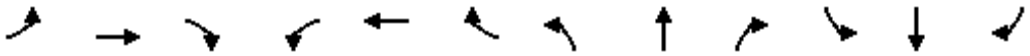
Movement	WB	WB	SB	SB	SB
Directions Served	T	T	T	T	T
Maximum Queue (ft)	138	125	98	108	88
Average Queue (ft)	123	51	66	92	37
95th Queue (ft)	159	103	112	110	77
Link Distance (ft)	57	57	13	13	13
Upstream Blk Time (%)	44	9	18	33	14
Queuing Penalty (veh)	111	23	86	159	70
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 21: Columbia Ave & I-26 WB Off Ramp

Movement	WB	WB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	168	186	62	96
Average Queue (ft)	136	151	26	43
95th Queue (ft)	175	183	62	72
Link Distance (ft)	103	103	30	30
Upstream Blk Time (%)	18	25	11	39
Queuing Penalty (veh)	94	127	32	112
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 22: Columbia Ave & I-26 WB Ramps

Movement	EB	EB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	94	90	83	171
Average Queue (ft)	59	73	23	127
95th Queue (ft)	100	111	60	177
Link Distance (ft)	13	13	16	16
Upstream Blk Time (%)	46	45	8	43
Queuing Penalty (veh)	92	90	23	124
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				



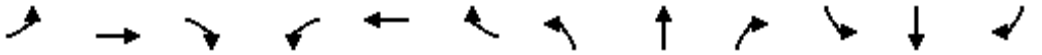
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	723	0	0	0	0	0	1781	0
Future Volume (vph)	0	0	0	0	723	0	0	0	0	0	1781	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		135			109			140			150	
Travel Time (s)		2.6			2.1			2.7			2.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	803	0	0	0	0	0	1979	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA						NA	
Protected Phases					4						6	
Permitted Phases												
Detector Phase					4						6	
Switch Phase												
Minimum Initial (s)					10.0						10.0	
Minimum Split (s)					22.0						22.0	
Total Split (s)					25.0						35.0	
Total Split (%)					41.7%						58.3%	
Maximum Green (s)					19.0						29.0	
Yellow Time (s)					4.0						4.0	
All-Red Time (s)					2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Max	
Act Effct Green (s)					18.0						30.0	
Actuated g/C Ratio					0.30						0.50	
v/c Ratio					0.76						0.78	
Control Delay					19.5						11.1	
Queue Delay					0.0						0.0	
Total Delay					19.5						11.1	
LOS					B						B	
Approach Delay					19.5						11.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS					B						B	
Queue Length 50th (ft)					83						127	
Queue Length 95th (ft)					m146						209	
Internal Link Dist (ft)		55			29			60			70	
Turn Bay Length (ft)												
Base Capacity (vph)					1120						2542	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.72						0.78	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 45 (75%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 64.4%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: I-26 EB Ramps & Columbia Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	723	0	0	0	0	0	1781	0
Future Volume (veh/h)	0	0	0	0	723	0	0	0	0	0	1781	0
Number				7	4	14				1	6	16
Initial Q (Qb), veh				0	0	0				0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00				1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				0	1863	0				0	1863	0
Adj Flow Rate, veh/h				0	803	0				0	1979	0
Adj No. of Lanes				0	2	0				0	3	0
Peak Hour Factor				0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %				0	2	0				0	2	0
Cap, veh/h				0	987	0				0	2458	0
Arrive On Green				0.00	0.28	0.00				0.00	0.16	0.00
Sat Flow, veh/h				0	3725	0				0	5421	0
Grp Volume(v), veh/h				0	803	0				0	1979	0
Grp Sat Flow(s),veh/h/ln				0	1770	0				0	1695	0
Q Serve(g_s), s				0.0	12.7	0.0				0.0	22.5	0.0
Cycle Q Clear(g_c), s				0.0	12.7	0.0				0.0	22.5	0.0
Prop In Lane				0.00		0.00				0.00		0.00
Lane Grp Cap(c), veh/h				0	987	0				0	2458	0
V/C Ratio(X)				0.00	0.81	0.00				0.00	0.81	0.00
Avail Cap(c_a), veh/h				0	1121	0				0	2458	0
HCM Platoon Ratio				1.00	1.00	1.00				1.00	0.33	1.00
Upstream Filter(I)				0.00	1.00	0.00				0.00	1.00	0.00
Uniform Delay (d), s/veh				0.0	20.2	0.0				0.0	22.5	0.0
Incr Delay (d2), s/veh				0.0	4.2	0.0				0.0	2.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	6.7	0.0				0.0	11.2	0.0
LnGrp Delay(d),s/veh				0.0	24.4	0.0				0.0	25.4	0.0
LnGrp LOS					C						C	
Approach Vol, veh/h					803						1979	
Approach Delay, s/veh					24.4						25.4	
Approach LOS					C						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				22.7		35.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				19.0		29.0		
Max Q Clear Time (g_c+I1), s				14.7		24.5		
Green Ext Time (p_c), s				2.0		3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	25.1
HCM 2010 LOS	C

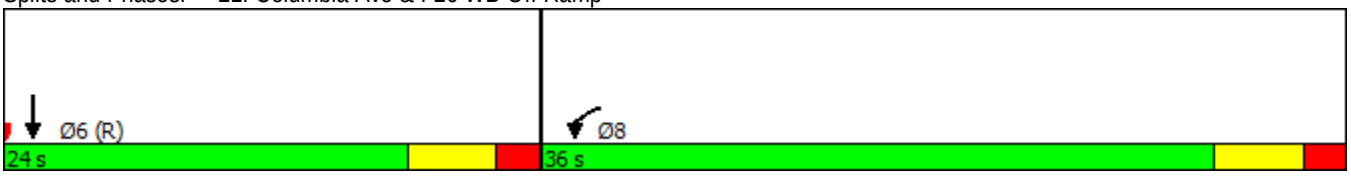
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1325	0	0	0	0	713
Future Volume (vph)	1325	0	0	0	0	713
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	3433	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	3433	0	0	0	0	3539
Right Turn on Red	Yes	Yes		Yes		
Satd. Flow (RTOR)	59					
Link Speed (mph)	30		35			35
Link Distance (ft)	149		327			152
Travel Time (s)	3.4		6.4			3.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1472	0	0	0	0	792
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		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)	15	9		9	15	
Turn Type	Prot					NA
Protected Phases	8					6
Permitted Phases						
Detector Phase	8					6
Switch Phase						
Minimum Initial (s)	7.0					10.0
Minimum Split (s)	15.0					22.0
Total Split (s)	36.0					24.0
Total Split (%)	60.0%					40.0%
Maximum Green (s)	30.0					18.0
Yellow Time (s)	4.0					4.0
All-Red Time (s)	2.0					2.0
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	6.0					6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	Min					C-Max
Act Effct Green (s)	29.0					19.0
Actuated g/C Ratio	0.48					0.32
v/c Ratio	0.87					0.71
Control Delay	20.3					13.0
Queue Delay	0.0					0.5
Total Delay	20.3					13.5
LOS	C					B
Approach Delay	20.3					13.5

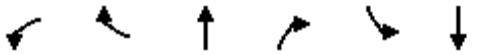
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	C					B
Queue Length 50th (ft)	210					134
Queue Length 95th (ft)	#308					193
Internal Link Dist (ft)	69		247			72
Turn Bay Length (ft)						
Base Capacity (vph)	1746					1118
Starvation Cap Reductn	0					86
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.84					0.77

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 16 (27%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 67.5%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 21: Columbia Ave & I-26 WB Off Ramp





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1325	0	0	0	0	713
Future Volume (veh/h)	1325	0	0	0	0	713
Number	3	18			1	6
Initial Q (Qb), veh	0	0			0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			1.00	
Parking Bus, Adj	1.00	1.00			1.00	1.00
Adj Sat Flow, veh/h/ln	1863	0			0	1863
Adj Flow Rate, veh/h	1472	0			0	792
Adj No. of Lanes	2	0			0	2
Peak Hour Factor	0.90	0.90			0.90	0.90
Percent Heavy Veh, %	2	0			0	2
Cap, veh/h	0	0			0	1062
Arrive On Green	0.00	0.00			0.00	0.10
Sat Flow, veh/h	0				0	3725
Grp Volume(v), veh/h	0.0				0	792
Grp Sat Flow(s),veh/h/ln					0	1770
Q Serve(g_s), s					0.0	13.1
Cycle Q Clear(g_c), s					0.0	13.1
Prop In Lane					0.00	
Lane Grp Cap(c), veh/h					0	1062
V/C Ratio(X)					0.00	0.75
Avail Cap(c_a), veh/h					0	1062
HCM Platoon Ratio					1.00	0.33
Upstream Filter(I)					0.00	0.91
Uniform Delay (d), s/veh					0.0	24.8
Incr Delay (d2), s/veh					0.0	4.4
Initial Q Delay(d3),s/veh					0.0	0.0
%ile BackOfQ(50%),veh/ln					0.0	7.0
LnGrp Delay(d),s/veh					0.0	29.2
LnGrp LOS						C
Approach Vol, veh/h						792
Approach Delay, s/veh						29.2
Approach LOS						C

Timer	1	2	3	4	5	6	7	8
Assigned Phs						6		
Phs Duration (G+Y+Rc), s						24.0		
Change Period (Y+Rc), s						6.0		
Max Green Setting (Gmax), s						18.0		
Max Q Clear Time (g_c+I1), s						15.1		
Green Ext Time (p_c), s						1.4		

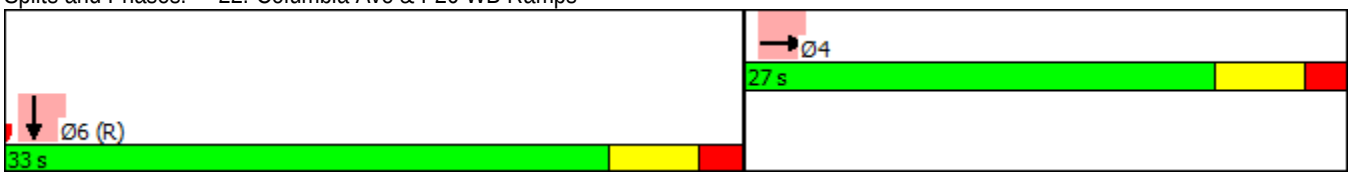
Intersection Summary	
HCM 2010 Ctrl Delay	29.2
HCM 2010 LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	543	0	0	0	0	0	0	0	0	713	0
Future Volume (vph)	0	543	0	0	0	0	0	0	0	0	713	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3539	0	0	0	0	0	0	0	0	3539	0
Flt Permitted												
Satd. Flow (perm)	0	3539	0	0	0	0	0	0	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		159			115			152			129	
Travel Time (s)		3.1			2.2			3.0			2.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	603	0	0	0	0	0	0	0	0	792	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)		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	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA									NA	
Protected Phases		4									6	
Permitted Phases												
Detector Phase		4									6	
Switch Phase												
Minimum Initial (s)		10.0									10.0	
Minimum Split (s)		22.0									22.0	
Total Split (s)		27.0									33.0	
Total Split (%)		45.0%									55.0%	
Maximum Green (s)		21.0									27.0	
Yellow Time (s)		4.0									4.0	
All-Red Time (s)		2.0									2.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		6.0									6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0									3.0	
Recall Mode		None									C-Max	
Act Effct Green (s)		16.2									31.8	
Actuated g/C Ratio		0.27									0.53	
v/c Ratio		0.63									0.42	
Control Delay		5.8									10.2	
Queue Delay		0.0									0.8	
Total Delay		5.8									11.0	
LOS		A									B	
Approach Delay		5.8									11.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A									B	
Queue Length 50th (ft)		5									83	
Queue Length 95th (ft)		6									144	
Internal Link Dist (ft)		79			35			72			49	
Turn Bay Length (ft)												
Base Capacity (vph)		1238									1875	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		0									718	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.49									0.68	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 4 (7%), Referenced to phase 6:SBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 44.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 22: Columbia Ave & I-26 WB Ramps



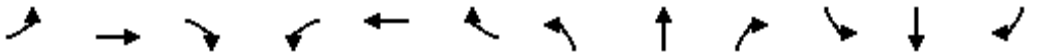
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	543	0	0	0	0	0	0	0	0	713	0
Future Volume (veh/h)	0	543	0	0	0	0	0	0	0	0	713	0
Number	7	4	14							1	6	16
Initial Q (Qb), veh	0	0	0							0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00							1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00							1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	0							0	1863	0
Adj Flow Rate, veh/h	0	603	0							0	792	0
Adj No. of Lanes	0	2	0							0	2	0
Peak Hour Factor	0.90	0.90	0.90							0.90	0.90	0.90
Percent Heavy Veh, %	0	2	0							0	2	0
Cap, veh/h	0	834	0							0	1593	0
Arrive On Green	0.00	0.24	0.00							0.00	0.45	0.00
Sat Flow, veh/h	0	3725	0							0	3725	0
Grp Volume(v), veh/h	0	603	0							0	792	0
Grp Sat Flow(s),veh/h/ln	0	1770	0							0	1770	0
Q Serve(g_s), s	0.0	9.4	0.0							0.0	9.5	0.0
Cycle Q Clear(g_c), s	0.0	9.4	0.0							0.0	9.5	0.0
Prop In Lane	0.00		0.00							0.00		0.00
Lane Grp Cap(c), veh/h	0	834	0							0	1593	0
V/C Ratio(X)	0.00	0.72	0.00							0.00	0.50	0.00
Avail Cap(c_a), veh/h	0	1239	0							0	1593	0
HCM Platoon Ratio	1.00	1.00	1.00							1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00							0.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	21.1	0.0							0.0	11.7	0.0
Incr Delay (d2), s/veh	0.0	1.2	0.0							0.0	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0							0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.7	0.0							0.0	4.9	0.0
LnGrp Delay(d),s/veh	0.0	22.3	0.0							0.0	12.8	0.0
LnGrp LOS		C									B	
Approach Vol, veh/h		603									792	
Approach Delay, s/veh		22.3									12.8	
Approach LOS		C									B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		
Phs Duration (G+Y+Rc), s				20.1		33.0		
Change Period (Y+Rc), s				6.0		6.0		
Max Green Setting (Gmax), s				21.0		27.0		
Max Q Clear Time (g_c+I1), s				11.4		11.5		
Green Ext Time (p_c), s				2.7		4.8		

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

APPENDIX M

BUILD ALT 2 2040 SYNCHRO AND SIM TRAFFIC REPORTS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	9	185	0	0	0	0	498	1261	147	1461	0
Future Volume (vph)	29	9	185	0	0	0	0	498	1261	147	1461	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected		0.963								0.950		
Satd. Flow (prot)	0	1794	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.963								0.432		
Satd. Flow (perm)	0	1794	1583	0	0	0	0	1863	1583	805	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62						973			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1099			740	
Travel Time (s)		13.3			3.6			21.4			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	32	10	206	0	0	0	0	553	1401	163	1623	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	206	0	0	0	0	553	1401	163	1623	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)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	16.0	16.0	16.0					74.0	74.0	74.0	74.0	
Total Split (%)	17.8%	17.8%	17.8%					82.2%	82.2%	82.2%	82.2%	
Maximum Green (s)	10.0	10.0	10.0					68.0	68.0	68.0	68.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		9.9	9.9					68.1	68.1	68.1	68.1	
Actuated g/C Ratio		0.11	0.11					0.76	0.76	0.76	0.76	
v/c Ratio		0.21	0.90					0.39	0.98	0.27	0.61	
Control Delay		39.4	67.3					2.0	25.5	4.6	6.1	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		39.4	67.3					2.0	25.5	4.6	6.1	
LOS		D	E					A	C	A	A	
Approach Delay		62.6						18.8			6.0	
Approach LOS		E						B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 21 (23%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 15.8		Intersection LOS: B	
Intersection Capacity Utilization 107.2%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	9	185	0	0	0	0	498	1261	147	1461	0
Future Volume (veh/h)	29	9	185	0	0	0	0	498	1261	147	1461	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	32	10	0				0	553	0	163	1623	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	69	22	80				0	1520	1292	709	2888	0
Arrive On Green	0.05	0.05	0.00				0.00	0.82	0.00	0.82	0.82	0.00
Sat Flow, veh/h	1367	427	1583				0	1863	1583	852	3632	0
Grp Volume(v), veh/h	42	0	0				0	553	0	163	1623	0
Grp Sat Flow(s),veh/h/ln	1794	0	1583				0	1863	1583	852	1770	0
Q Serve(g_s), s	2.0	0.0	0.0				0.0	7.0	0.0	5.6	14.0	0.0
Cycle Q Clear(g_c), s	2.0	0.0	0.0				0.0	7.0	0.0	12.6	14.0	0.0
Prop In Lane	0.76		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	91	0	80				0	1520	1292	709	2888	0
V/C Ratio(X)	0.46	0.00	0.00				0.00	0.36	0.00	0.23	0.56	0.00
Avail Cap(c_a), veh/h	199	0	176				0	1520	1292	709	2888	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.69	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.5	0.0	0.0				0.0	2.2	0.0	3.8	2.8	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0				0.0	0.5	0.0	0.8	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0				0.0	3.7	0.0	1.4	6.9	0.0
LnGrp Delay(d),s/veh	45.2	0.0	0.0				0.0	2.6	0.0	4.6	3.6	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		42						553			1786	
Approach Delay, s/veh		45.2						2.6			3.7	
Approach LOS		D						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		79.4		10.6		79.4		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		68.0		10.0		68.0		
Max Q Clear Time (g_c+I1), s		9.0		4.0		16.0		
Green Ext Time (p_c), s		33.2		0.0		30.9		

Intersection Summary	
HCM 2010 Ctrl Delay	4.2
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1026	0	3	159	125	402	0	0	582	56
Future Vol, veh/h	0	0	1026	0	3	159	125	402	0	0	582	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1140	0	3	177	139	447	0	0	647	62

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	1371	447	647	0	-	-	-	0
Stage 1	-	724	-	-	-	-	-	-	-
Stage 2	-	647	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	4.12	-	-	-	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	2.218	-	-	-	-	-
Pot Cap-1 Maneuver	0	146	612	939	-	0	0	-	-
Stage 1	0	430	-	-	-	0	0	-	-
Stage 2	0	467	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	-	0	612	939	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.3	2.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	939	-	612	-	-
HCM Lane V/C Ratio	0.148	-	0.294	-	-
HCM Control Delay (s)	9.5	-	13.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.5	-	1.2	-	-

SimTraffic Simulation Summary
2040 Build Loop AM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	7126	7166	7170	7153
Vehs Exited	7053	7137	7105	7097
Starting Vehs	206	249	253	232
Ending Vehs	279	278	318	289
Travel Distance (mi)	7952	8033	8009	7998
Travel Time (hr)	264.0	268.1	284.3	272.1
Total Delay (hr)	110.8	114.2	130.7	118.5
Total Stops	5500	5470	6120	5699
Fuel Used (gal)	308.2	311.4	313.6	311.1

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	7126	7166	7170	7153
Vehs Exited	7053	7137	7105	7097
Starting Vehs	206	249	253	232
Ending Vehs	279	278	318	289
Travel Distance (mi)	7952	8033	8009	7998
Travel Time (hr)	264.0	268.1	284.3	272.1
Total Delay (hr)	110.8	114.2	130.7	118.5
Total Stops	5500	5470	6120	5699
Fuel Used (gal)	308.2	311.4	313.6	311.1

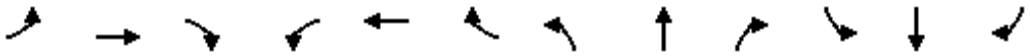
Queuing and Blocking Report
2040 Build Loop AM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	R	L	T	T
Maximum Queue (ft)	105	94	404	738	93	126	158
Average Queue (ft)	30	4	44	82	36	49	54
95th Queue (ft)	74	43	180	456	69	117	127
Link Distance (ft)		761	1032	1032		690	690
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	225				150		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 2: Columbia Ave & I-26 WB Ramps

Movement	WB	NB
Directions Served	TR	L
Maximum Queue (ft)	74	72
Average Queue (ft)	35	30
95th Queue (ft)	56	59
Link Distance (ft)	543	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		175
Storage Blk Time (%)		
Queuing Penalty (veh)		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	9	173	0	0	0	0	723	1096	257	1781	0
Future Volume (vph)	48	9	173	0	0	0	0	723	1096	257	1781	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	0		0	0		0	150		0
Storage Lanes	1		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	1788	1583	0	0	0	0	1863	1583	1770	3539	0
Flt Permitted		0.960								0.291		
Satd. Flow (perm)	0	1788	1583	0	0	0	0	1863	1583	542	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			36						992			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		881			239			1090			740	
Travel Time (s)		13.3			3.6			21.2			14.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	192	0	0	0	0	803	1218	286	1979	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)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Detector Phase	4	4	4					2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					10.0	10.0	10.0	10.0	
Minimum Split (s)	15.0	15.0	15.0					22.0	22.0	22.0	22.0	
Total Split (s)	18.0	18.0	18.0					72.0	72.0	72.0	72.0	
Total Split (%)	20.0%	20.0%	20.0%					80.0%	80.0%	80.0%	80.0%	
Maximum Green (s)	12.0	12.0	12.0					66.0	66.0	66.0	66.0	
Yellow Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0					6.0	6.0	6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Recall Mode	None	None	None					C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		11.6	11.6					66.4	66.4	66.4	66.4	
Actuated g/C Ratio		0.13	0.13					0.74	0.74	0.74	0.74	
v/c Ratio		0.27	0.82					0.58	0.85	0.72	0.76	
Control Delay		38.5	58.4					5.9	12.5	19.6	9.6	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		38.5	58.4					5.9	12.5	19.6	9.6	
LOS		D	E					A	B	B	A	
Approach Delay		53.5						9.9			10.8	
Approach LOS		D						A			B	
Queue Length 50th (ft)		33	87					117	215	76	295	
Queue Length 95th (ft)		71	#198					200	387	#260	381	
Internal Link Dist (ft)		801			159			1010			660	
Turn Bay Length (ft)										150		
Base Capacity (vph)		241	245					1378	1429	400	2618	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.26	0.78					0.58	0.85	0.71	0.76	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 83 (92%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 102.9%		ICU Level of Service G	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Columbia Ave & I-26 EB Ramps

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	9	173	0	0	0	0	723	1096	257	1781	0
Future Volume (veh/h)	48	9	173	0	0	0	0	723	1096	257	1781	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863				0	1863	1863	1863	1863	0
Adj Flow Rate, veh/h	53	10	0				0	803	0	286	1979	0
Adj No. of Lanes	0	1	1				0	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	93	18	98				0	1499	1275	623	2849	0
Arrive On Green	0.06	0.06	0.00				0.00	1.00	0.00	0.80	0.80	0.00
Sat Flow, veh/h	1504	284	1583				0	1863	1583	675	3632	0
Grp Volume(v), veh/h	63	0	0				0	803	0	286	1979	0
Grp Sat Flow(s),veh/h/ln	1788	0	1583				0	1863	1583	675	1770	0
Q Serve(g_s), s	3.1	0.0	0.0				0.0	0.0	0.0	12.9	22.3	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0				0.0	0.0	0.0	12.9	22.3	0.0
Prop In Lane	0.84		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	110	0	98				0	1499	1275	623	2849	0
V/C Ratio(X)	0.57	0.00	0.00				0.00	0.54	0.00	0.46	0.69	0.00
Avail Cap(c_a), veh/h	238	0	211				0	1499	1275	623	2849	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.56	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.1	0.0	0.0				0.0	0.0	0.0	3.0	3.9	0.0
Incr Delay (d2), s/veh	4.6	0.0	0.0				0.0	0.8	0.0	2.4	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0				0.0	0.3	0.0	2.7	11.0	0.0
LnGrp Delay(d),s/veh	45.7	0.0	0.0				0.0	0.8	0.0	5.4	5.3	0.0
LnGrp LOS	D							A		A	A	
Approach Vol, veh/h		63						803			2265	
Approach Delay, s/veh		45.7						0.8			5.3	
Approach LOS		D						A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		78.4		11.6		78.4		
Change Period (Y+Rc), s		6.0		6.0		6.0		
Max Green Setting (Gmax), s		66.0		12.0		66.0		
Max Q Clear Time (g_c+I1), s		2.0		5.1		24.3		
Green Ext Time (p_c), s		51.7		0.1		36.1		

Intersection Summary	
HCM 2010 Ctrl Delay	5.0
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1325	0	3	248	228	543	0	0	713	36
Future Vol, veh/h	0	0	1325	0	3	248	228	543	0	0	713	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	175	-	-	-	-	150
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1472	0	3	276	253	603	0	0	792	40

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	-	1902	603	792	0	-	-	-	0
Stage 1	-	1110	-	-	-	-	-	-	-
Stage 2	-	792	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	4.12	-	-	-	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	2.218	-	-	-	-	-
Pot Cap-1 Maneuver	0	69	499	829	-	0	0	-	-
Stage 1	0	285	-	-	-	0	0	-	-
Stage 2	0	401	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	-	0	499	829	-	-	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-
Stage 1	-	0	-	-	-	-	-	-	-
Stage 2	-	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21	3.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	829	-	499	-	-
HCM Lane V/C Ratio	0.306	-	0.559	-	-
HCM Control Delay (s)	11.2	-	21	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	1.3	-	3.4	-	-

SimTraffic Simulation Summary
2040 Build Loop PM

Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	4:35	4:35	4:35	4:35
End Time	5:45	5:45	5:45	5:45
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	7947	7934	7944	7939
Vehs Exited	7774	7802	7793	7790
Starting Vehs	293	297	322	301
Ending Vehs	466	429	473	455
Travel Distance (mi)	8876	8865	8887	8876
Travel Time (hr)	714.6	740.6	789.1	748.1
Total Delay (hr)	545.6	571.2	620.8	579.2
Total Stops	7925	7708	9099	8242
Fuel Used (gal)	444.8	453.7	461.6	453.4

Interval #0 Information Seeding

Start Time	4:35
End Time	4:45
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:45
End Time	5:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	Avg
Vehs Entered	7947	7934	7944	7939
Vehs Exited	7774	7802	7793	7790
Starting Vehs	293	297	322	301
Ending Vehs	466	429	473	455
Travel Distance (mi)	8876	8865	8887	8876
Travel Time (hr)	714.6	740.6	789.1	748.1
Total Delay (hr)	545.6	571.2	620.8	579.2
Total Stops	7925	7708	9099	8242
Fuel Used (gal)	444.8	453.7	461.6	453.4

Queuing and Blocking Report
2040 Build Loop PM

Intersection: 1: Columbia Ave & I-26 EB Ramps

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	R	L	T	T
Maximum Queue (ft)	103	80	629	606	160	171	160
Average Queue (ft)	45	7	189	173	70	70	71
95th Queue (ft)	94	43	669	758	124	155	151
Link Distance (ft)		762	1024	1024		690	690
Upstream Blk Time (%)			0	2			
Queuing Penalty (veh)			4	16			
Storage Bay Dist (ft)	225				150		
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					3	1	

Intersection: 3: Columbia Ave & I-26 WB Ramps

Movement	WB	NB	SB
Directions Served	TR	L	R
Maximum Queue (ft)	96	137	7
Average Queue (ft)	46	56	0
95th Queue (ft)	76	102	4
Link Distance (ft)	543		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		175	150
Storage Blk Time (%)		0	
Queuing Penalty (veh)		1	

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2
Jurisdiction:	
Analysis Year:	2040 Build Alt 2 Ramp
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1713	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	162	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1026	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1713	162	1026	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	476	45	285	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2018	185	1174	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2018 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2018	4800	No
$v_{FO} = v - v_F - v_R$	1833	4800	No
v_R	185	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2018 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2018	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 10.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.315

Space mean speed in ramp influence area, S_R = 64.6 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 64.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	AM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:	
Analysis Year:	2040 Build Alt 2 Loop
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	2256	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1026	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	184	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	550	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2256	1026	184	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	627	285	51	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2657	1174	211	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2657 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2657	4800	No
$v_{FO} = v_F - v_R$	1483	4800	No
v_R	1174	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2657 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2657	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 16.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.404

Space mean speed in ramp influence area, S_R = 61.7 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 61.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2
Jurisdiction:	
Analysis Year:	2040 Build Alt 2 Ramp
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	1325	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	247	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1026	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1325	247	1026	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	368	69	285	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1561	283	1174	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1561 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1561	4800	No
$v_{FO} = v_F - v_R$	1278	4800	No
v_R	283	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1561 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1561	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 6.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.323	
Space mean speed in ramp influence area,	S_R = 64.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.65

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	AECOM
Agency/Co.:	AECOM
Date performed:	7/1/2016
Analysis time period:	PM Peak
Freeway/Dir of Travel:	I-26 WB
Junction:	S-48 WB Off-Ramp Alt 2 Loop
Jurisdiction:	
Analysis Year:	2040 Build Alt 2 Loop
Description:	S-48 IMR

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	75.0	mph
Volume on freeway	3216	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	1325	vph
Length of first accel/decel lane	1225	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	267	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	550	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3216	1325	267	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	893	368	74	v
Trucks and buses	4	2	2	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Rolling	Rolling	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	2.5	2.5	2.5	
Recreational vehicle PCE, ER	2.0	2.0	2.0	

	.943	0.971	0.971	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3788	1516	306	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3788 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3788	4800	No
$v_{FO} = v_F - v_R$	2272	4800	No
v_R	1516	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3788 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3788	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 25.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.434	
Space mean speed in ramp influence area,	S_R = 60.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 60.7	mph

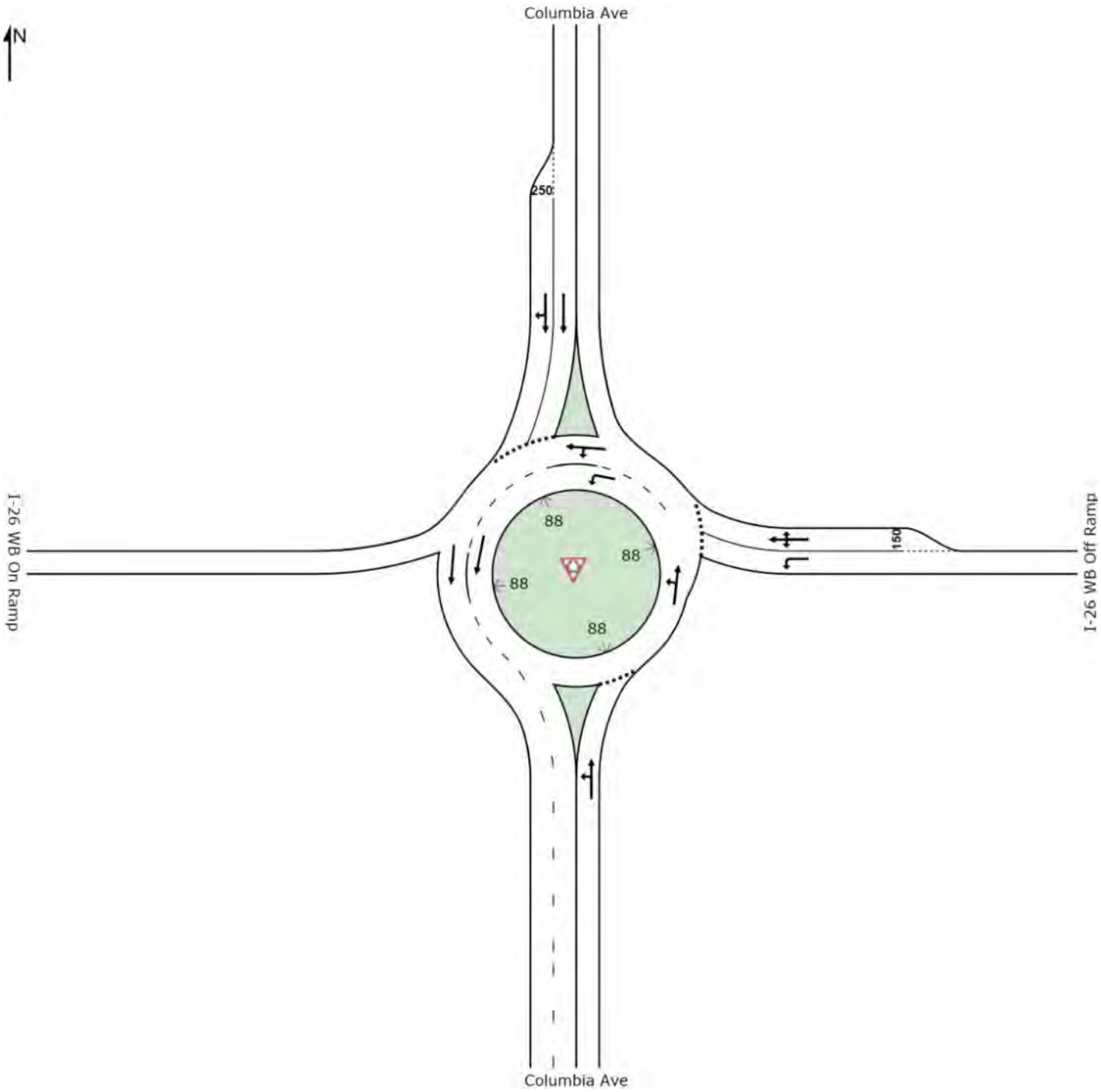
APPENDIX N

BUILD ALT 3 2020 AND 2040 SIDRA REPORTS

SITE LAYOUT

Site: I-26 WB Ramps 2020 AM - Alt 3

I-26 WB Ramps 2020 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 WB Ramps 2020 AM - Alt 3

I-26 WB Ramps 2020 AM
Roundabout

Volume Display Method: Total and %

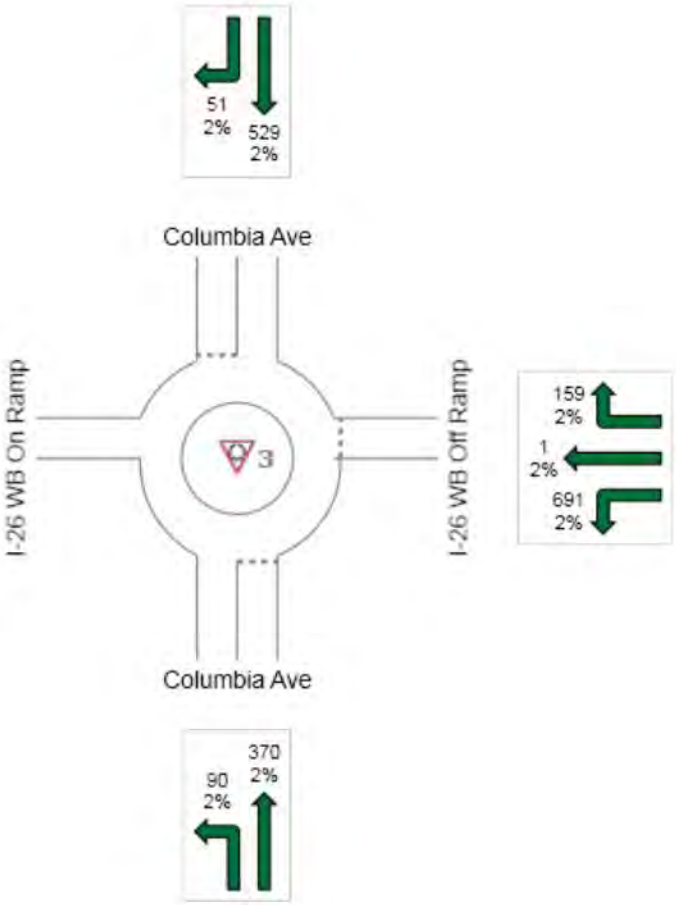
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 1891

Light Vehicles (LV): 1853

Heavy Vehicles (HV): 38



MOVEMENT SUMMARY

Site: I-26 WB Ramps 2020 AM - Alt 3

I-26 WB Ramps 2020 AM
Roundabout

Movement Performance - Vehicles

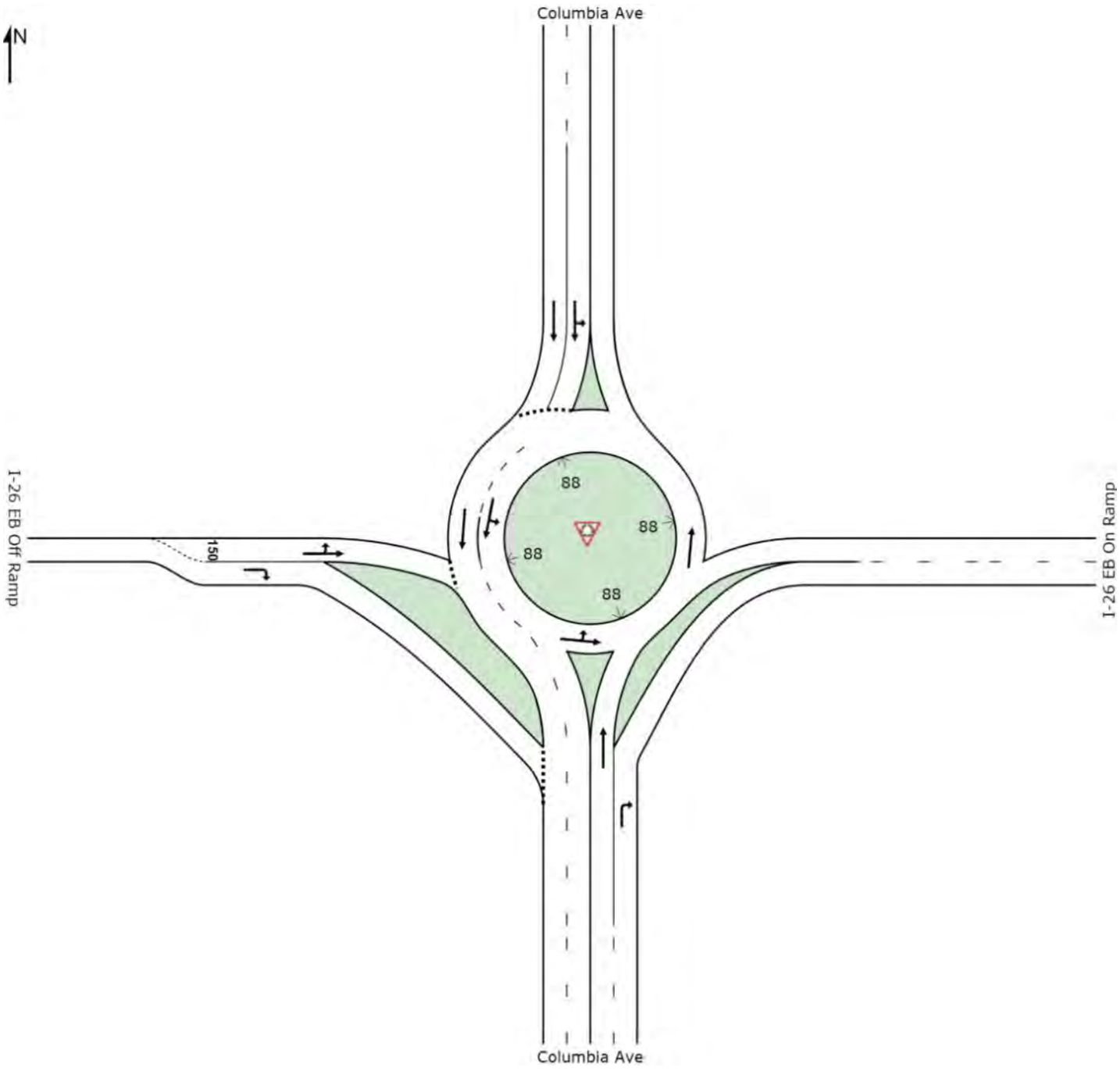
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	98	2.0	0.451	8.2	LOS A	0.0	0.0	0.00	0.00	26.0
8	T1	402	2.0	0.451	8.2	LOS A	0.0	0.0	0.00	0.00	25.5
Approach		500	2.0	0.451	8.2	LOS A	0.0	0.0	0.00	0.00	25.6
East: I-26 WB Off Ramp											
1	L2	751	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	20.6
6	T1	1	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	20.4
16	R2	173	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	19.9
Approach		925	2.0	0.695	20.3	LOS C	5.1	128.5	0.79	0.95	20.4
North: Columbia Ave											
4	T1	575	2.0	0.533	15.5	LOS C	2.2	55.3	0.65	0.73	22.0
14	R2	55	2.0	0.533	15.2	LOS C	2.1	53.3	0.64	0.72	21.5
Approach		630	2.0	0.533	15.5	LOS C	2.2	55.3	0.65	0.73	22.0
All Vehicles		2055	2.0	0.695	15.9	LOS C	5.1	128.5	0.55	0.65	22.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 EB Ramps 2020 AM - Alt 3

I-26 EB Ramps 2020 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 EB Ramps 2020 AM - Alt 3

I-26 EB Ramps 2020 AM
Roundabout

Volume Display Method: Total and %

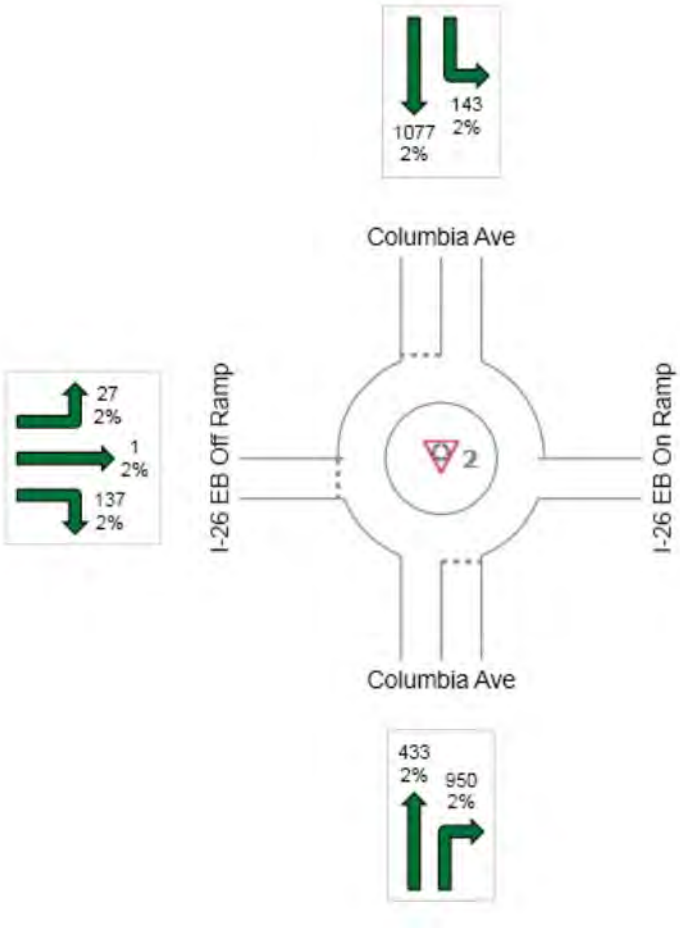
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 2768

Light Vehicles (LV): 2713

Heavy Vehicles (HV): 55



MOVEMENT SUMMARY

Site: I-26 EB Ramps 2020 AM - Alt 3

I-26 EB Ramps 2020 AM
Roundabout

Movement Performance - Vehicles

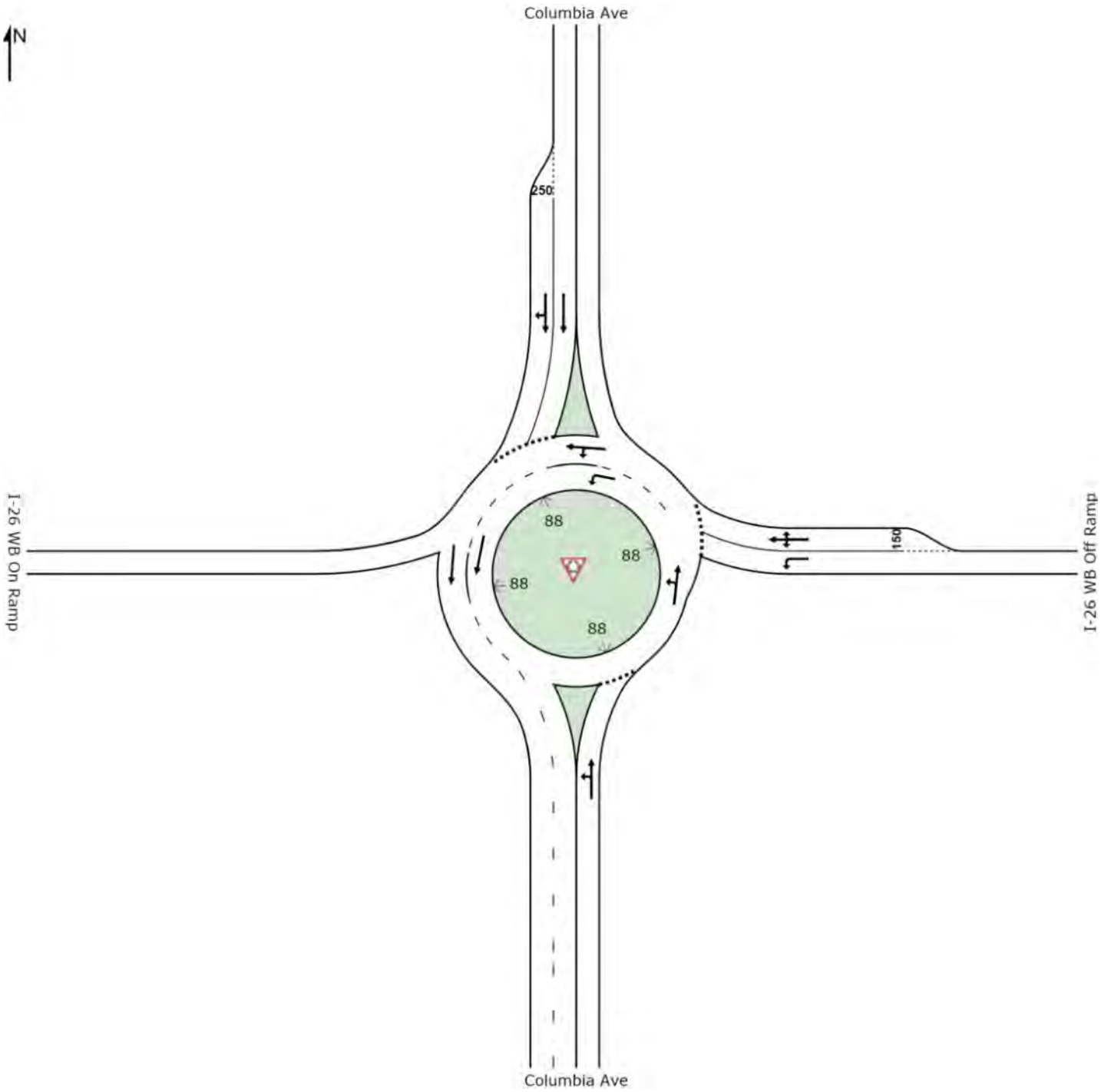
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	471	2.0	0.243	0.0	LOS A	0.0	0.0	0.00	0.00	25.8
18	R2	1033	2.0	0.629	0.2	LOS A	0.0	0.0	0.00	0.00	25.0
Approach		1503	2.0	0.629	0.1	NA	0.0	0.0	0.00	0.00	25.2
North: Columbia Ave											
7	L2	155	2.0	0.598	11.0	LOS B	0.0	0.0	0.00	0.00	25.9
4	T1	1171	2.0	0.598	11.0	LOS B	0.0	0.0	0.00	0.00	25.7
Approach		1326	2.0	0.598	11.0	LOS B	0.0	0.0	0.00	0.00	25.7
West: I-26 EB Off Ramp											
5	L2	29	2.0	0.071	9.4	LOS A	0.2	4.4	0.63	0.63	22.6
2	T1	1	2.0	0.071	9.4	LOS A	0.2	4.4	0.63	0.63	22.3
12	R2	149	2.0	0.310	12.4	LOS B	0.9	22.8	0.65	0.68	22.0
Approach		179	2.0	0.310	11.9	LOS B	0.9	22.8	0.65	0.67	22.1
All Vehicles		3009	2.0	0.629	5.6	LOS A	0.9	22.8	0.04	0.04	25.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 WB Ramps 2020 PM - Alt 3

I-26 WB Ramps 2042 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 WB Ramps 2020 PM - Alt 3

I-26 WB Ramps 2042 PM
Roundabout

Volume Display Method: Total and %

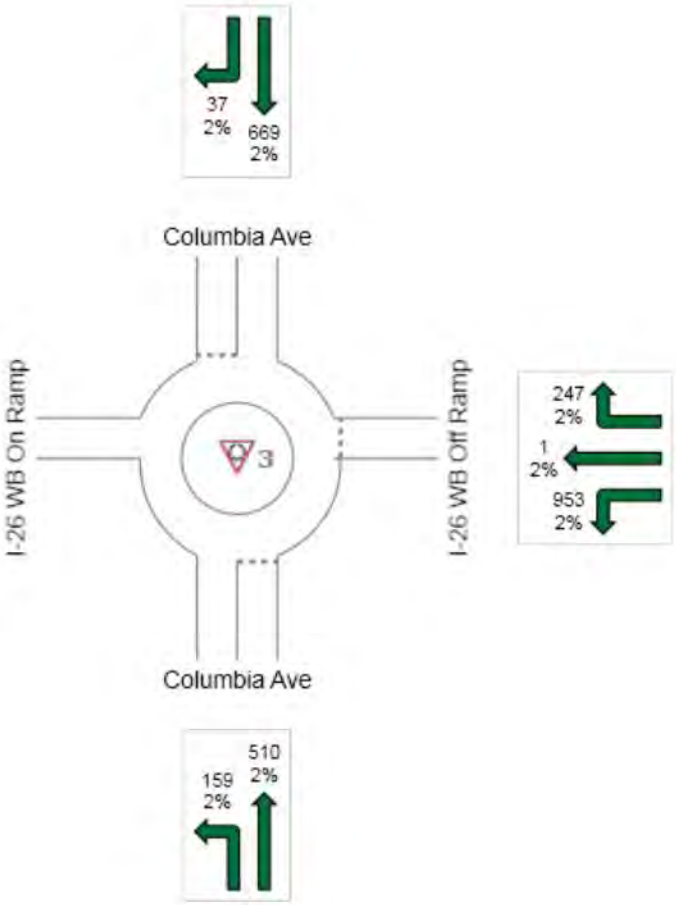
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 2576

Light Vehicles (LV): 2524

Heavy Vehicles (HV): 52



MOVEMENT SUMMARY

Site: I-26 WB Ramps 2020 PM - Alt 3

I-26 WB Ramps 2042 PM
Roundabout

Movement Performance - Vehicles

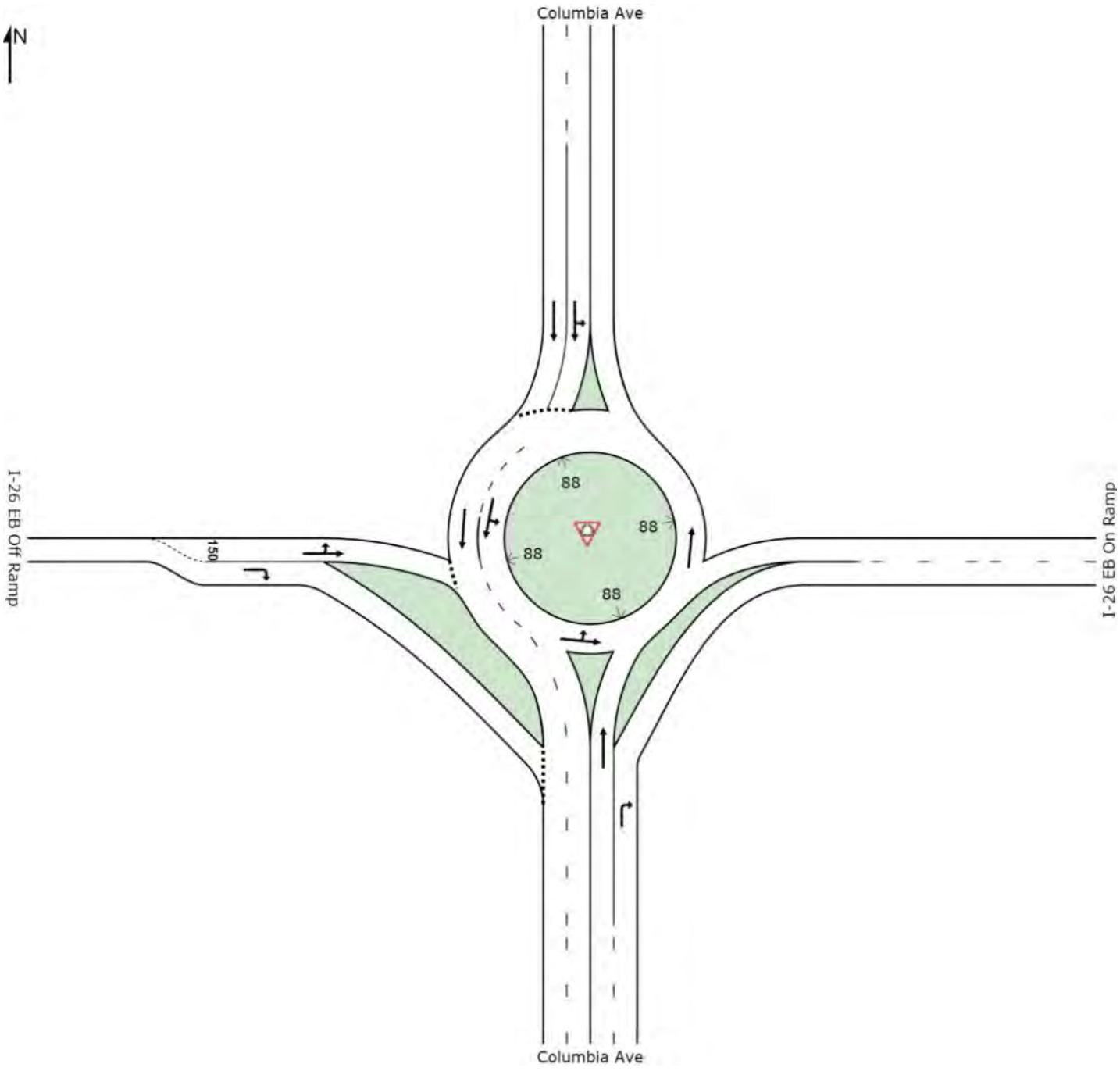
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	173	2.0	0.656	12.5	LOS B	0.0	0.0	0.00	0.00	25.9
8	T1	554	2.0	0.656	12.5	LOS B	0.0	0.0	0.00	0.00	25.4
Approach		727	2.0	0.656	12.5	LOS B	0.0	0.0	0.00	0.00	25.5
East: I-26 WB Off Ramp											
1	L2	1036	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.7
6	T1	1	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.6
16	R2	268	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.5
Approach		1305	2.0	1.237	146.6	LOS F	50.2	1275.0	1.00	4.14	9.6
North: Columbia Ave											
4	T1	727	2.0	0.731	27.0	LOS D	3.8	95.4	0.80	0.99	19.8
14	R2	40	2.0	0.731	26.4	LOS D	3.7	92.8	0.79	0.97	19.5
Approach		767	2.0	0.731	27.0	LOS D	3.8	95.4	0.80	0.99	19.8
All Vehicles		2800	2.0	1.237	79.0	LOS F	50.2	1275.0	0.68	2.20	13.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 EB Ramps 2020 PM - Alt 3

I-26 EB Ramps 2020 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 EB Ramps 2020 PM - Alt 3

I-26 EB Ramps 2020 PM
Roundabout

Volume Display Method: Total and %

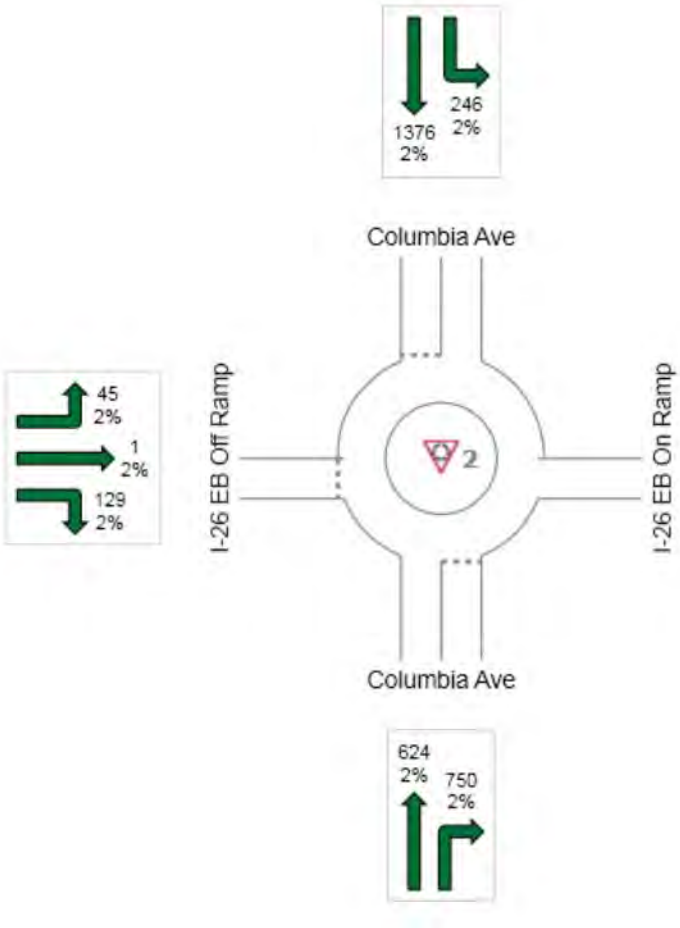
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 3171

Light Vehicles (LV): 3108

Heavy Vehicles (HV): 63



MOVEMENT SUMMARY

Site: I-26 EB Ramps 2020 PM - Alt 3

I-26 EB Ramps 2020 PM
Roundabout

Movement Performance - Vehicles

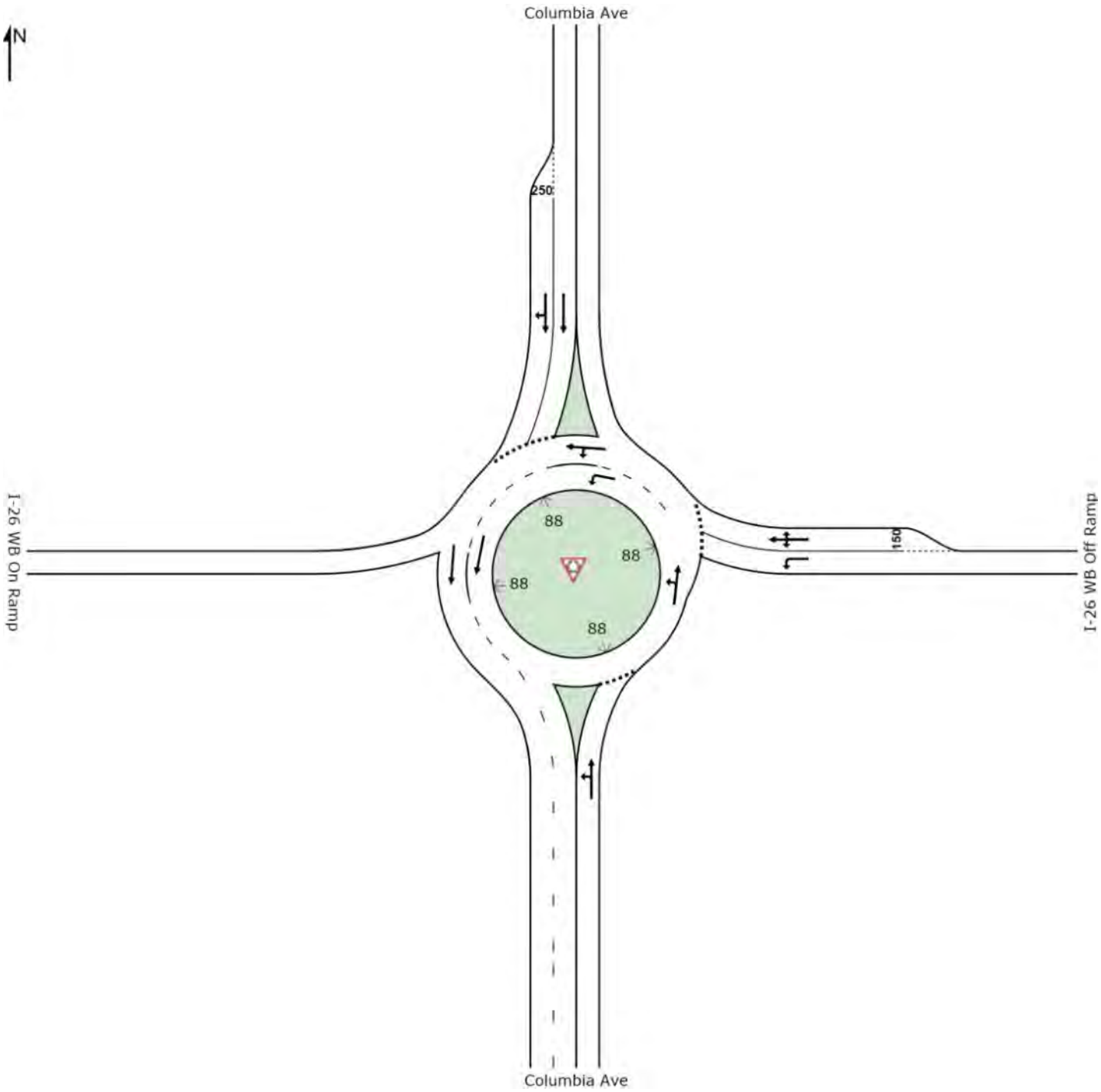
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	678	2.0	0.350	0.0	LOS A	0.0	0.0	0.00	0.00	25.8
18	R2	815	2.0	0.497	0.1	LOS A	0.0	0.0	0.00	0.00	25.0
Approach		1493	2.0	0.497	0.1	NA	0.0	0.0	0.00	0.00	25.3
North: Columbia Ave											
7	L2	267	2.0	0.796	18.5	LOS C	0.0	0.0	0.00	0.00	25.8
4	T1	1496	2.0	0.796	18.5	LOS C	0.0	0.0	0.00	0.00	25.7
Approach		1763	2.0	0.796	18.5	LOS C	0.0	0.0	0.00	0.00	25.7
West: I-26 EB Off Ramp											
5	L2	49	2.0	0.159	14.4	LOS B	0.4	10.0	0.75	0.75	21.6
2	T1	1	2.0	0.159	14.4	LOS B	0.4	10.0	0.75	0.75	21.3
12	R2	140	2.0	0.368	16.7	LOS C	1.1	27.5	0.75	0.81	21.1
Approach		190	2.0	0.368	16.1	LOS C	1.1	27.5	0.75	0.79	21.2
All Vehicles		3447	2.0	0.796	10.4	LOS B	1.1	27.5	0.04	0.04	25.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 WB Ramps 2040 AM - Alt 3

I-26 WB Ramps 2040 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 WB Ramps 2040 AM - Alt 3

I-26 WB Ramps 2040 AM
Roundabout

Volume Display Method: Total and %

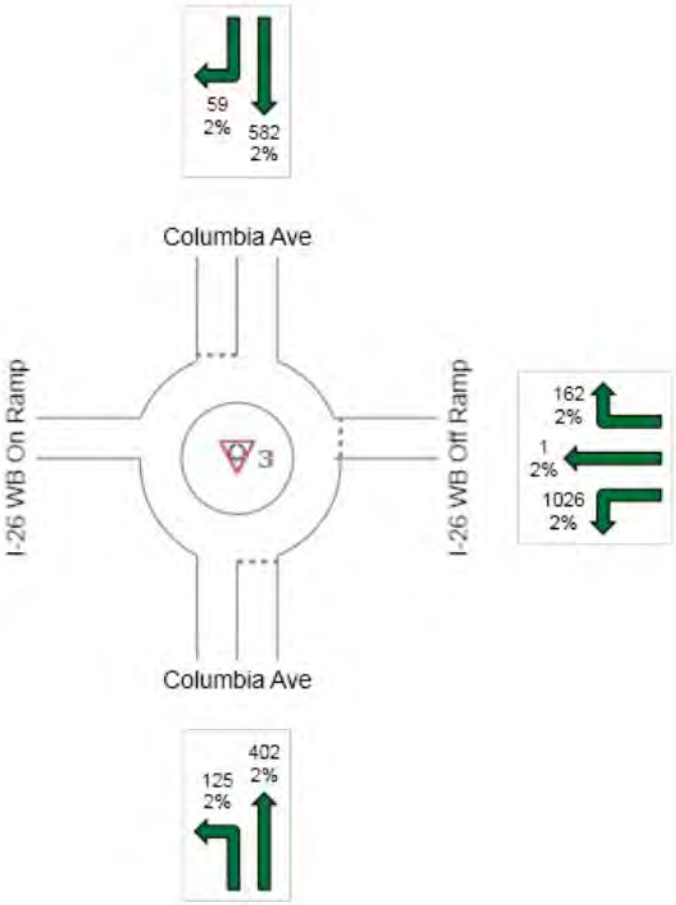
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 2357

Light Vehicles (LV): 2310

Heavy Vehicles (HV): 47



MOVEMENT SUMMARY

Site: I-26 WB Ramps 2040 AM - Alt 3

I-26 WB Ramps 2040 AM
Roundabout

Movement Performance - Vehicles

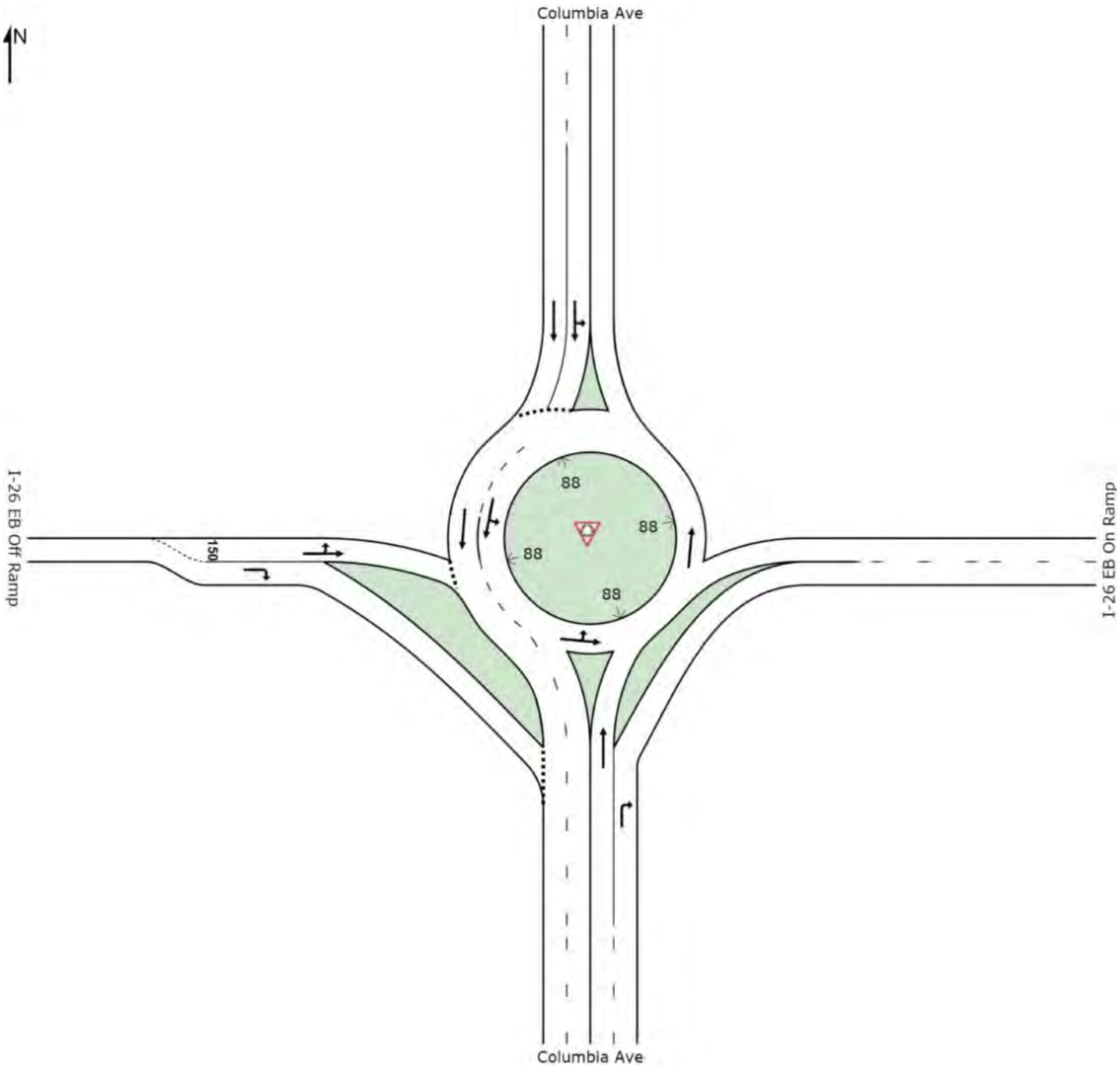
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	136	2.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.9
8	T1	437	2.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.4
Approach		573	2.0	0.517	9.3	LOS A	0.0	0.0	0.00	0.00	25.5
East: I-26 WB Off Ramp											
1	L2	1115	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.9
6	T1	1	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.7
16	R2	176	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.5
Approach		1292	2.0	1.046	74.6	LOS F	25.7	653.2	1.00	2.42	13.8
North: Columbia Ave											
4	T1	633	2.0	0.765	33.2	LOS D	3.9	98.1	0.85	1.08	18.8
14	R2	64	2.0	0.765	32.4	LOS D	3.8	95.9	0.84	1.07	18.5
Approach		697	2.0	0.765	33.1	LOS D	3.9	98.1	0.85	1.08	18.8
All Vehicles		2562	2.0	1.046	48.7	LOS E	25.7	653.2	0.74	1.52	16.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 EB Ramps 2040 AM - Alt 3

I-26 EB Ramps 2040 AM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 EB Ramps 2040 AM - Alt 3

I-26 EB Ramps 2040 AM
Roundabout

Volume Display Method: Total and %

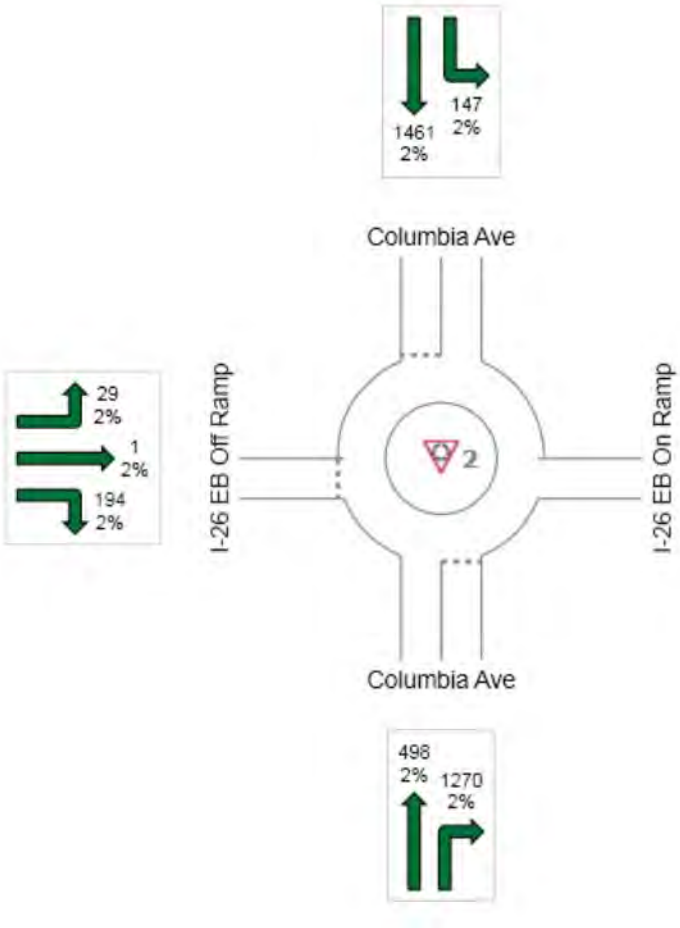
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 3600

Light Vehicles (LV): 3528

Heavy Vehicles (HV): 72



MOVEMENT SUMMARY

Site: I-26 EB Ramps 2040 AM - Alt 3

I-26 EB Ramps 2040 AM
Roundabout

Movement Performance - Vehicles

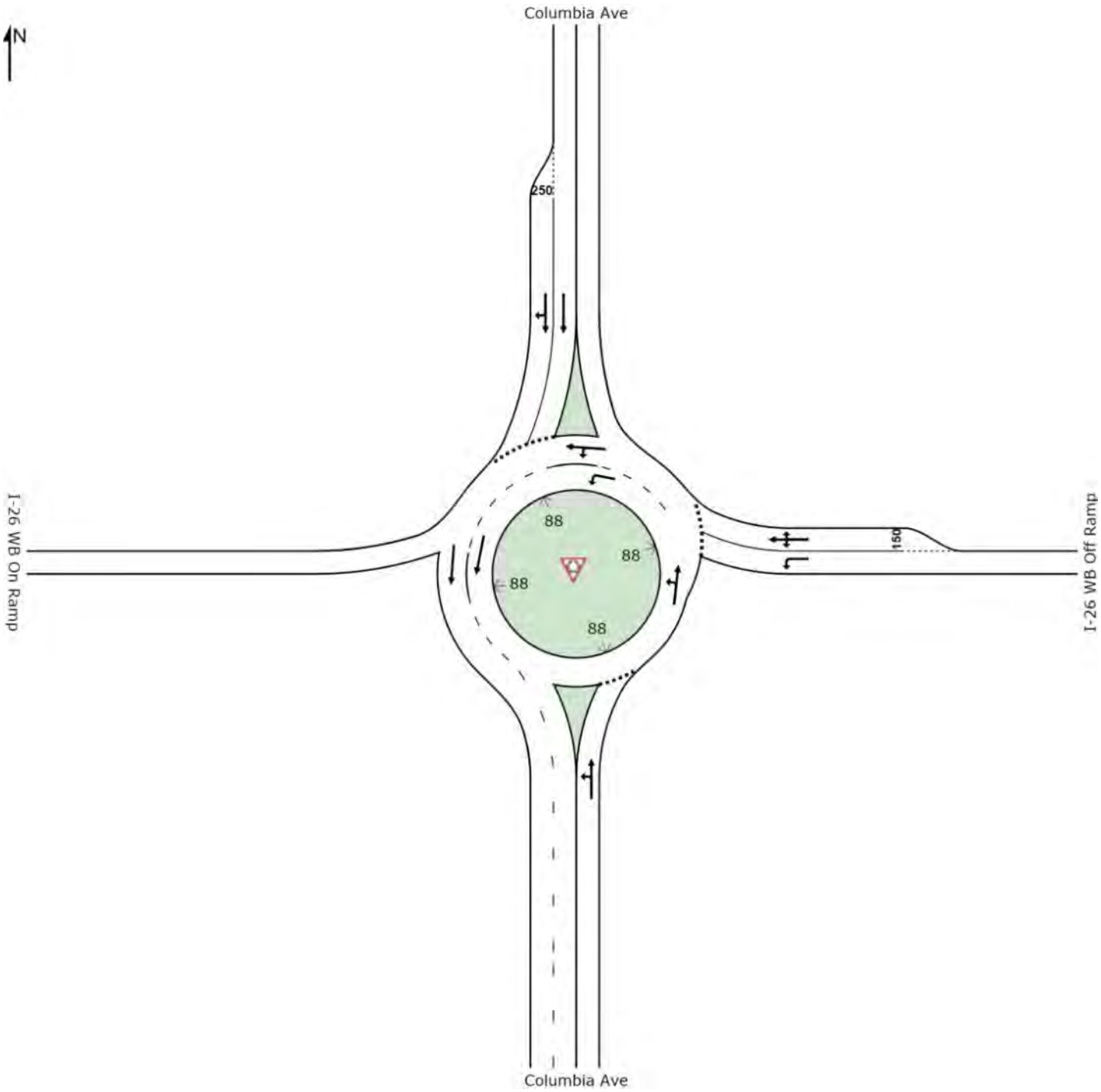
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	541	2.0	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	25.8
18	R2	1380	2.0	0.841	0.5	LOS A	0.0	0.0	0.00	0.00	24.8
Approach		1922	2.0	0.841	0.4	NA	0.0	0.0	0.00	0.00	25.1
North: Columbia Ave											
7	L2	160	2.0	0.789	18.1	LOS C	0.0	0.0	0.00	0.00	26.0
4	T1	1588	2.0	0.789	18.1	LOS C	0.0	0.0	0.00	0.00	25.7
Approach		1748	2.0	0.789	18.1	LOS C	0.0	0.0	0.00	0.00	25.8
West: I-26 EB Off Ramp											
5	L2	32	2.0	0.103	13.1	LOS B	0.2	6.3	0.73	0.73	21.8
2	T1	1	2.0	0.103	13.1	LOS B	0.2	6.3	0.73	0.73	21.6
12	R2	211	2.0	0.592	26.7	LOS D	2.1	52.5	0.83	0.96	19.3
Approach		243	2.0	0.592	24.9	LOS C	2.1	52.5	0.82	0.93	19.6
All Vehicles		3913	2.0	0.841	9.8	LOS A	2.1	52.5	0.05	0.06	24.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 WB Ramps 2040 PM - Alt 3

I-26 WB Ramps 2040 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 WB Ramps 2040 PM - Alt 3

I-26 WB Ramps 2040 PM
Roundabout

Volume Display Method: Total and %

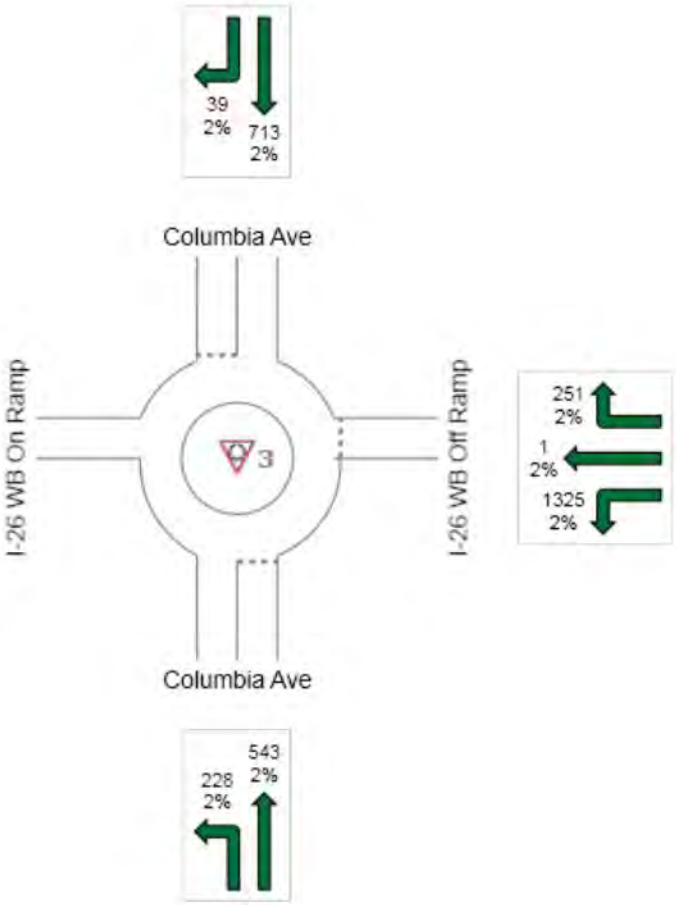
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 3100

Light Vehicles (LV): 3038

Heavy Vehicles (HV): 62



MOVEMENT SUMMARY

Site: I-26 WB Ramps 2040 PM - Alt 3

I-26 WB Ramps 2040 PM
Roundabout

Movement Performance - Vehicles

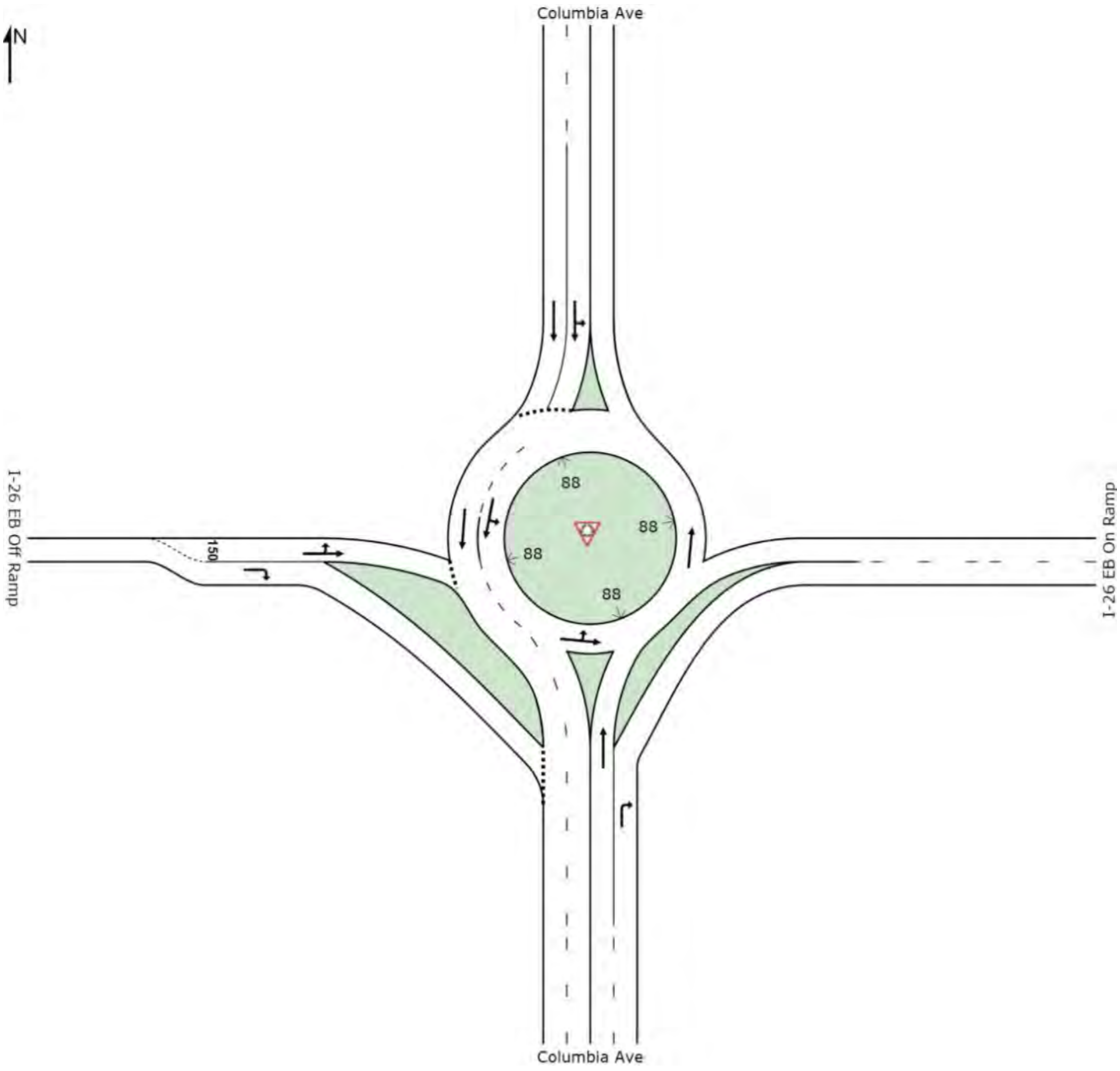
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
3	L2	248	2.0	0.756	16.3	LOS C	0.0	0.0	0.00	0.00	25.9
8	T1	590	2.0	0.756	16.3	LOS C	0.0	0.0	0.00	0.00	25.3
Approach		838	2.0	0.756	16.3	LOS C	0.0	0.0	0.00	0.00	25.5
East: I-26 WB Off Ramp											
1	L2	1440	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
6	T1	1	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
16	R2	273	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
Approach		1714	2.0	1.819	397.3	LOS F	131.7	3345.1	1.00	7.42	4.7
North: Columbia Ave											
4	T1	775	2.0	0.796	33.1	LOS D	4.6	116.5	0.84	1.10	18.8
14	R2	42	2.0	0.796	32.4	LOS D	4.5	113.6	0.83	1.08	18.5
Approach		817	2.0	0.796	33.0	LOS D	4.6	116.5	0.84	1.10	18.8
All Vehicles		3370	2.0	1.819	214.2	LOS F	131.7	3345.1	0.71	4.04	7.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: I-26 EB Ramps 2040 PM - Alt 3

I-26 EB Ramps 2040 PM
Roundabout



INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: I-26 EB Ramps 2040 PM - Alt 3

I-26 EB Ramps 2040 PM
Roundabout

Volume Display Method: Total and %

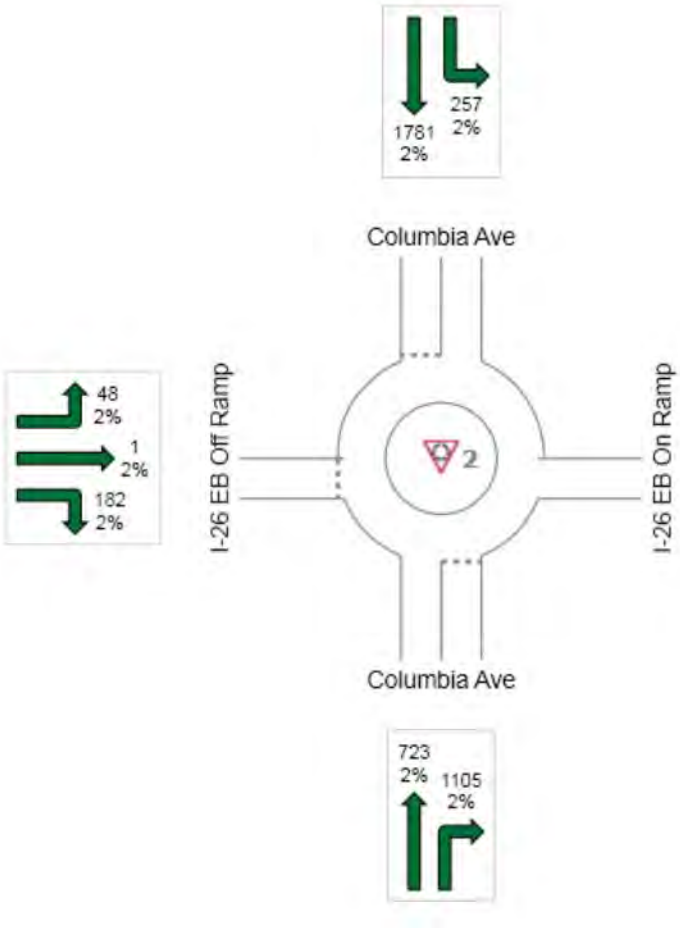
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 4097

Light Vehicles (LV): 4015

Heavy Vehicles (HV): 82



MOVEMENT SUMMARY

Site: I-26 EB Ramps 2040 PM - Alt 3

I-26 EB Ramps 2040 PM
Roundabout

Movement Performance - Vehicles

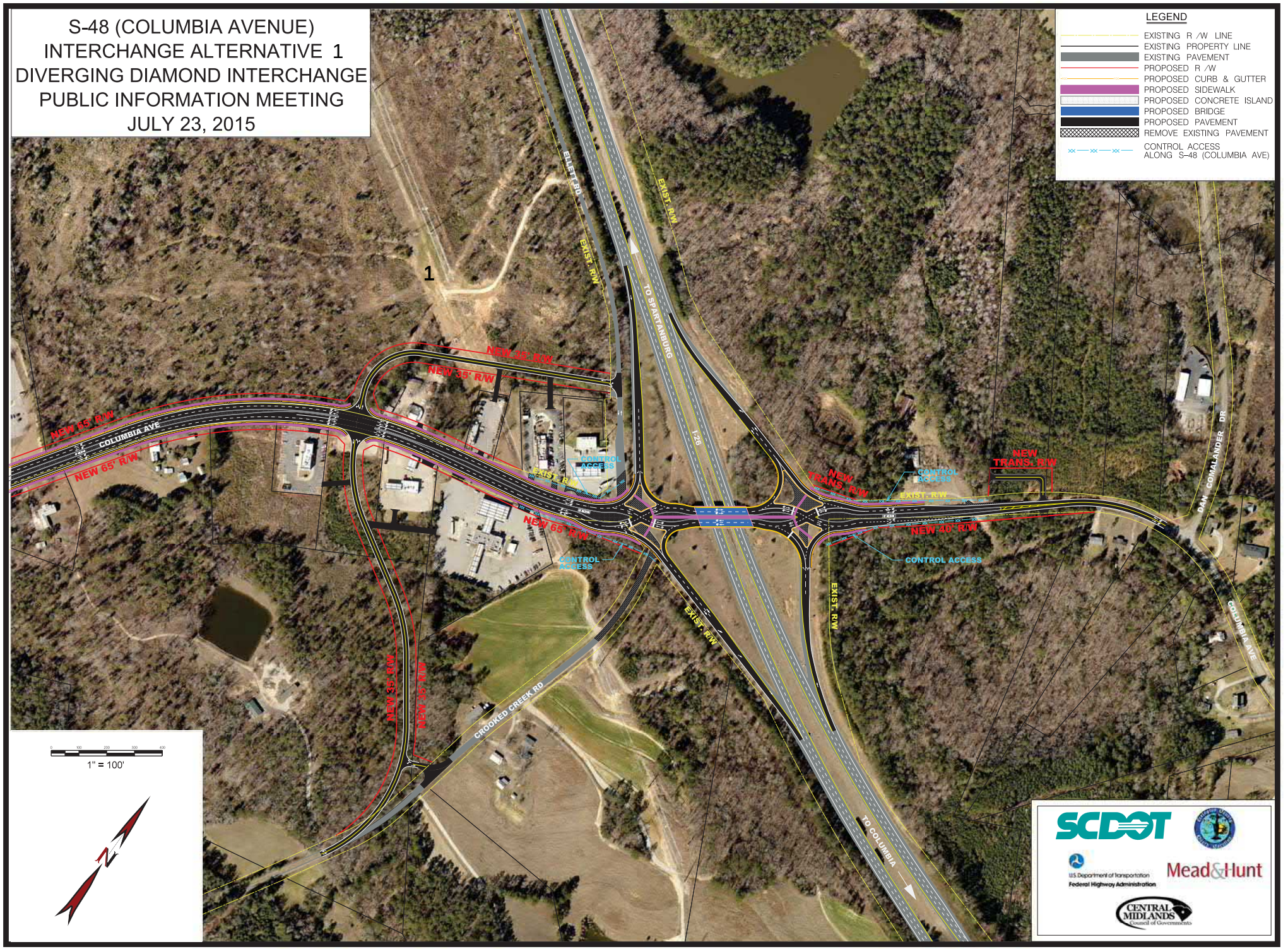
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Columbia Ave											
8	T1	786	2.0	0.406	0.1	LOS A	0.0	0.0	0.00	0.00	25.7
18	R2	1201	2.0	0.732	0.3	LOS A	0.0	0.0	0.00	0.00	24.9
Approach		1987	2.0	0.732	0.2	NA	0.0	0.0	0.00	0.00	25.2
North: Columbia Ave											
7	L2	279	2.0	1.000	46.4	LOS E	0.0	0.0	1.00	0.04	17.0
4	T1	1936	2.0	1.000	46.4	LOS E	0.0	0.0	1.00	0.04	16.9
Approach		2215	2.0	1.000	46.4	LOS E	0.0	0.0	1.00	0.04	16.9
West: I-26 EB Off Ramp											
5	L2	52	2.0	0.234	21.7	LOS C	0.6	14.8	0.83	0.86	20.2
2	T1	1	2.0	0.234	21.7	LOS C	0.6	14.8	0.83	0.86	19.9
12	R2	198	2.0	0.711	43.0	LOS E	2.6	66.0	0.91	1.11	16.9
Approach		251	2.0	0.711	38.5	LOS E	2.6	66.0	0.89	1.06	17.5
All Vehicles		4453	2.0	1.000	25.4	LOS D	2.6	66.0	0.55	0.08	19.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX O

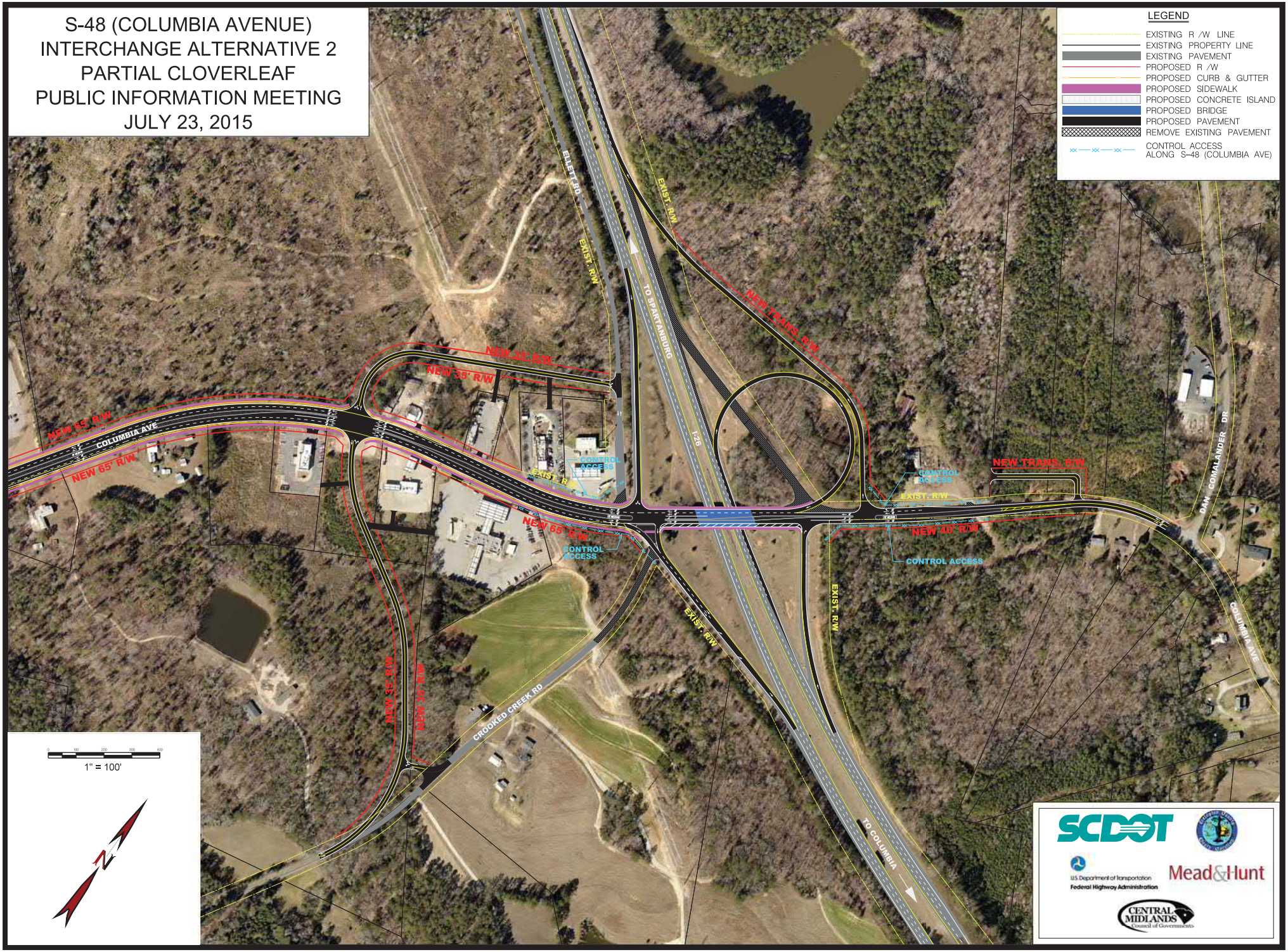
ALTERNATIVE 1, 2, & 3 CONCEPTUAL DESIGNS

S-48 (COLUMBIA AVENUE) INTERCHANGE ALTERNATIVE 1 DIVERGING DIAMOND INTERCHANGE PUBLIC INFORMATION MEETING JULY 23, 2015



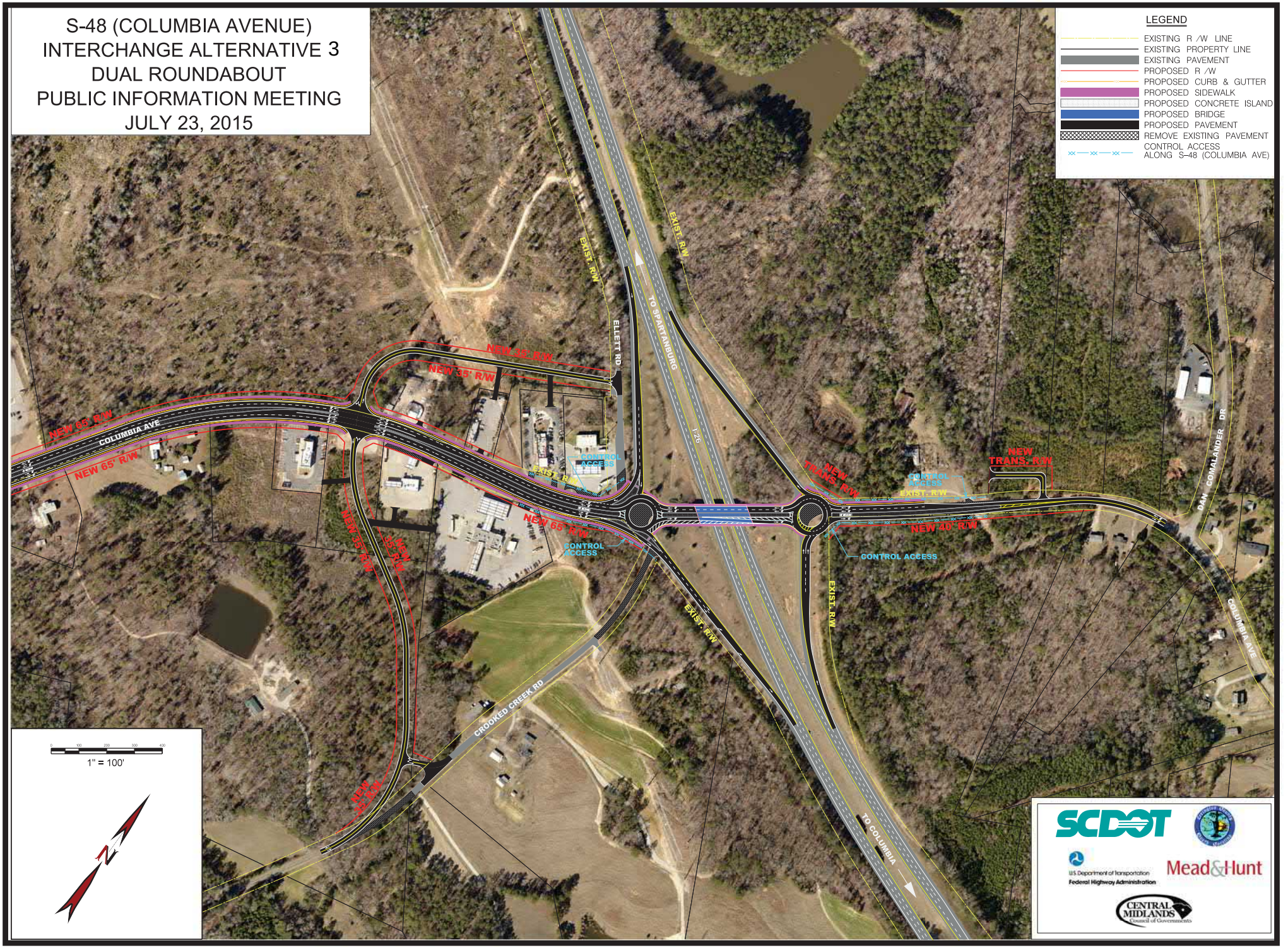
ALL RIGHT-OF-WAY (R/W) SHOWN IS PROPOSED AND SUBJECT TO CHANGE

S-48 (COLUMBIA AVENUE) INTERCHANGE ALTERNATIVE 2 PARTIAL CLOVERLEAF PUBLIC INFORMATION MEETING JULY 23, 2015



ALL RIGHT-OF-WAY (R/W) SHOWN IS PROPOSED AND SUBJECT TO CHANGE

S-48 (COLUMBIA AVENUE) INTERCHANGE ALTERNATIVE 3 DUAL ROUNDABOUT PUBLIC INFORMATION MEETING JULY 23, 2015

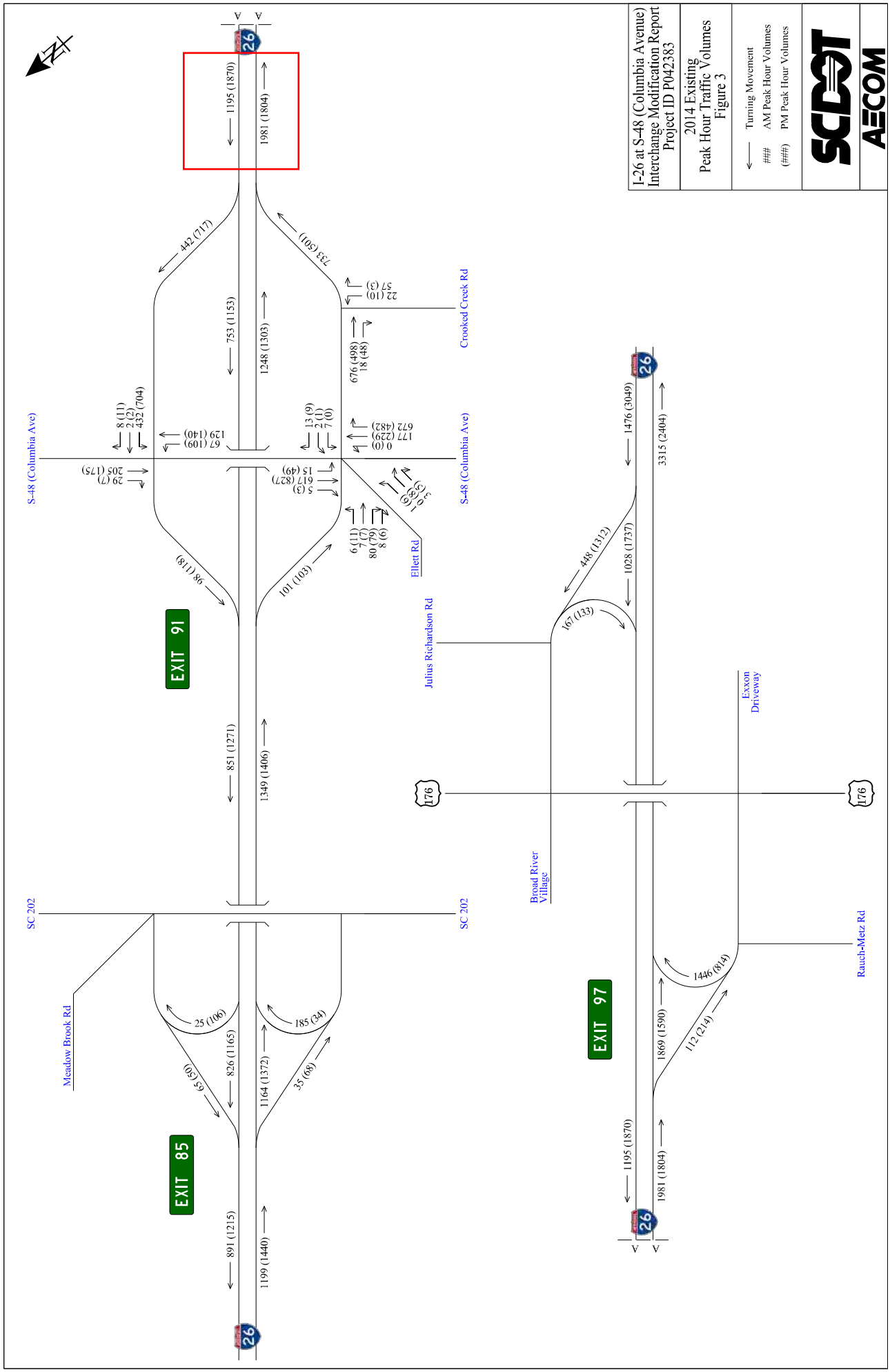


ALL RIGHT-OF-WAY (R/W) SHOWN IS PROPOSED AND SUBJECT TO CHANGE

APPENDIX B

Traffic Counts

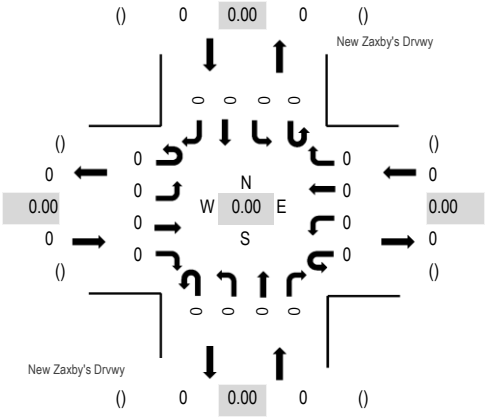
DocuSign Envelope ID: 80BCC4F1-7DFA-49FB-8D14-889B07D24B97



All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

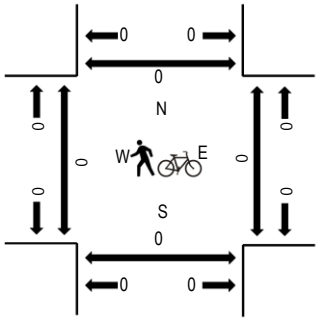
Location: #1 New Zaxby's Drvwy & AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:00 AM - 07:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Eastbound				Westbound				New Zaxby's Drvwy Northbound				New Zaxby's Drvwy Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0

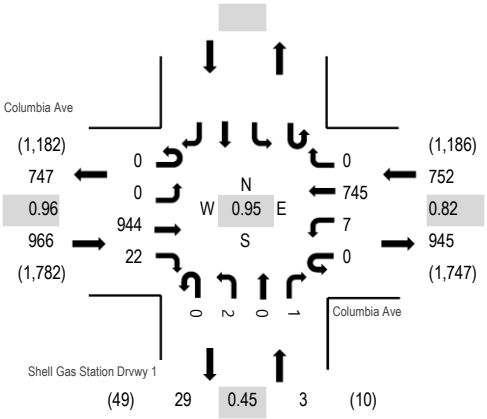
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

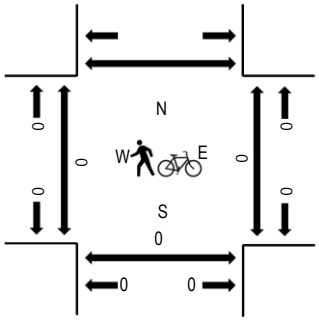
Location: #2 Shell Gas Station Drvwy 1 & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Shell Gas Station Drvwy 1 Northbound				Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	240	5	0	1	94	0	0	0	0	0					340	1,517	0	0	0	
7:15 AM	0	0	248	8	0	0	98	0	0	0	0	0					354	1,630	0	0	0	
7:30 AM	0	0	239	7	0	2	131	0	0	0	0	0					379	1,721	0	0	0	
7:45 AM	0	0	234	4	0	2	203	0	0	0	0	1					444	1,627	0	0	0	
8:00 AM	0	0	217	7	0	0	228	0	0	1	0	0					453	1,461	0	0	0	
8:15 AM	0	0	254	4	0	3	183	0	0	1	0	0					445		0	0	0	
8:30 AM	0	0	156	1	0	2	124	0	0	2	0	0					285		0	0	0	
8:45 AM	0	0	155	3	0	0	115	0	0	2	0	3					278		0	0	0	

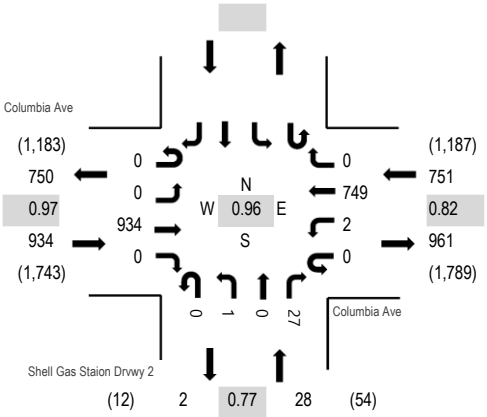
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	8	0	0	0	7	0	0	0	0	0					15
Lights	0	0	905	22	0	6	713	0	0	2	0	1					1,649
Mediums	0	0	31	0	0	1	25	0	0	0	0	0					57
Total	0	0	944	22	0	7	745	0	0	2	0	1					1,721

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

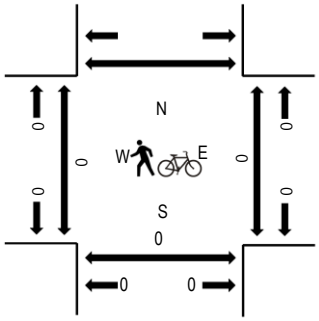
Location: #3 Shell Gas Staion Drvwy 2 & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Shell Gas Staion Drvwy 2 Northbound				Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	245	0	0	1	93	0	0	1	0	9					349	1,523	0	0	0	
7:15 AM	0	0	247	1	0	0	96	0	0	2	0	4					350	1,618	0	0	0	
7:30 AM	0	0	240	0	0	0	133	0	0	1	0	10					384	1,713	0	0	0	
7:45 AM	0	0	232	0	0	1	200	0	0	0	0	7					440	1,622	0	0	0	
8:00 AM	0	0	213	0	0	1	228	0	0	0	0	2					444	1,461	0	0	0	
8:15 AM	0	0	249	0	0	0	188	0	0	0	0	8					445		0	0	0	
8:30 AM	0	0	158	1	0	1	127	0	0	1	0	5					293		0	0	0	
8:45 AM	0	0	156	1	0	5	113	0	0	0	0	4					279		0	0	0	

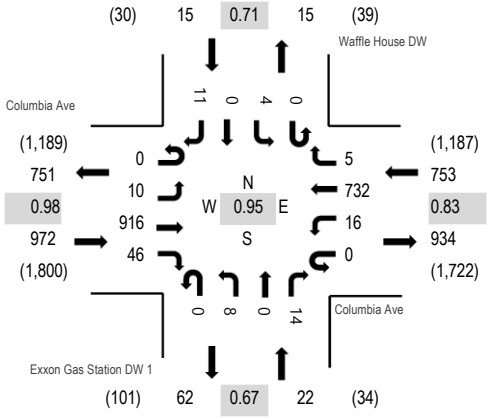
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	5	0	0	0	5	0	0	0	0	0					10
Lights	0	0	896	0	0	2	716	0	0	1	0	27					1,642
Mediums	0	0	33	0	0	0	28	0	0	0	0	0					61
Total	0	0	934	0	0	2	749	0	0	1	0	27					1,713

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

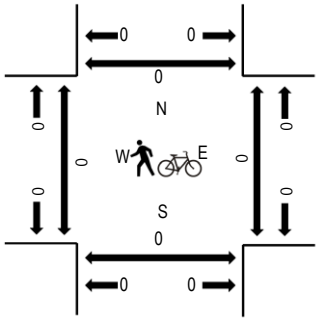
Location: #4 Exxon Gas Station DW 1 & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Exxon Gas Station DW 1 Northbound				Waffle House DW Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	3	244	6	0	0	91	3	0	3	0	1	0	1	0	1	353	1,562	0	0	0	0
7:15 AM	0	3	245	5	0	2	95	4	0	1	0	0	0	1	0	2	358	1,665	0	0	0	0
7:30 AM	0	1	228	20	0	5	130	0	0	0	0	2	0	1	0	1	388	1,762	0	0	0	0
7:45 AM	0	2	230	9	0	6	199	2	0	3	0	6	0	1	0	5	463	1,672	0	0	0	0
8:00 AM	0	3	206	9	0	2	224	2	0	1	0	5	0	0	0	4	456	1,489	0	0	0	0
8:15 AM	0	4	252	8	0	3	179	1	0	4	0	1	0	2	0	1	455		0	0	0	0
8:30 AM	0	1	153	9	0	2	123	2	0	3	0	1	0	1	0	3	298		0	0	0	0
8:45 AM	0	4	140	15	0	0	108	4	0	2	0	1	0	0	0	6	280		0	0	0	0

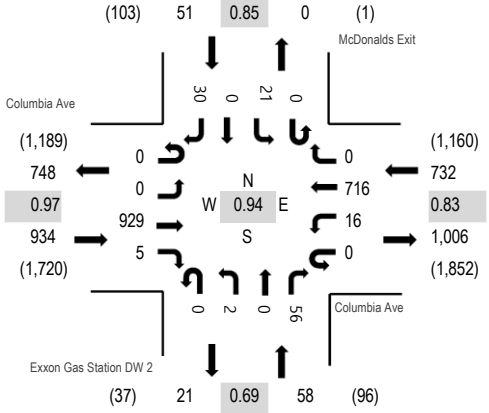
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	6	0	0	1	5	0	0	2	0	1	0	0	0	0	15
Lights	0	10	879	44	0	14	700	5	0	5	0	12	0	4	0	11	1,684
Mediums	0	0	31	2	0	1	27	0	0	1	0	1	0	0	0	0	63
Total	0	10	916	46	0	16	732	5	0	8	0	14	0	4	0	11	1,762

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

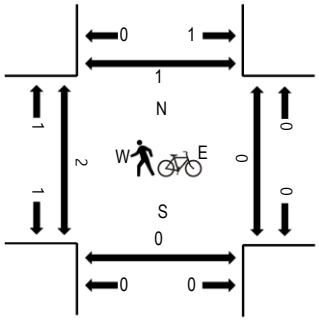
Location: #5 Exxon Gas Station DW 2 & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Exxon Gas Station DW 2 Northbound				McDonalds Exit Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	244	0	0	2	87	0	0	2	0	6	0	9	0	5	355	1,585	0	0	0	0
7:15 AM	0	0	245	2	0	3	103	0	0	0	0	6	0	2	0	5	366	1,692	0	0	0	0
7:30 AM	0	0	232	0	0	5	119	0	0	1	0	20	0	6	0	9	392	1,775	2	0	0	1
7:45 AM	0	0	238	0	0	6	206	0	0	0	0	13	0	2	0	7	472	1,697	0	0	0	0
8:00 AM	0	0	208	1	0	5	218	0	0	0	0	13	0	8	0	9	462	1,494	0	0	0	0
8:15 AM	0	0	251	4	0	0	173	0	0	1	0	10	0	5	0	5	449		0	0	0	0
8:30 AM	0	0	154	0	0	2	126	0	0	1	1	14	0	11	0	5	314		0	0	0	0
8:45 AM	0	0	141	0	0	7	98	0	0	0	0	8	0	6	0	9	269		0	0	0	0

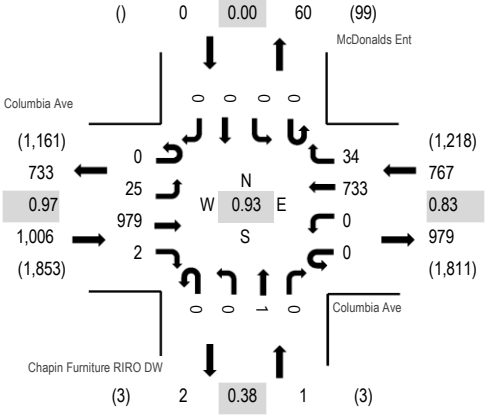
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	7	0	0	3	6	0	0	0	0	3	0	0	0	0	19
Lights	0	0	893	4	0	12	687	0	0	1	0	51	0	21	0	30	1,699
Mediums	0	0	29	1	0	1	23	0	0	1	0	2	0	0	0	0	57
Total	0	0	929	5	0	16	716	0	0	2	0	56	0	21	0	30	1,775

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

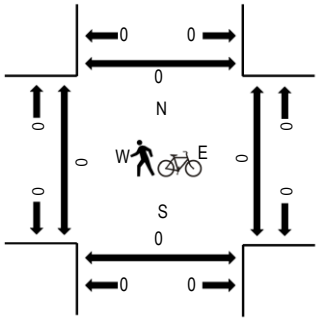
Location: #6 Chapin Furniture RIRO DW & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Chapin Furniture RIRO DW Northbound				McDonalds Ent Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	5	258	0	0	0	89	4	0	0	0	0	0	0	0	0	356	1,583	0	0	0	0
7:15 AM	0	2	247	0	0	0	104	6	0	0	0	2	0	0	0	0	361	1,687	0	0	0	0
7:30 AM	0	9	250	0	0	0	125	7	0	0	0	0	0	0	0	0	391	1,774	0	0	0	0
7:45 AM	0	6	247	0	0	0	211	10	0	0	1	0	0	0	0	0	475	1,697	0	0	0	0
8:00 AM	0	7	222	0	0	0	222	9	0	0	0	0	0	0	0	0	460	1,491	0	0	0	0
8:15 AM	0	3	260	2	0	0	175	8	0	0	0	0	0	0	0	0	448		0	0	0	0
8:30 AM	0	5	174	1	0	0	129	5	0	0	0	0	0	0	0	0	314		0	0	0	0
8:45 AM	0	4	151	0	0	0	106	8	0	0	0	0	0	0	0	0	269		0	0	0	0

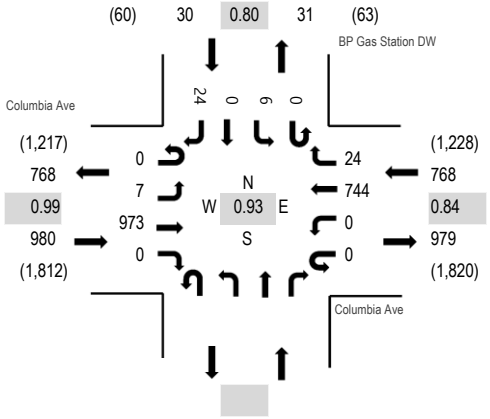
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	9	0	0	0	10	0	0	0	0	0	0	0	0	0	19
Lights	0	25	937	2	0	0	697	34	0	0	1	0	0	0	0	0	1,696
Mediums	0	0	33	0	0	0	26	0	0	0	0	0	0	0	0	0	59
Total	0	25	979	2	0	0	733	34	0	0	1	0	0	0	0	0	1,774

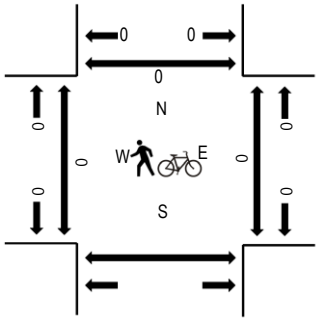
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: #7 BP Gas Station DW & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Northbound				BP Gas Station DW Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	1	253	0	0	0	87	5					0	3	0	6	355	1,594	0	0		0
7:15 AM	0	1	250	0	0	0	103	8					0	2	0	6	370	1,698	0	0		0
7:30 AM	0	2	248	0	0	0	129	5					0	4	0	4	392	1,778	0	0		0
7:45 AM	0	2	247	0	0	0	215	9					0	0	0	4	477	1,706	0	0		0
8:00 AM	0	1	219	0	0	0	224	5					0	0	0	10	459	1,506	0	0		0
8:15 AM	0	2	259	0	0	0	176	5					0	2	0	6	450		0	0		0
8:30 AM	0	1	172	0	0	0	128	9					0	6	0	4	320		0	0		0
8:45 AM	0	0	154	0	0	0	113	7					0	1	0	2	277		0	0		0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	8	0	0	0	7	0					0	0	0	2	17
Lights	0	6	934	0	0	0	712	21					0	6	0	20	1,699
Mediums	0	1	31	0	0	0	25	3					0	0	0	2	62
Total	0	7	973	0	0	0	744	24					0	6	0	24	1,778

All Traffic Data Services Inc.
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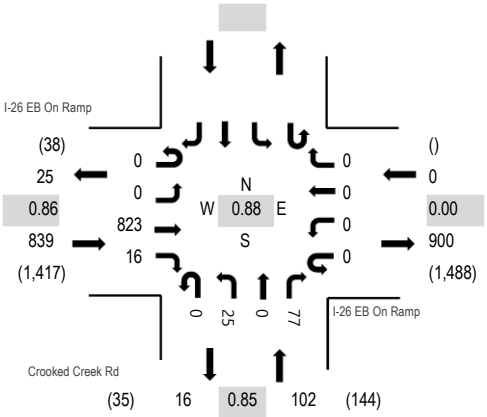
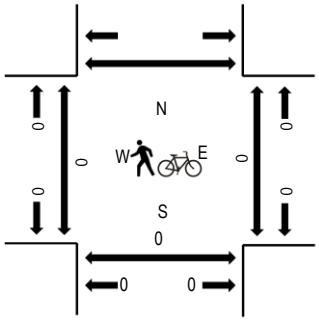
Location: #8 Crooked Creek Rd & I-26 EB On Ramp AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:00 AM - 07:15 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	I-26 EB On Ramp Eastbound				I-26 EB On Ramp Westbound				Crooked Creek Rd Northbound				Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	240	3	0	0	0	0	0	3	0	20					266	941	0	0	0	
7:15 AM	0	0	221	3	0	0	0	0	0	3	0	27					254	819	0	0	0	
7:30 AM	0	0	200	7	0	0	0	0	0	10	0	19					236	745	0	0	0	
7:45 AM	0	0	162	3	0	0	0	0	0	9	0	11					185	659	0	0	0	
8:00 AM	0	0	124	5	0	0	0	0	0	7	0	8					144	620	0	0	0	
8:15 AM	0	0	164	6	0	0	0	0	0	2	0	8					180		0	0	0	
8:30 AM	0	0	139	4	0	0	0	0	0	1	0	6					150		0	0	0	
8:45 AM	0	0	132	4	0	0	0	0	0	3	0	7					146		0	0	0	

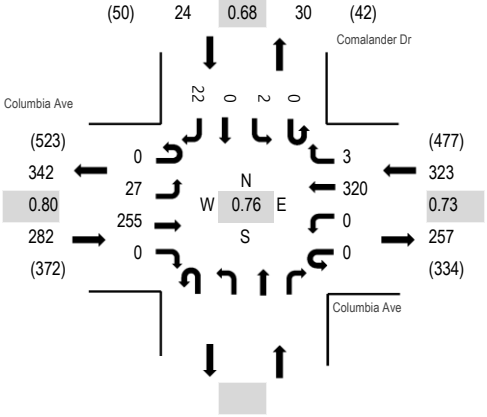
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	5	0	0	0	0	0	0	0	0	0					5
Lights	0	0	811	16	0	0	0	0	0	25	0	77					929
Mediums	0	0	7	0	0	0	0	0	0	0	0	0					7
Total	0	0	823	16	0	0	0	0	0	25	0	77					941

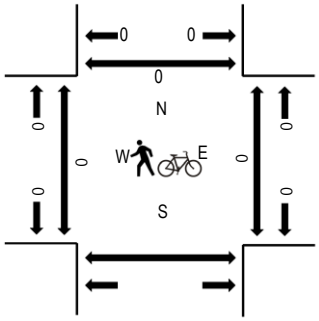
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: #9 Comalander Dr & Columbia Ave AM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Northbound				Comalander Dr Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	1	12	0	0	0	41	0					0	0	0	10	64	396	0	0		0
7:15 AM	0	2	21	0	0	0	49	0					0	0	0	6	78	538	0	0		0
7:30 AM	0	7	32	0	0	0	38	0					0	0	0	6	83	621	0	0		0
7:45 AM	0	7	62	0	0	0	95	2					0	0	0	5	171	629	0	0		0
8:00 AM	0	4	84	0	0	0	110	0					0	0	0	8	206	503	0	0		0
8:15 AM	0	4	81	0	0	0	70	1					0	1	0	4	161		0	0		0
8:30 AM	0	12	28	0	0	0	45	0					0	1	0	5	91		0	0		0
8:45 AM	1	2	12	0	0	0	26	0					0	0	0	4	45		0	0		0

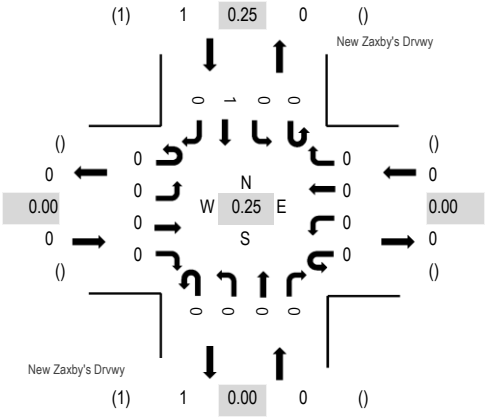
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	2	1	0	0	0	8	0					0	0	0	0	11
Lights	0	24	237	0	0	0	295	3					0	0	0	21	580
Mediums	0	1	17	0	0	0	17	0					0	2	0	1	38
Total	0	27	255	0	0	0	320	3					0	2	0	22	629

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

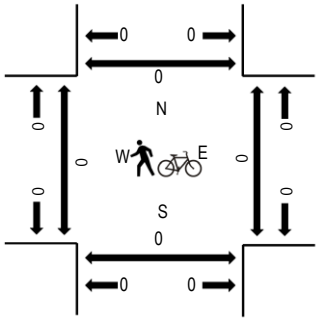
Location: #1 New Zaxby's Drvwy & PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Eastbound				Westbound				New Zaxby's Drvwy Northbound				New Zaxby's Drvwy Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1

All Traffic Data Services Inc.
(303) 216-2439
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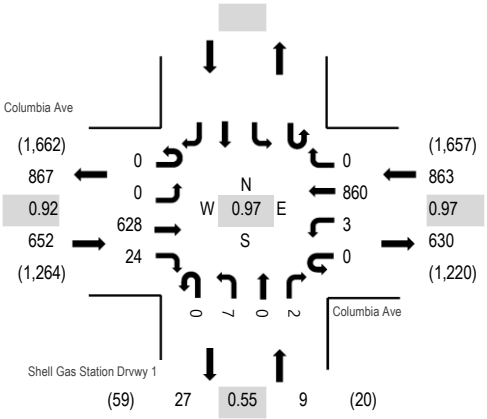
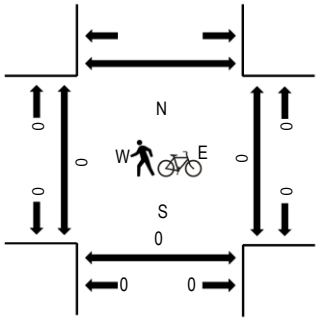
Location: #2 Shell Gas Station Drvwy 1 & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Shell Gas Station Drvwy 1 Northbound				Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	192	9	0	0	212	0	0	3	0	2					418	1,417	0	0	1	
4:15 PM	0	0	144	8	0	1	183	0	0	2	0	1					339	1,390	0	0	0	
4:30 PM	0	0	122	6	0	4	205	0	0	0	0	1					338	1,443	0	0	0	
4:45 PM	0	0	128	3	0	1	188	0	0	2	0	0					322	1,480	0	0	0	
5:00 PM	0	0	172	5	0	0	213	0	0	1	0	0					391	1,524	0	0	0	
5:15 PM	0	0	159	8	0	2	221	0	0	2	0	0					392		0	0	0	
5:30 PM	0	0	160	6	0	0	207	0	0	1	0	1					375		0	0	0	
5:45 PM	0	0	137	5	0	1	219	0	0	3	0	1					366		0	0	0	

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0					0
Lights	0	0	616	24	0	3	855	0	0	7	0	2					1,507
Mediums	0	0	12	0	0	0	5	0	0	0	0	0					17
Total	0	0	628	24	0	3	860	0	0	7	0	2					1,524

All Traffic Data Services Inc.
(303) 216-2439
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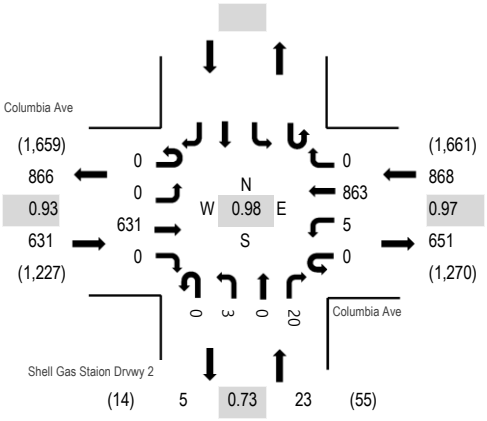
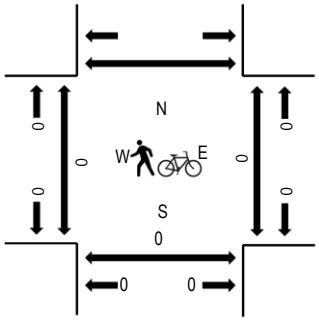
Location: #3 Shell Gas Staion Drvwy 2 & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Shell Gas Staion Drvwy 2 Northbound				Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	198	1	0	3	209	0	0	2	0	9					422	1,421	0	0	1	
4:15 PM	0	0	145	1	0	3	184	0	0	1	0	9					343	1,388	0	0	0	
4:30 PM	0	0	119	1	0	0	205	0	0	2	0	5					332	1,433	0	0	0	
4:45 PM	0	0	131	0	0	0	189	0	0	1	0	3					324	1,477	0	0	0	
5:00 PM	0	0	169	0	0	1	214	0	0	2	0	3					389	1,522	0	0	0	
5:15 PM	0	0	159	0	0	0	220	0	0	1	0	8					388		0	0	0	
5:30 PM	0	0	162	0	0	2	207	0	0	0	0	5					376		0	0	0	
5:45 PM	0	0	141	0	0	2	222	0	0	0	0	4					369		0	0	0	

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	0	0	0	0	0	0	0					1
Lights	0	0	619	0	0	5	859	0	0	3	0	20					1,506
Mediums	0	0	11	0	0	0	4	0	0	0	0	0					15
Total	0	0	631	0	0	5	863	0	0	3	0	20					1,522

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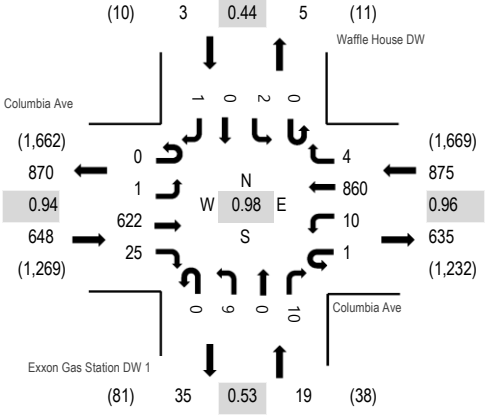
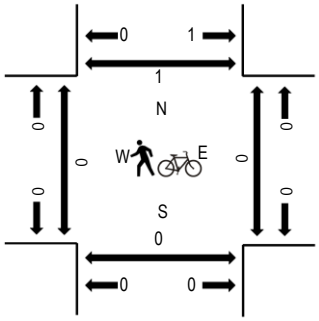
Location: #4 Exxon Gas Station DW 1 & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Exxon Gas Station DW 1 Northbound				Waffle House DW Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	196	13	0	2	209	1	0	1	0	4	0	0	0	2	428	1,441	1	0	0	1
4:15 PM	0	0	148	6	0	5	183	2	0	3	0	4	0	0	0	0	351	1,404	0	0	0	0
4:30 PM	0	2	116	5	0	2	202	0	0	1	0	3	0	1	0	3	335	1,446	0	0	0	0
4:45 PM	0	1	123	11	0	2	186	0	0	2	0	1	0	1	0	0	327	1,496	0	0	0	1
5:00 PM	0	0	167	5	1	2	211	0	0	1	0	4	0	0	0	0	391	1,545	0	0	0	0
5:15 PM	0	0	160	7	0	1	221	2	0	1	0	1	0	0	0	0	393		0	0	0	0
5:30 PM	0	0	157	8	0	4	203	2	0	6	0	3	0	2	0	0	385		0	0	0	1
5:45 PM	0	1	138	5	0	3	225	0	0	1	0	2	0	0	0	1	376		0	0	0	0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lights	0	1	610	25	1	9	855	4	0	9	0	9	0	2	0	1	1,526
Mediums	0	0	11	0	0	1	5	0	0	0	0	1	0	0	0	0	18
Total	0	1	622	25	1	10	860	4	0	9	0	10	0	2	0	1	1,545

All Traffic Data Services Inc.
(303) 216-2439
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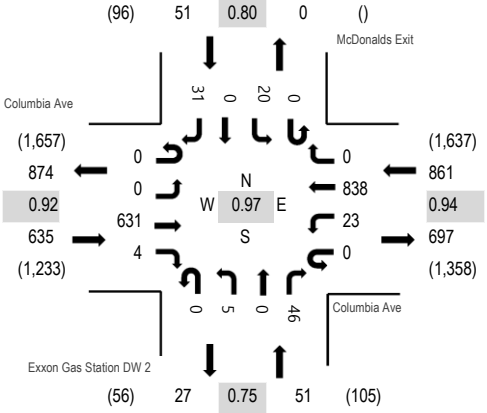
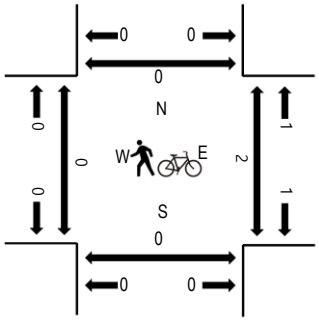
Location: #5 Exxon Gas Station DW 2 & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Exxon Gas Station DW 2 Northbound				McDonalds Exit Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	199	2	0	5	203	0	0	1	0	17	0	6	0	8	441	1,473	0	0	0	2
4:15 PM	0	0	151	1	0	10	180	0	0	0	0	13	0	6	0	8	369	1,443	0	0	0	0
4:30 PM	0	0	122	0	0	7	196	0	0	0	0	10	0	1	0	6	342	1,478	0	0	0	0
4:45 PM	0	0	122	1	0	3	172	0	0	2	0	11	0	3	0	7	321	1,526	0	0	0	0
5:00 PM	0	0	172	0	0	5	205	0	0	1	0	12	0	8	0	8	411	1,598	0	2	0	0
5:15 PM	0	0	160	0	0	8	218	0	0	1	0	8	0	4	0	5	404		0	0	0	0
5:30 PM	0	0	161	2	0	2	194	0	0	2	0	15	0	3	0	11	390		0	0	0	0
5:45 PM	0	0	138	2	0	8	221	0	0	1	0	11	0	5	0	7	393		0	0	0	0

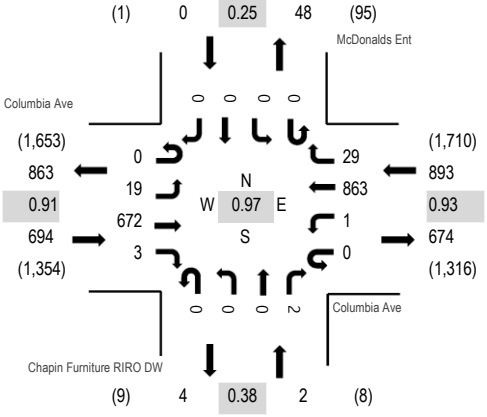
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	3
Lights	0	0	619	4	0	20	832	0	0	5	0	45	0	20	0	31	1,576
Mediums	0	0	11	0	0	2	6	0	0	0	0	0	0	0	0	0	19
Total	0	0	631	4	0	23	838	0	0	5	0	46	0	20	0	31	1,598

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

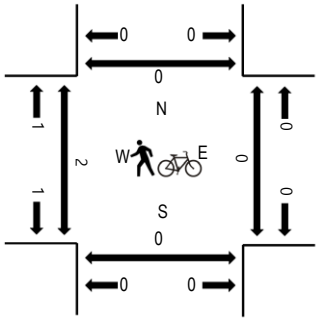
Location: #6 Chapin Furniture RIRO DW & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Chapin Furniture RIRO DW Northbound				McDonalds Ent Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	2	222	0	0	1	208	9	0	0	0	4	0	0	0	1	447	1,484	0	0	0	0
4:15 PM	0	5	163	2	0	0	190	6	0	1	0	0	0	0	0	0	367	1,444	0	0	0	0
4:30 PM	0	5	120	2	0	0	207	7	0	0	0	1	0	0	0	0	342	1,487	0	0	0	0
4:45 PM	0	7	132	0	0	0	183	6	0	0	0	0	0	0	0	0	328	1,526	0	0	0	0
5:00 PM	0	7	183	1	0	0	210	5	0	0	0	1	0	0	0	0	407	1,589	2	0	0	0
5:15 PM	0	3	169	1	0	0	228	9	0	0	0	0	0	0	0	0	410		0	0	0	0
5:30 PM	0	3	175	0	0	0	196	6	0	0	0	1	0	0	0	0	381		0	0	0	0
5:45 PM	0	6	145	1	0	1	229	9	0	0	0	0	0	0	0	0	391		0	0	0	0

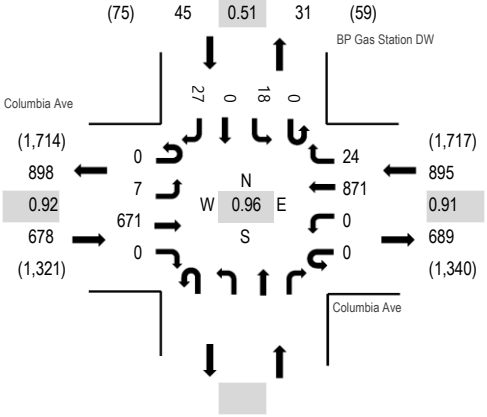
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3
Lights	0	19	659	3	0	1	855	29	0	0	0	2	0	0	0	0	1,568
Mediums	0	0	11	0	0	0	7	0	0	0	0	0	0	0	0	0	18
Total	0	19	672	3	0	1	863	29	0	0	0	2	0	0	0	0	1,589

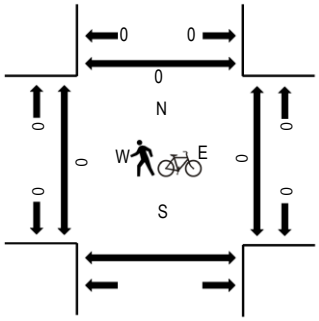
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: #7 BP Gas Station DW & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Northbound				BP Gas Station DW Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	1	227	0	0	0	212	4					0	2	0	6	452	1,495	0	0		0
4:15 PM	0	2	160	0	0	0	191	6					0	3	0	5	367	1,459	0	0		0
4:30 PM	0	1	117	0	0	0	210	5					0	4	0	4	341	1,514	0	0		0
4:45 PM	0	1	134	0	0	0	186	8					0	4	0	2	335	1,559	0	0		0
5:00 PM	0	2	182	0	0	0	205	5					0	8	0	14	416	1,618	0	0		0
5:15 PM	0	2	170	0	0	0	237	8					0	4	0	1	422		0	0		0
5:30 PM	0	3	170	0	0	0	196	6					0	4	0	7	386		0	0		0
5:45 PM	0	0	149	0	0	0	233	5					0	2	0	5	394		0	0		0

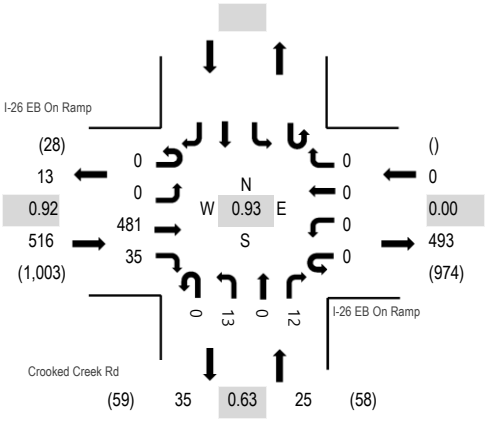
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	3	0	0	0	1	0					0	0	0	0	4
Lights	0	7	658	0	0	0	863	24					0	18	0	27	1,597
Mediums	0	0	10	0	0	0	7	0					0	0	0	0	17
Total	0	7	671	0	0	0	871	24					0	18	0	27	1,618

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

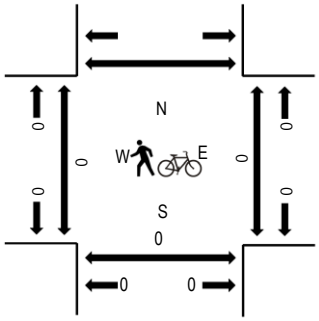
Location: #8 Crooked Creek Rd & I-26 EB On Ramp PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	I-26 EB On Ramp Eastbound				I-26 EB On Ramp Westbound				Crooked Creek Rd Northbound				Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	163	3	0	0	0	0	0	5	0	8					179	520	0	0	0	
4:15 PM	0	0	116	6	0	0	0	0	0	2	0	4					128	487	0	0	0	
4:30 PM	0	0	90	12	0	0	0	0	0	2	0	3					107	496	0	0	0	
4:45 PM	0	0	94	3	0	0	0	0	0	6	0	3					106	532	0	0	0	
5:00 PM	0	0	130	10	0	0	0	0	0	3	0	3					146	541	0	0	0	
5:15 PM	0	0	123	11	0	0	0	0	0	1	0	2					137		0	0	0	
5:30 PM	0	0	125	5	0	0	0	0	0	8	0	5					143		0	0	0	
5:45 PM	0	0	103	9	0	0	0	0	0	1	0	2					115		0	0	0	

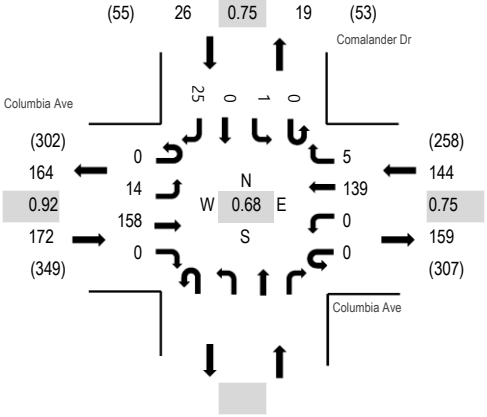
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	2	0	0	0	0	0	0	0	0	0					2
Lights	0	0	472	34	0	0	0	0	0	12	0	12					530
Mediums	0	0	7	1	0	0	0	0	0	1	0	0					9
Total	0	0	481	35	0	0	0	0	0	13	0	12					541

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

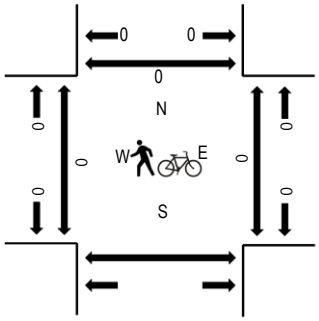
Location: #9 Comalander Dr & Columbia Ave PM
Date and Start Time: Thursday, January 30, 2020
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	Columbia Ave Eastbound				Columbia Ave Westbound				Northbound				Comalander Dr Southbound				Total	Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	3	64	0	0	0	47	1					0	0	0	11	126	342	0	0		0
4:15 PM	0	3	35	0	0	0	25	0					0	1	0	4	68	294	0	0		0
4:30 PM	0	4	27	0	0	0	33	1					0	0	0	5	70	311	0	0		0
4:45 PM	0	4	32	0	0	0	34	3					0	0	0	5	78	317	0	0		0
5:00 PM	0	5	35	0	0	0	28	0					0	0	0	10	78	320	0	0		0
5:15 PM	0	11	33	0	0	0	30	1					0	0	0	10	85		0	0		0
5:30 PM	0	6	42	0	0	0	21	3					0	0	0	4	76		0	0		0
5:45 PM	0	7	38	0	0	0	30	1					0	0	0	5	81		0	0		0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0					0	0	0	0	0
Lights	0	14	153	0	0	0	137	5					0	1	0	23	333
Mediums	0	0	5	0	0	0	2	0					0	0	0	2	9
Total	0	14	158	0	0	0	139	5					0	1	0	25	342

APPENDIX C

Volume Development Worksheets

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

S-48/Columbia Avenue at Ellett Road/New Frontage Road

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: Wednesday, January 15, 2020

AM PEAK HOUR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2020 RAW TRAFFIC VOLUMES*				111		179		789	152	156	608	
Balance Adjustment								4				
2020 EXISTING TRAFFIC VOLUMES				**111**		**179**		**793**	**152**	**156**	**608**	
Years To Buildout (2024)				4		4		4	4	4	4	
Yearly Growth Rate				0.0%		0.0%		1.5%	0.0%	0.0%	1.5%	
Background Traffic Growth				0		0		46	0	0	36	
Balance Adjustment												
Chapin Comm. Village Vested Volumes								211			182	
Chapin Tech. Park Vested Volumes	36		24				125	258			347	175
2024 NO-BUILD TRAFFIC VOLUMES	**36**	**0**	**24**	**111**	**0**	**179**	**125**	**1,308**	**152**	**156**	**1,173**	**175**
Build Alt. Diversion (Ellet Road)	3		1				1	-1				5
Build Alt. Diversion (Crooked Creek Road)				7		105		-16	16	1	-7	
2024 BUILD TRAFFIC VOLUMES	**39**	**0**	**25**	**118**	**0**	**284**	**126**	**1,291**	**168**	**157**	**1,166**	**180**
Years To Buildout (2044)				24		24		24	24	24	24	
Yearly Growth Rate				0.0%		0.0%		1.5%	0.0%	0.0%	1.5%	
Background Traffic Growth				0		0		285	0	0	218	
Balance Adjustment												
Chapin Comm. Village Vested Volumes								211			182	
Chapin Tech. Park Vested Volumes	36		24				125	258			347	175
2044 NO-BUILD TRAFFIC VOLUMES	**36**	**0**	**24**	**111**	**0**	**179**	**125**	**1,547**	**152**	**156**	**1,355**	**175**
Build Alt. Diversion (Ellet Road)	4		1				1	-1				6
Build Alt. Diversion (Crooked Creek Road)				10		134		-21	21	1	-10	
2044 BUILD TRAFFIC VOLUMES	**40**	**0**	**25**	**121**	**0**	**313**	**126**	**1,525**	**173**	**157**	**1,345**	**181**

PM PEAK HOUR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2020 RAW TRAFFIC VOLUMES*				109		160		532	112	142	800	
Balance Adjustment											-6	
2020 EXISTING TRAFFIC VOLUMES				**109**		**160**		**532**	**112**	**142**	**794**	
Years To Buildout (2024)				4		4		4	4	4	4	
Yearly Growth Rate				0.0%		0.0%		1.5%	0.0%	0.0%	1.5%	
Background Traffic Growth				0		0		33	0	0	48	
Balance Adjustment												
Chapin Comm. Village Vested Volumes								332			283	
Chapin Tech. Park Vested Volumes	155		104				26	491			413	39
2024 NO-BUILD TRAFFIC VOLUMES	**155**	**0**	**104**	**109**	**0**	**160**	**26**	**1,388**	**112**	**142**	**1,538**	**39**
Build Alt. Diversion (Ellet Road)	12		5				2	-2				19
Build Alt. Diversion (Crooked Creek Road)				0		19		-35	35	2	0	
2024 BUILD TRAFFIC VOLUMES	**167**	**0**	**109**	**109**	**0**	**179**	**28**	**1,351**	**147**	**144**	**1,538**	**58**
Years To Buildout (2044)				24		24		24	24	24	24	
Yearly Growth Rate				0.0%		0.0%		1.5%	0.0%	0.0%	1.5%	
Background Traffic Growth				0		0		192	0	0	287	
Balance Adjustment												
Chapin Comm. Village Vested Volumes								332			283	
Chapin Tech. Park Vested Volumes	155		104				26	491			413	39
2044 NO-BUILD TRAFFIC VOLUMES	**155**	**0**	**104**	**109**	**0**	**160**	**26**	**1,547**	**112**	**142**	**1,777**	**39**
Build Alt. Diversion (Ellet Road)	16		7				3	-3				24
Build Alt. Diversion (Crooked Creek Road)				0		24		-45	45	3	0	
2044 BUILD TRAFFIC VOLUMES	**171**	**0**	**111**	**109**	**0**	**184**	**29**	**1,499**	**157**	**145**	**1,777**	**63**

*Notes:

Light orange-shaded volumes are the diverted trips of the six driveways located just south of the current interchange.

Blue-shaded volumes for the S-48/Columbia Avenue through movements derived from the existing I-26 EB Ramps/Ellet Road intersection and the diverted trips of the six driveways located just south of the current interchange.

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

S-48/Columbia Avenue at I-26 EB Ramps

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: Wednesday, January 15, 2020

AM PEAK HOUR	EBL	EBT	EBR	EBR2	SEBL	SEBT	SEBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2020 RAW TRAFFIC VOLUMES	12	4	62	1	1	2	1	7	0	22	1	322	645	19	690	4
Balance Adjustment												4			4	
2020 EXISTING TRAFFIC VOLUMES	**12**	**4**	**62**	**1**	**1**	**2**	**1**	**7**	**0**	**22**	**1**	**326**	**645**	**19**	**694**	**4**
Years To Buildout (2024)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	1	0	4	0	0	0	0	0	0	1	0	20	39	1	42	0
Balance Adjustment			-1									-1	-10		-8	
Chapin Comm. Village Vested Volumes	21											211		127	182	
Chapin Tech. Park Vested Volumes			68									36	258		454	
2024 NO-BUILD TRAFFIC VOLUMES	**34**	**4**	**133**	**1**	**1**	**2**	**1**	**7**	**0**	**23**	**1**	**592**	**932**	**147**	**1,364**	**4**
Build Alt. Diversion (Ellet Road)			1	-1	-1	-2	-1				-1	1	2		4	-4
Build Alt. Diversion (Crooked Creek Road)								-7	0	-23		23	66	-1	1	
2024 BUILD TRAFFIC VOLUMES	**34**	**4**	**134**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**616**	**1,000**	**146**	**1,369**	**0**
Years To Buildout (2044)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	4	1	22	0	0	1	0	3	0	8	0	118	232	7	250	1
Balance Adjustment			-7									-7	-57		-49	
Chapin Comm. Village Vested Volumes	21											211		127	182	
Chapin Tech. Park Vested Volumes			68									36	258		454	
2044 NO-BUILD TRAFFIC VOLUMES	**37**	**5**	**145**	**1**	**1**	**3**	**1**	**10**	**0**	**30**	**1**	**684**	**1,078**	**153**	**1,531**	**5**
Build Alt. Diversion (Ellet Road)			1	-1	-1	-3	-1				-1	1	3		5	-5
Build Alt. Diversion (Crooked Creek Road)								-10	0	-30		30	83	-1	1	
2044 BUILD TRAFFIC VOLUMES	**37**	**5**	**146**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**715**	**1,164**	**152**	**1,537**	**0**

PM PEAK HOUR	EBL	EBT	EBR	EBR2	SEBL	SEBT	SEBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2020 RAW TRAFFIC VOLUMES	20	5	73	6	4	8	5	0	0	6	2	228	462	37	864	12
Balance Adjustment																
2020 EXISTING TRAFFIC VOLUMES	**20**	**5**	**73**	**6**	**4**	**8**	**5**	**0**	**0**	**6**	**2**	**228**	**462**	**37**	**864**	**12**
Years To Buildout (2024)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	1	0	4	0	0	0	0	0	0	0	0	14	29	2	52	1
Balance Adjustment			-1									-1	-9		-8	
Chapin Comm. Village Vested Volumes	33											332		198	283	
Chapin Tech. Park Vested Volumes			60									84	562		392	
2024 NO-BUILD TRAFFIC VOLUMES	**54**	**5**	**136**	**6**	**4**	**8**	**5**	**0**	**0**	**6**	**2**	**657**	**1,044**	**237**	**1,583**	**13**
Build Alt. Diversion (Ellet Road)			6	-6	-4	-8	-5				-2	4	8		13	-13
Build Alt. Diversion (Crooked Creek Road)								0	0	-6		6	-22	-2	2	
2024 BUILD TRAFFIC VOLUMES	**54**	**5**	**142**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**667**	**1,030**	**235**	**1,598**	**0**
Years To Buildout (2044)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	7	2	26	2	1	3	2	0	0	2	1	82	167	13	311	4
Balance Adjustment			-5									-8	-50		-46	
Chapin Comm. Village Vested Volumes	33											332		198	283	
Chapin Tech. Park Vested Volumes			60									84	562		392	
2044 NO-BUILD TRAFFIC VOLUMES	**60**	**7**	**154**	**8**	**5**	**11**	**7**	**0**	**0**	**8**	**3**	**718**	**1,141**	**248**	**1,804**	**16**
Build Alt. Diversion (Ellet Road)			8	-8	-5	-11	-7				-3	5	11		16	-16
Build Alt. Diversion (Crooked Creek Road)								0		-8		8	-29	-3	3	
2044 BUILD TRAFFIC VOLUMES	**60**	**7**	**162**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**731**	**1,123**	**245**	**1,823**	**0**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

S-48/Columbia Avenue at I-26 WB Ramps

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: Wednesday, January 15, 2020

AM PEAK HOUR			EBR	WBL	WBT	WBR	NBL	NBT			SBT	SBR
2020 RAW TRAFFIC VOLUMES				414	1	14	86	275			299	68
Balance Adjustment				2							2	
2020 EXISTING TRAFFIC VOLUMES				**416**	**1**	**14**	**86**	**275**			**301**	**68**
Years To Buildout (2024)				4	4	4	4	4			4	4
Yearly Growth Rate				1.5%	1.5%	1.5%	1.5%	1.5%			1.5%	1.5%
Background Traffic Growth				25	0	1	5	17			18	4
Balance Adjustment				-8			-1					
Chapin Comm. Village Vested Volumes						148		232			309	18
Chapin Tech. Park Vested Volumes				454			36					
2024 NO-BUILD TRAFFIC VOLUMES				**887**	**1**	**163**	**126**	**524**			**628**	**90**
Build Alt. Diversion (New Loop)			887	-887								
2024 BUILD TRAFFIC VOLUMES			**887**	**0**	**1**	**163**	**126**	**524**			**628**	**90**

Years To Buildout (2044)				24	24	24	24	24			24	24
Yearly Growth Rate				1.5%	1.5%	1.5%	1.5%	1.5%			1.5%	1.5%
Background Traffic Growth				149	0	5	31	99			109	24
Balance Adjustment				-49			-7					
Chapin Comm. Village Vested Volumes						148		232			309	18
Chapin Tech. Park Vested Volumes				454			36					
2044 NO-BUILD TRAFFIC VOLUMES				**970**	**1**	**167**	**146**	**606**			**719**	**110**
Build Alt. Diversion (New Loop)			970	-970								
2044 BUILD TRAFFIC VOLUMES			**970**	**0**	**1**	**167**	**146**	**606**			**719**	**110**

PM PEAK HOUR			EBR	WBL	WBT	WBR	NBL	NBT			SBT	SBR
2020 RAW TRAFFIC VOLUMES				747	0	13	70	186			164	19
Balance Adjustment				1			1	1			1	
2020 EXISTING TRAFFIC VOLUMES				**748**	**0**	**13**	**71**	**187**			**165**	**19**
Years To Buildout (2024)				4	4	4	4	4			4	4
Yearly Growth Rate				1.5%	1.5%	1.5%	1.5%	1.5%			1.5%	1.5%
Background Traffic Growth				45	0	1	4	11			10	1
Balance Adjustment				-8			-1					
Chapin Comm. Village Vested Volumes						233		365			481	27
Chapin Tech. Park Vested Volumes				392			84					
2024 NO-BUILD TRAFFIC VOLUMES				**1,177**	**0**	**247**	**158**	**563**			**656**	**47**
Build Alt. Diversion (New Loop)			1,177	-1,177								
2024 BUILD TRAFFIC VOLUMES			**1,177**	**0**	**0**	**247**	**158**	**563**			**656**	**47**

Years To Buildout (2044)				24	24	24	24	24			24	24
Yearly Growth Rate				1.5%	1.5%	1.5%	1.5%	1.5%			1.5%	1.5%
Background Traffic Growth				269	0	5	25	67			59	7
Balance Adjustment				-46			-8					
Chapin Comm. Village Vested Volumes						233		365			481	27
Chapin Tech. Park Vested Volumes				392			84					
2044 NO-BUILD TRAFFIC VOLUMES				**1,363**	**0**	**251**	**172**	**619**			**705**	**53**
Build Alt. Diversion (New Loop)			1,363	-1,363								
2044 BUILD TRAFFIC VOLUMES			**1,363**	**0**	**0**	**251**	**172**	**619**			**705**	**53**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

S-48/Columbia Avenue at Comalander Drive

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: Thursday, January 30, 2020

AM PEAK HOUR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2020 RAW TRAFFIC VOLUMES	27	255	0	0	320	3	0	0	0	2	0	22
Balance Adjustment	1	6			25							2
2020 EXISTING TRAFFIC VOLUMES	**28**	**261**	**0**	**0**	**345**	**3**	**0**	**0**	**0**	**2**	**0**	**24**
Years To Buildout (2024)	4	4	4	4	4	4	4	4	4	4	4	4
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	2	16	0	0	21	0	0	0	0	0	0	1
Balance Adjustment												
Chapin Comm. Village Vested Volumes	190		190				163					164
Chapin Tech. Park Vested Volumes												
2024 NO-BUILD TRAFFIC VOLUMES	**220**	**277**	**190**	**0**	**366**	**3**	**163**	**0**	**0**	**2**	**0**	**189**
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)												
2024 BUILD TRAFFIC VOLUMES	**220**	**277**	**190**	**0**	**366**	**3**	**163**	**0**	**0**	**2**	**0**	**189**
Years To Buildout (2044)	24	24	24	24	24	24	24	24	24	24	24	24
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	10	94	0	0	124	1	0	0	0	1	0	9
Balance Adjustment												
Chapin Comm. Village Vested Volumes	190		190				163					164
Chapin Tech. Park Vested Volumes												
2044 NO-BUILD TRAFFIC VOLUMES	**228**	**355**	**190**	**0**	**469**	**4**	**163**	**0**	**0**	**3**	**0**	**197**
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)												
2044 BUILD TRAFFIC VOLUMES	**228**	**355**	**190**	**0**	**469**	**4**	**163**	**0**	**0**	**3**	**0**	**197**

PM PEAK HOUR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2020 RAW TRAFFIC VOLUMES	14	158	0	0	139	5	0	0	0	1	0	25
Balance Adjustment	2	26			17							3
2020 EXISTING TRAFFIC VOLUMES	**16**	**184**	**0**	**0**	**156**	**5**	**0**	**0**	**0**	**1**	**0**	**28**
Years To Buildout (2024)	4	4	4	4	4	4	4	4	4	4	4	4
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	1	11	0	0	9	0	0	0	0	0	0	2
Balance Adjustment												
Chapin Comm. Village Vested Volumes	299		299				254					254
Chapin Tech. Park Vested Volumes												
2024 NO-BUILD TRAFFIC VOLUMES	**316**	**195**	**299**	**0**	**165**	**5**	**254**	**0**	**0**	**1**	**0**	**284**
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)												
2024 BUILD TRAFFIC VOLUMES	**316**	**195**	**299**	**0**	**165**	**5**	**254**	**0**	**0**	**1**	**0**	**284**
Years To Buildout (2044)	24	24	24	24	24	24	24	24	24	24	24	24
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	6	66	0	0	56	2	0	0	0	0	0	10
Balance Adjustment												
Chapin Comm. Village Vested Volumes	299		299				254					254
Chapin Tech. Park Vested Volumes												
2044 NO-BUILD TRAFFIC VOLUMES	**321**	**250**	**299**	**0**	**212**	**7**	**254**	**0**	**0**	**1**	**0**	**292**
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)												
2044 BUILD TRAFFIC VOLUMES	**321**	**250**	**299**	**0**	**212**	**7**	**254**	**0**	**0**	**1**	**0**	**292**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

I-26 EB On Ramp at Crooked Creek Road

TRAFFIC CONTROL: Unsignalized

DATE COUNTED: Wednesday, January 15, 2020

AM PEAK HOUR	EBT	EBR	NBL	NBR
2020 RAW TRAFFIC VOLUMES	654	16	29	77
Balance Adjustment				
2020 EXISTING TRAFFIC VOLUMES	**654**	**16**	**29**	**77**
Years To Buildout (2024)	4	4	4	4
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	39	1	1	5
Balance Adjustment	-10			
Chapin Comm. Village Vested Volumes	127			
Chapin Tech. Park Vested Volumes	258			
2024 NO-BUILD TRAFFIC VOLUMES	**1,068**	**17**	**30**	**82**
Build Alt. Diversion (Ellet Road)				
Build Alt. Diversion (Crooked Creek Road)		-17	-30	-82
2024 BUILD TRAFFIC VOLUMES		**0**	**0**	**0**
Years To Buildout (2044)	24	24	24	24
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	235	6	10	28
Balance Adjustment	-57			
Chapin Comm. Village Vested Volumes	127			
Chapin Tech. Park Vested Volumes	258			
2044 NO-BUILD TRAFFIC VOLUMES	**1,217**	**22**	**39**	**105**
Build Alt. Diversion (Ellet Road)				
Build Alt. Diversion (Crooked Creek Road)		-22	-39	-105
2044 BUILD TRAFFIC VOLUMES		**0**	**0**	**0**

PM PEAK HOUR	EBT	EBR	NBL	NBR
2020 RAW TRAFFIC VOLUMES	477	35	6	12
Balance Adjustment				
2020 EXISTING TRAFFIC VOLUMES	**477**	**35**	**6**	**12**
Years To Buildout (2024)	4	4	4	4
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	29	2	0	1
Balance Adjustment	-9			
Chapin Comm. Village Vested Volumes	198			
Chapin Tech. Park Vested Volumes	562			
2024 NO-BUILD TRAFFIC VOLUMES	**1,257**	**37**	**6**	**13**
Build Alt. Diversion (Ellet Road)				
Build Alt. Diversion (Crooked Creek Road)		-37	-6	-13
2024 BUILD TRAFFIC VOLUMES		**0**	**0**	**0**
Years To Buildout (2044)	24	24	24	24
Yearly Growth Rate	1.5%	1.5%	1.5%	1.5%
Background Traffic Growth	172	13	2	4
Balance Adjustment	-50			
Chapin Comm. Village Vested Volumes	198			
Chapin Tech. Park Vested Volumes	562			
2044 NO-BUILD TRAFFIC VOLUMES	**1,359**	**48**	**8**	**16**
Build Alt. Diversion (Ellet Road)				
Build Alt. Diversion (Crooked Creek Road)		-48	-8	-16
2044 BUILD TRAFFIC VOLUMES		**0**	**0**	**0**

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

New Frontage Road at Crooked Creek Road

TRAFFIC CONTROL: Roundabout

AM PEAK HOUR		EBT	EBR	WBL	WBT		NBL		NBR			
2020 RAW TRAFFIC VOLUMES												
Balance Adjustment												
2020 EXISTING TRAFFIC VOLUMES												
Years To Buildout (2024)												
Yearly Growth Rate												
Background Traffic Growth												
Balance Adjustment												
Chapin Comm. Village Vested Volumes												
Chapin Tech. Park Vested Volumes												
2024 NO-BUILD TRAFFIC VOLUMES												
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)				112					17			
2024 BUILD TRAFFIC VOLUMES		**0**	**0**	**112**	**0**		**0**		**17**			

Years To Buildout (2044)												
Yearly Growth Rate												
Background Traffic Growth												
Balance Adjustment												
Chapin Comm. Village Vested Volumes												
Chapin Tech. Park Vested Volumes												
2044 NO-BUILD TRAFFIC VOLUMES												
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)				144					22			
2044 BUILD TRAFFIC VOLUMES		**0**	**0**	**144**	**0**		**0**		**22**			

PM PEAK HOUR		EBT	EBR	WBL	WBT		NBL		NBR			
2020 RAW TRAFFIC VOLUMES												
Balance Adjustment												
2020 EXISTING TRAFFIC VOLUMES												
Years To Buildout (2024)												
Yearly Growth Rate												
Background Traffic Growth												
Balance Adjustment												
Chapin Comm. Village Vested Volumes												
Chapin Tech. Park Vested Volumes												
2024 NO-BUILD TRAFFIC VOLUMES												
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)				19					37			
2024 BUILD TRAFFIC VOLUMES		**0**	**0**	**19**	**0**		**0**		**37**			

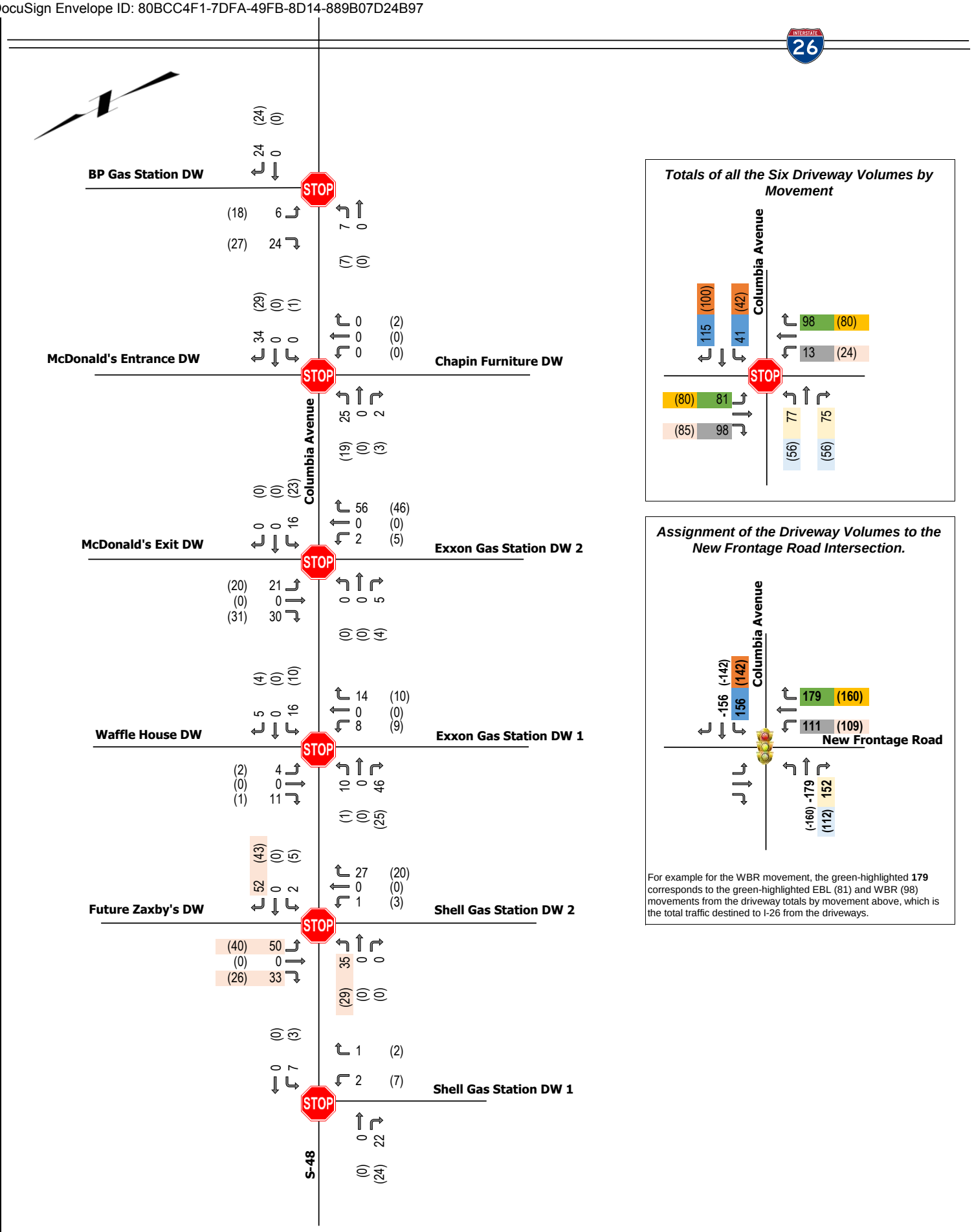
Years To Buildout (2044)												
Yearly Growth Rate												
Background Traffic Growth												
Balance Adjustment												
Chapin Comm. Village Vested Volumes												
Chapin Tech. Park Vested Volumes												
2044 NO-BUILD TRAFFIC VOLUMES												
Build Alt. Diversion (Ellet Road)												
Build Alt. Diversion (Crooked Creek Road)				24					48			
2044 BUILD TRAFFIC VOLUMES		**0**	**0**	**24**	**0**		**0**		**48**			

INTERSECTION TRAFFIC VOLUME DEVELOPMENT

I-26

	EB Mainline			WB Mainline								
AM PEAK HOUR	N of S-48	Btwn Ramps	S of S-48	N of S-48	Btwn Ramps	Btwn Ramps	S of S-48	WB Off	WB Loop Off	WB On	EB Off	EB On
2014 TRAFFIC VOLUMES (AECOM)			1,981				1,195					
Years To Existing (2020)			6				6					
Yearly Growth Rate			2.0%				2.0%					
Background Traffic Growth			238				143					
2020 EXISTING TRAFFIC VOLUMES	**1,567**	**1,488**	**2,219**	**1,062**		**907**	**1,338**	**431**		**155**	**79**	**731**
Years To Buildout (2024)			4				4					
Yearly Growth Rate			2.0%				2.0%					
Background Traffic Growth			178				107					
Balance Adjustment												
Chapin Comm. Village Vested Volumes			127				148					
Chapin Tech. Park Vested Volumes			258				454					
2024 NO-BUILD TRAFFIC VOLUMES	**1,804**	**1,632**	**2,782**	**1,213**		**996**	**2,047**	**1,051**		**217**	**172**	**1,150**
Build Alt. Diversion (New Loop)								-887	887			
2024 BUILD TRAFFIC VOLUMES	**1,804**	**1,632**	**2,782**	**1,213**	**996**	**1,883**	**2,047**	**164**	**887**	**217**	**172**	**1,150**
Years To Buildout (2044)			24				24					
Yearly Growth Rate			2.0%				2.0%					
Background Traffic Growth			1,065				642					
Balance Adjustment												
Chapin Comm. Village Vested Volumes			127				148					
Chapin Tech. Park Vested Volumes			258				454					
2044 NO-BUILD TRAFFIC VOLUMES	**2,535**	**2,347**	**3,669**	**1,701**		**1,444**	**2,582**	**1,138**		**257**	**188**	**1,322**
Build Alt. Diversion (New Loop)								-970	970			
2044 BUILD TRAFFIC VOLUMES	**2,535**	**2,347**	**3,669**	**1,701**	**1,444**	**2,414**	**2,582**	**168**	**970**	**257**	**188**	**1,322**

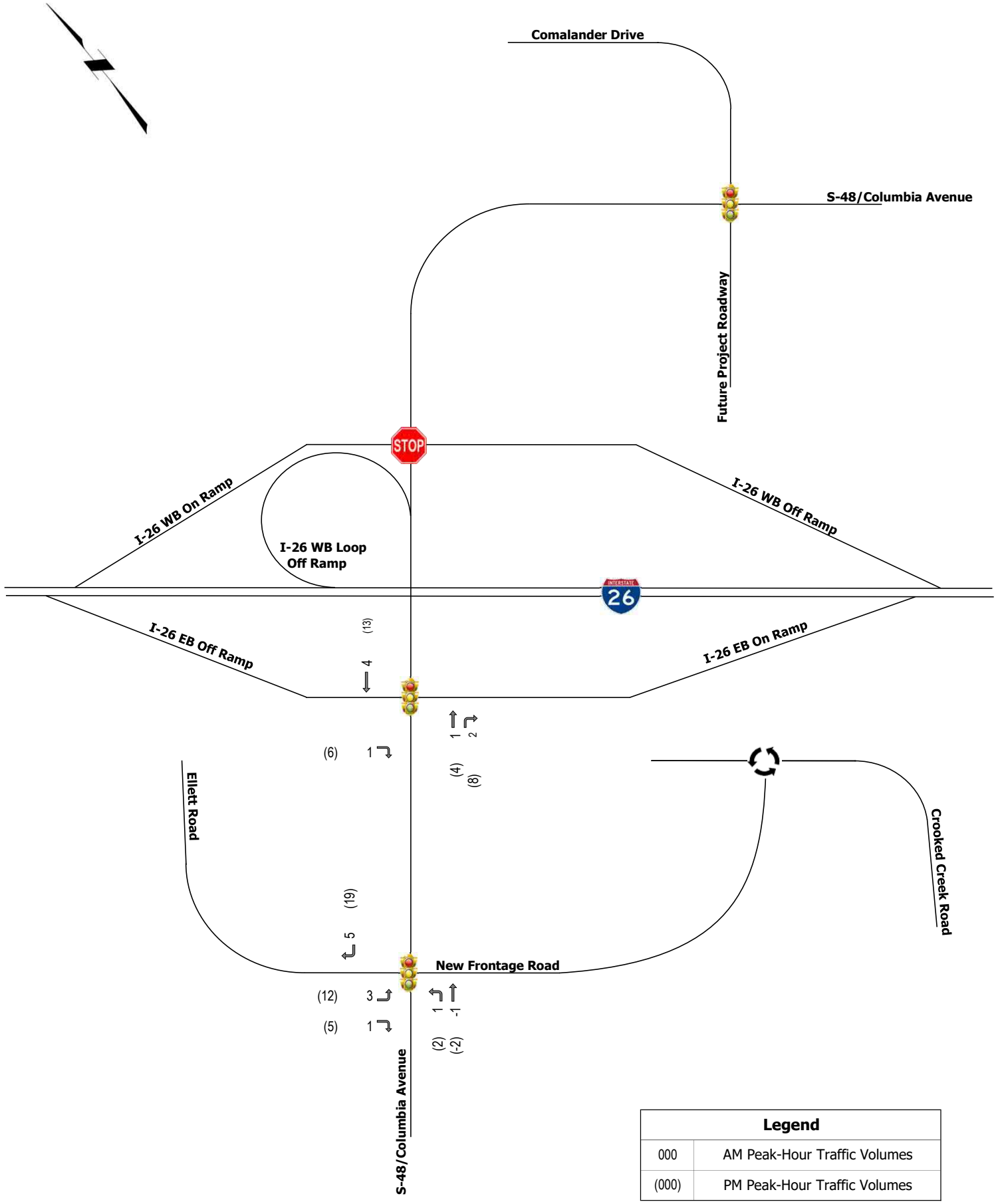
	EB Mainline			WB Mainline								
PM PEAK HOUR	N of S-48	Btwn Ramps	S of S-48	N of S-48	Btwn Ramps	Btwn Ramps	S of S-48	WB Off	WB Loop Off	WB On	EB Off	EB On
2014 TRAFFIC VOLUMES (AECOM)			1,804				1,870					
Years To Existing (2020)			6				6					
Yearly Growth Rate			2.0%				2.0%					
Background Traffic Growth			216				224					
2020 EXISTING TRAFFIC VOLUMES	**1,635**	**1,531**	**2,020**	**1,423**		**1,333**	**2,094**	**761**		**90**	**104**	**489**
Years To Buildout (2024)			4				4					
Yearly Growth Rate			2.0%				2.0%					
Background Traffic Growth			162				168					
Balance Adjustment												
Chapin Comm. Village Vested Volumes			198				233					
Chapin Tech. Park Vested Volumes			562				392					
2024 NO-BUILD TRAFFIC VOLUMES	**1,873**	**1,672**	**2,942**	**1,668**		**1,463**	**2,887**	**1,424**		**205**	**201**	**1,270**
Build Alt. Diversion (New Loop)								-1,177	1,177			
2024 BUILD TRAFFIC VOLUMES	**1,873**	**1,672**	**2,942**	**1,668**	**1,463**	**2,640**	**2,887**	**247**	**1,177**	**205**	**201**	**1,270**
Years To Buildout (2044)			24				24					
Yearly Growth Rate			2.0%				2.0%					
Background Traffic Growth			970				1,005					
Balance Adjustment												
Chapin Comm. Village Vested Volumes			198				233					
Chapin Tech. Park Vested Volumes			562				392					
2044 NO-BUILD TRAFFIC VOLUMES	**2,604**	**2,375**	**3,750**	**2,335**		**2,110**	**3,724**	**1,614**		**225**	**229**	**1,375**
Build Alt. Diversion (New Loop)								-1,363	1,363			
2044 BUILD TRAFFIC VOLUMES	**2,604**	**2,375**	**3,750**	**2,335**	**2,110**	**3,473**	**3,724**	**251**	**1,363**	**225**	**229**	**1,375**

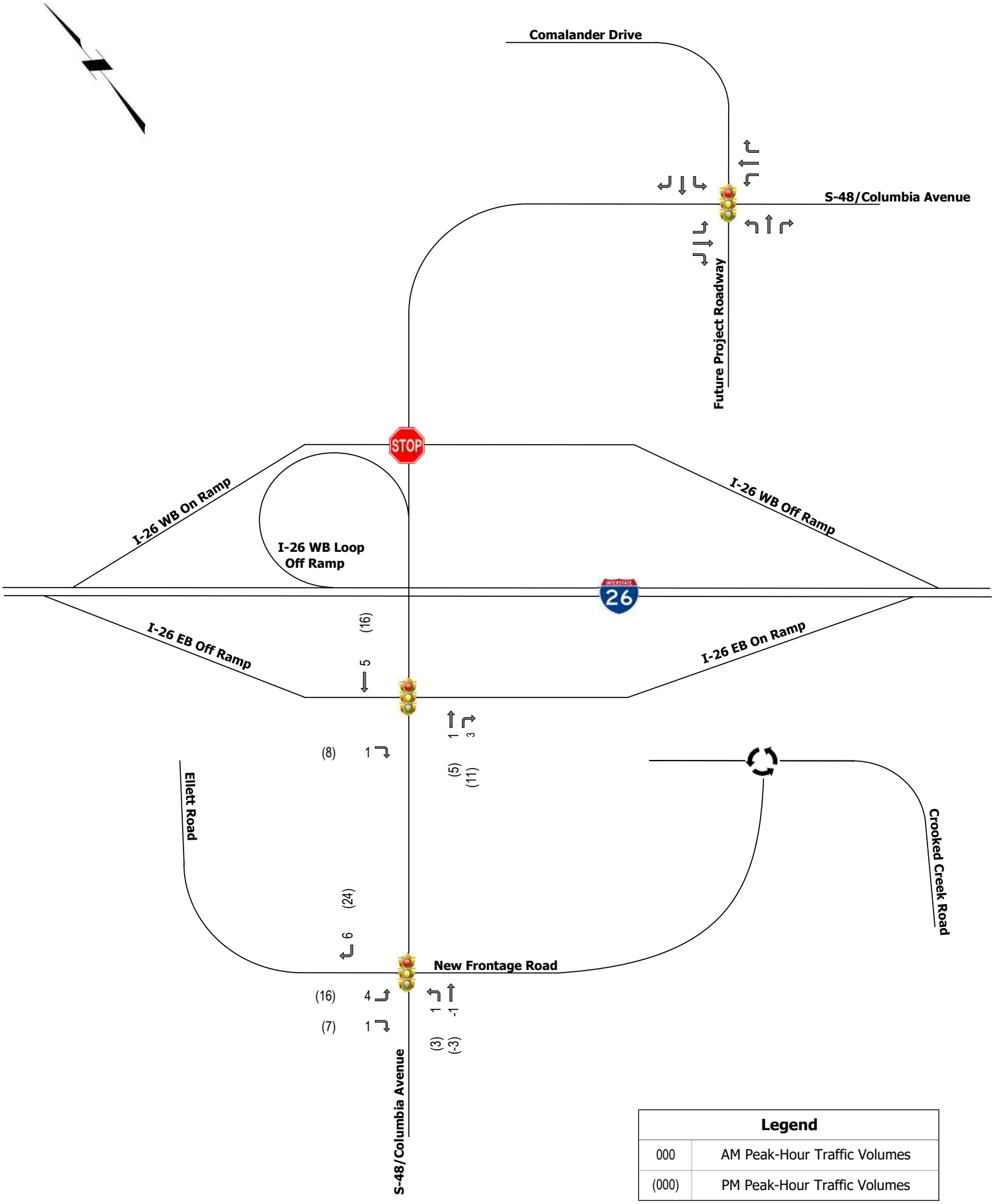


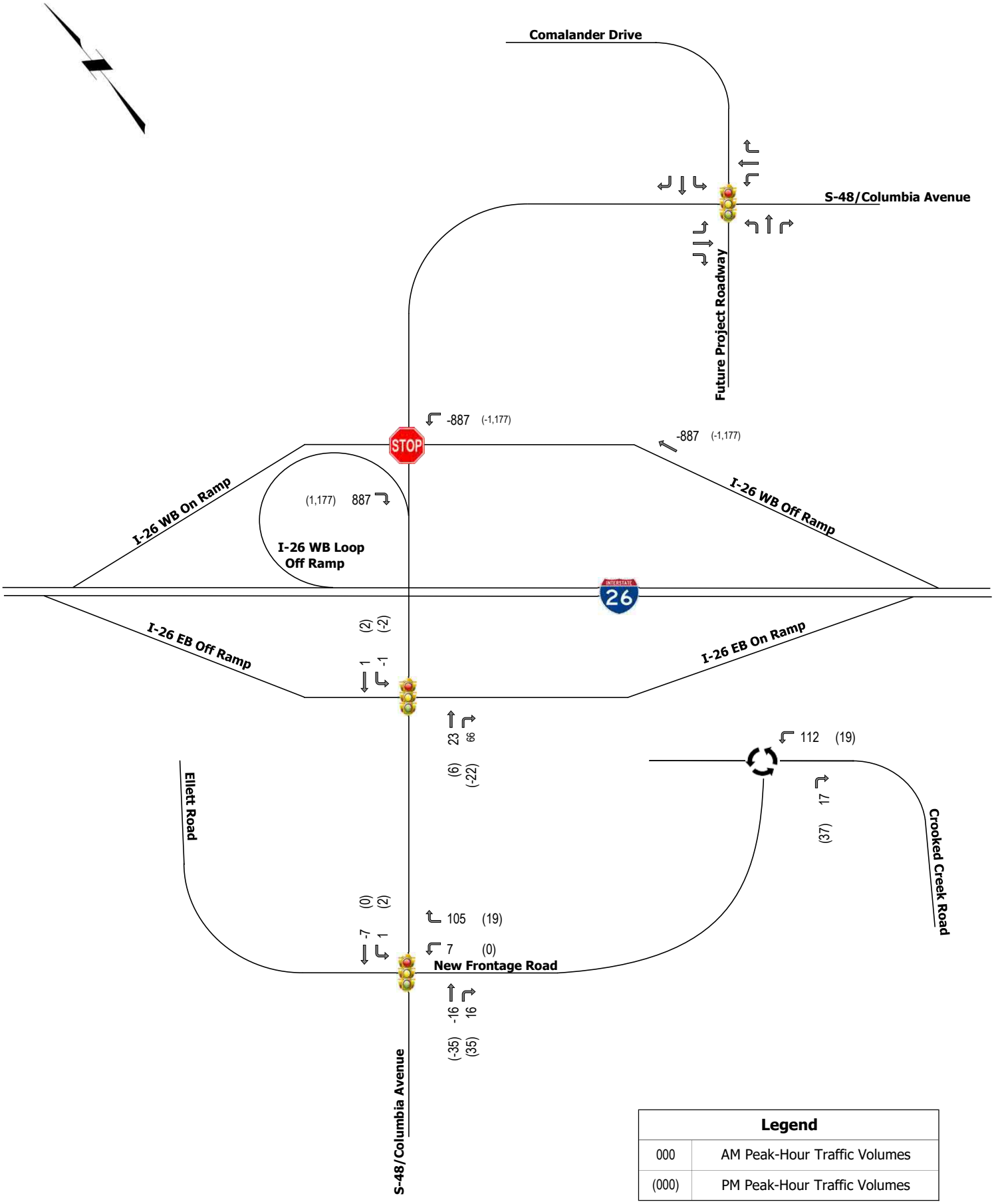
Totals of all the Six Driveway Volumes by Movement

Assignment of the Driveway Volumes to the New Frontage Road Intersection.

For example for the WBR movement, the green-highlighted **179** corresponds to the green-highlighted EBL (81) and WBR (98) movements from the driveway totals by movement above, which is the total traffic destined to I-26 from the driveways.

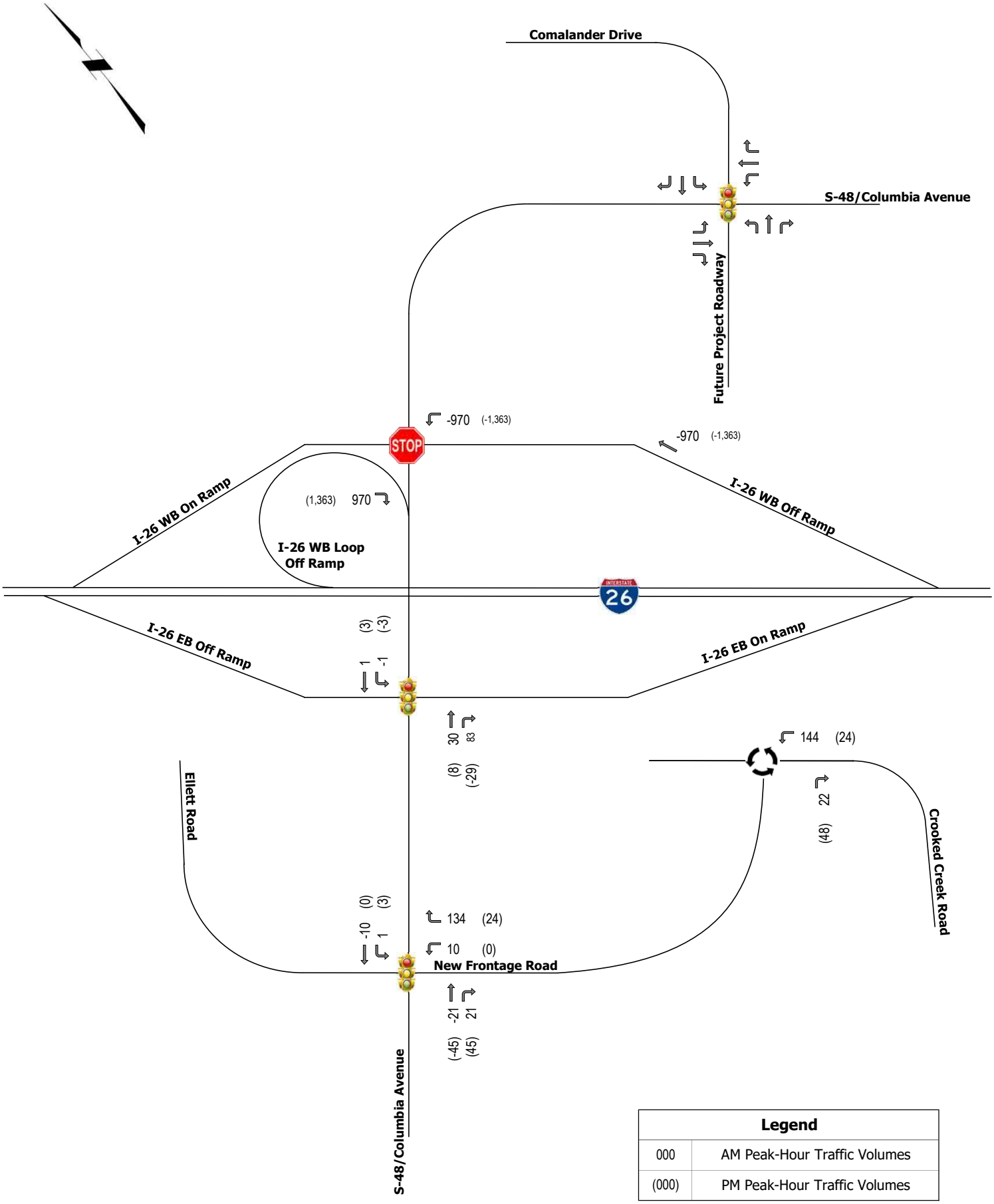




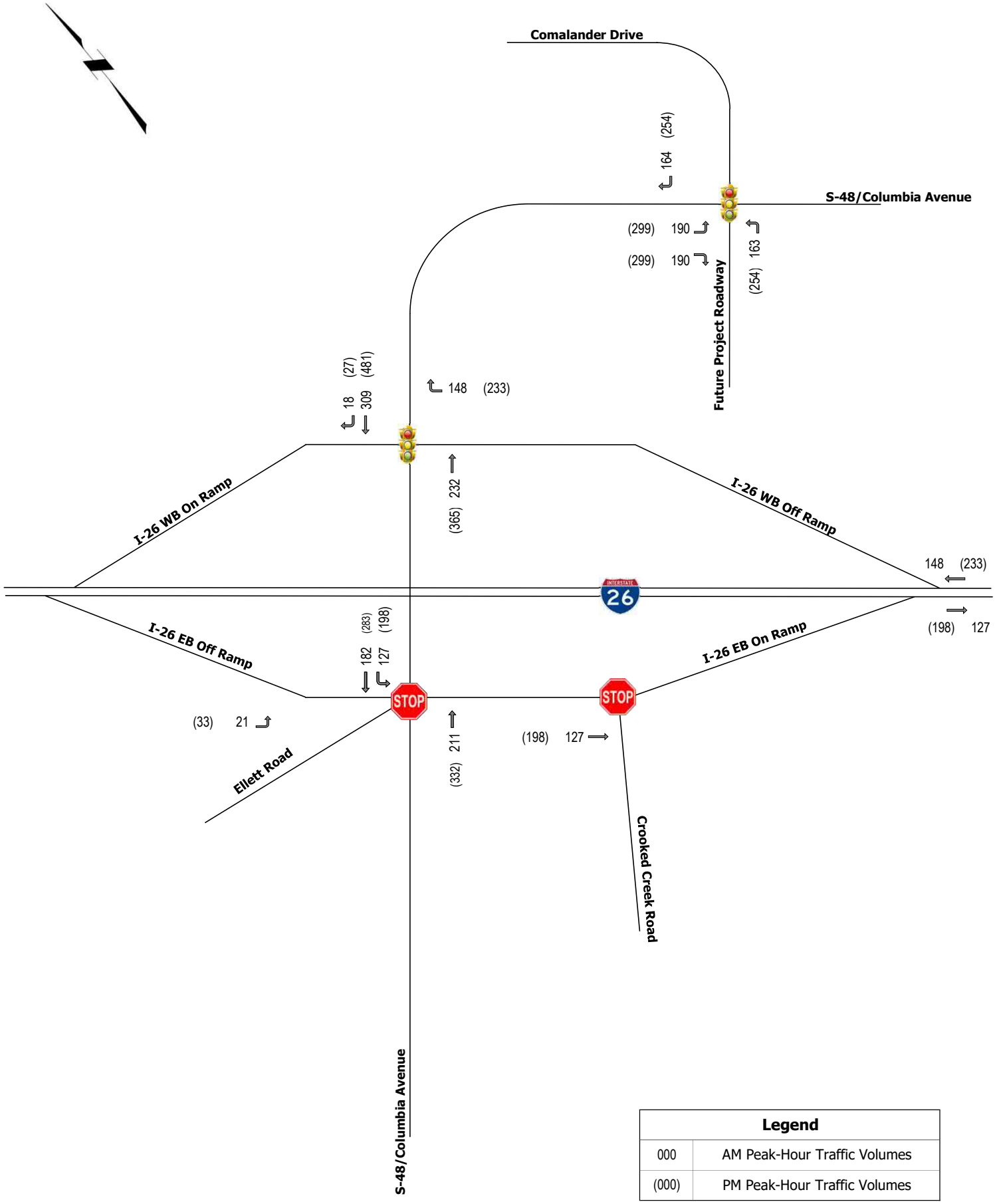


Moving forward.
RKA
RAMEY KEMP ASSOCIATES

I-26 at S-48/Columbia Avenue - Interchange Modification Report
Figure 4C - New I-26 WB Off Loop/Crooked Creek Road 2024 Traffic Diversions

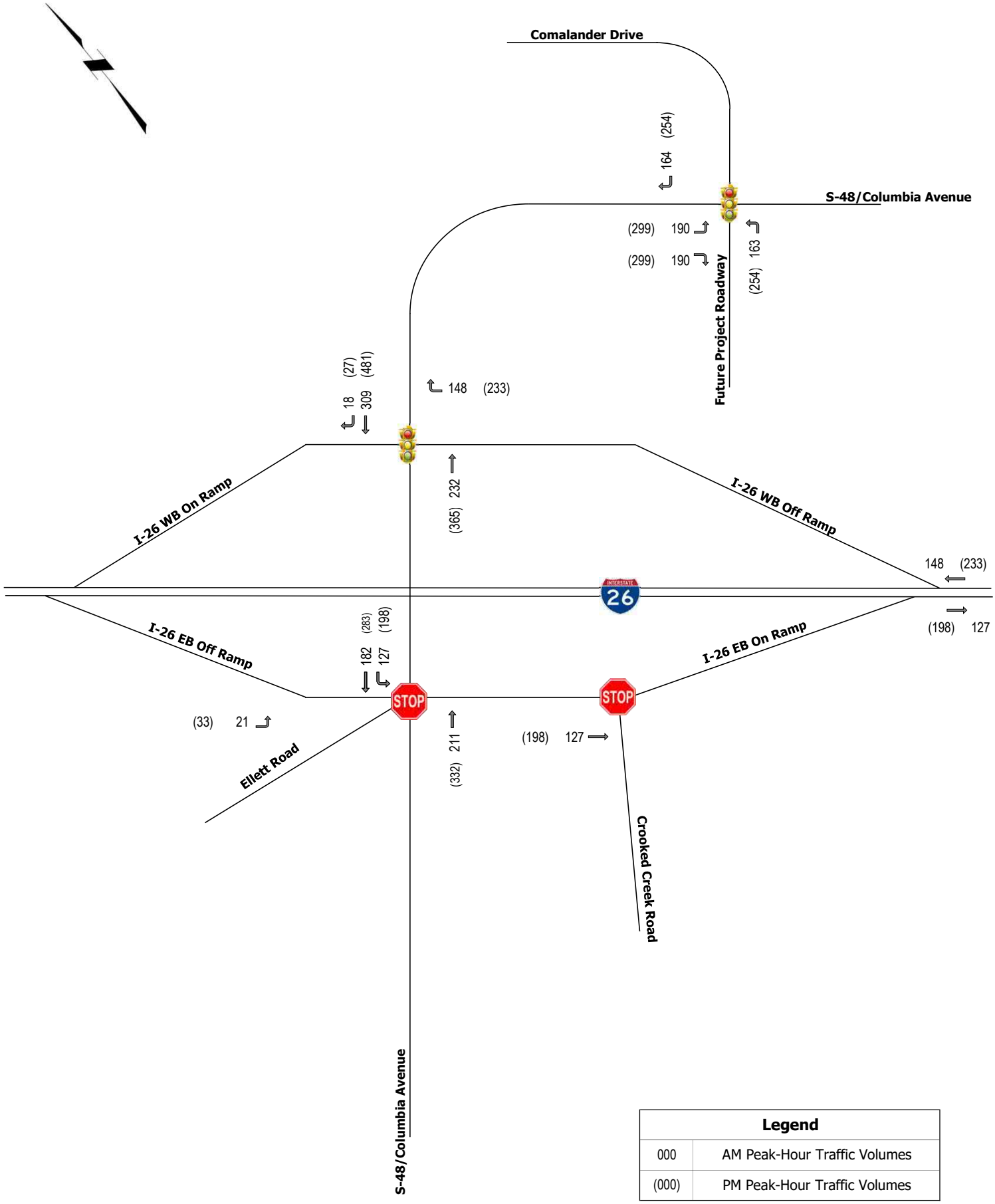


Legend	
000	AM Peak-Hour Traffic Volumes
(000)	PM Peak-Hour Traffic Volumes



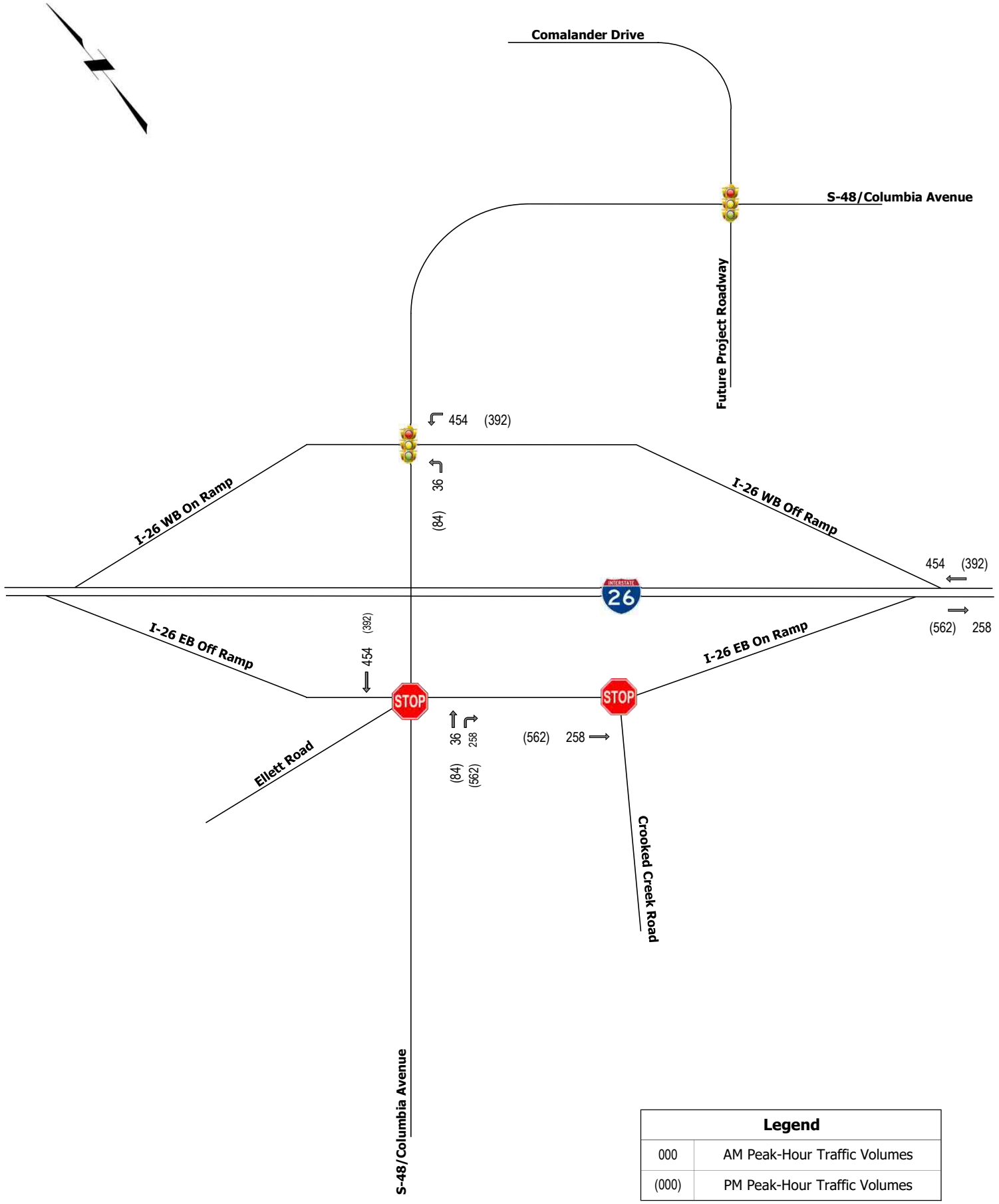
Moving forward.
RKA
RAMEY KEMP ASSOCIATES

I-26 at S-48/Columbia Avenue - Interchange Modification Report
Figure 6C - 2024 Chapin Comm. Village Vested Volumes



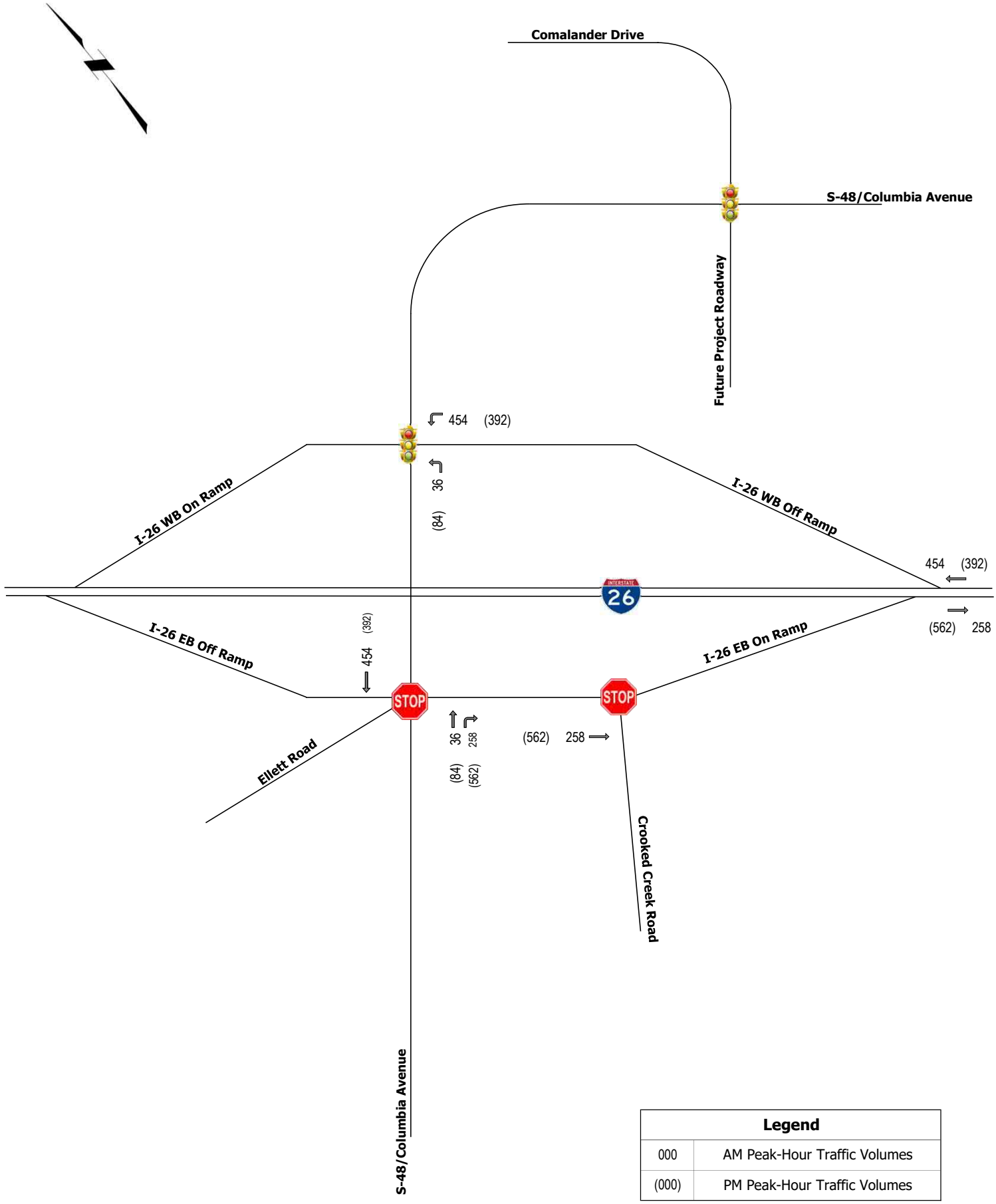
Moving forward.
RKA
RAMEY KEMP ASSOCIATES

I-26 at S-48/Columbia Avenue - Interchange Modification Report
Figure 7C - 2044 Chapin Comm. Village Vested Volumes



Moving forward.
RKA
RAMEY KEMP ASSOCIATES

I-26 at S-48/Columbia Avenue - Interchange Modification Report
Figure 8C - 2024 Chapin Tech. Park Vested Volumes



Moving forward.
RKA
RAMEY KEMP ASSOCIATES

I-26 at S-48/Columbia Avenue - Interchange Modification Report
Figure 9C - 2044 Chapin Tech. Park Vested Volumes

APPENDIX D

Freeway Analysis Worksheets

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1155	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.7	mi/h
Density, D	16.1	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1567	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1567	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1155	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1155	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.7	mi/h
Density, D	16.1	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:37:32

FREEWAY DIVERGE ANALYSIS

File Name:	AM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	14.3	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	63.1	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	63.1	mi/h
Density Across All Lanes, D	17.4	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1488		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	979		ft
Length of Second Deceleration Lane, LD2	-		ft
Junction Components	Freeway	Ramp	
Demand Volume, V	1488	79	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	8.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0800	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.862	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2194	96	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	2194	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2194	4646	No
vR	96	2033	No
v12	2194	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2194	pc/h
Length of Deceleration Lane, LA	979	ft
Density in Off-Ramp Influence Area, DR	14.3	pc/mi/ln
Density in Off-Ramp Influence Area, DR	12.3	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2194	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2194	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.321	
Average Speed in Ramp Influence Area, SR	63.1	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	63.1	mi/h
Density Across All Lanes, D	17.4	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:31:07

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1097	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	18.6	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1488	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1488	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1097	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1097	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	18.6	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:38:21

FREEWAY MERGE ANALYSIS

File Name:	AM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	19.1	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	64.8	mi/h
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp (Merge) Junction, S	64.8	mi/h
Density Across All Lanes, D	23.1	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1488	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1500	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1488	731	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2194	800	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	2194	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2994	4646	No
vR	800	2033	No
vR12	2994	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	800	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2194	pc/h
Length of Acceleration Lane, LA	1500	ft
Density in On-Ramp Influence Area, DR	19.1	pc/mi/ln
Density in On-Ramp Influence Area, DR	18.4	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1500	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2194	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2194	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2994	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.267	
Average Speed in Ramp Influence Area, SR	64.8	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp Junction, S	64.8	mi/h
Density Across All Lanes, D	23.1	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:45:47

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1636	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	67.6	mi/h
Density, D	24.2	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2219	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2219	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1636	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1636	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	67.6	mi/h
Density, D	24.2	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:38:50

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	986	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.6	mi/h
Density, D	13.8	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	1338	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1338	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	986	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	986	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.6	mi/h
Density, D	13.8	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:01:44

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	5.2	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	62.0	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	62.0	mi/h
Density Across All Lanes, D	10.8	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1469		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	907		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1176		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	907	431	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1337	499	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	1337	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	1337	4646	No
vR	499	2033	No
v12	1337	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1337	pc/h
Length of Deceleration Lane, LA	1176	ft
Density in Off-Ramp Influence Area, DR	5.2	pc/mi/ln
Density in Off-Ramp Influence Area, DR	4.7	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1337	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1337	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.357	
Average Speed in Ramp Influence Area, SR	62.0	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	62.0	mi/h
Density Across All Lanes, D	10.8	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:31:37

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91D-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	668	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	11.3	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	907	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	907	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	668	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	668	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	11.3	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:39:28

FREEWAY MERGE ANALYSIS

File Name:	AM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	9.6	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	65.9	mi/h
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.9	mi/h
Density Across All Lanes, D	11.5	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1469	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	907	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1227	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	907	155	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1337	179	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	1337	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	1516	4646	No
vR	179	2033	No
vR12	1516	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	179	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1337	pc/h
Length of Acceleration Lane, LA	1227	ft
Density in On-Ramp Influence Area, DR	9.6	pc/mi/ln
Density in On-Ramp Influence Area, DR	8.7	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1227	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1337	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1337	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	1516	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.231	
Average Speed in Ramp Influence Area, SR	65.9	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp Junction, S	65.9	mi/h
Density Across All Lanes, D	11.5	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:45:36

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	783	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.8	mi/h
Density, D	10.9	pc/mi/ln
Level of Service, LOS	A	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1062	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1062	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	783	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	783	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.8	mi/h
Density, D	10.9	pc/mi/ln
Level of Service, LOS	A	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:40:00

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1205	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.5	mi/h
Density, D	16.9	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1635	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1635	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1205	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1205	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.5	mi/h
Density, D	16.9	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:42:22

FREEWAY DIVERGE ANALYSIS

File Name:	PM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	14.9	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	63.1	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	63.1	mi/h
Density Across All Lanes, D	17.9	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1531		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	979		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1531	104	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2257	120	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	2257	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2257	4646	No
vR	120	2033	No
v12	2257	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2257	pc/h
Length of Deceleration Lane, LA	979	ft
Density in Off-Ramp Influence Area, DR	14.9	pc/mi/ln
Density in Off-Ramp Influence Area, DR	13.5	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2257	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2257	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.323	
Average Speed in Ramp Influence Area, SR	63.1	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	63.1	mi/h
Density Across All Lanes, D	17.9	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:00:24

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1128	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	19.1	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1531	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1531	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1128	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1128	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	19.1	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:42:38

FREEWAY MERGE ANALYSIS

File Name:	PM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	17.7	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	65.2	mi/h
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.2	mi/h
Density Across All Lanes, D	21.4	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1531	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1500	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1531	489	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2257	535	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	2257	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2792	4646	No
vR	535	2033	No
vR12	2792	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	535	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2257	pc/h
Length of Acceleration Lane, LA	1500	ft
Density in On-Ramp Influence Area, DR	17.7	pc/mi/ln
Density in On-Ramp Influence Area, DR	17.0	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1500	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2257	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2257	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2792	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.253	
Average Speed in Ramp Influence Area, SR	65.2	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp Junction, S	65.2	mi/h
Density Across All Lanes, D	21.4	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:45:22

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1489	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	69.5	mi/h
Density, D	21.4	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2020	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2020	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1489	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1489	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	69.5	mi/h
Density, D	21.4	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:42:02

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1544	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	68.7	mi/h
Density, D	22.5	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2094	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2094	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1544	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1544	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	68.7	mi/h
Density, D	22.5	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:43:35

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	10.6	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	61.1	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	61.1	mi/h
Density Across All Lanes, D	16.1	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1469		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1333		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1176		ft
Length of Second Deceleration Lane, LD2	-		ft
Junction Components	Freeway	Ramp	
Demand Volume, V	1333	761	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1965	833	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	1965	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	1965	4646	No
vR	833	2033	No
v12	1965	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1965	pc/h
Length of Deceleration Lane, LA	1176	ft
Density in Off-Ramp Influence Area, DR	10.6	pc/mi/ln
Density in Off-Ramp Influence Area, DR	10.2	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1965	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1965	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.387	
Average Speed in Ramp Influence Area, SR	61.1	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	61.1	mi/h
Density Across All Lanes, D	16.1	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:35:52

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91D-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	982	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	16.6	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1333	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1333	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	982	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	982	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	16.6	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:44:05

FREEWAY MERGE ANALYSIS

File Name:	PM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	13.9	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	65.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.5	mi/h
Density Across All Lanes, D	15.8	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1469	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1333	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1227	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1333	90	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	3.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0300	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.943	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1965	100	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	1965	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2065	4646	No
vR	100	2033	No
vR12	2065	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	100	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1965	pc/h
Length of Acceleration Lane, LA	1227	ft
Density in On-Ramp Influence Area, DR	13.9	pc/mi/ln
Density in On-Ramp Influence Area, DR	13.1	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1227	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1965	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1965	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2065	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.244	
Average Speed in Ramp Influence Area, SR	65.5	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp Junction, S	65.5	mi/h
Density Across All Lanes, D	15.8	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:45:03

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Existing (2020)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1049	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.8	mi/h
Density, D	14.6	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1423	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1423	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1049	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1049	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.8	mi/h
Density, D	14.6	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:43:50

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1330	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	70.9	mi/h
Density, D	18.8	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1804	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1804	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1330	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1330	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	70.9	mi/h
Density, D	18.8	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:41:00

FREEWAY DIVERGE ANALYSIS

File Name:	AM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	16.1	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	62.8	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	62.8	mi/h
Density Across All Lanes, D	19.2	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1632	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	979	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1632	172	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	8.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0800	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.862	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2406	210	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	2406	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2406	4646	No
vR	210	2033	No
v12	2406	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2406	pc/h
Length of Deceleration Lane, LA	979	ft
Density in Off-Ramp Influence Area, DR	16.1	pc/mi/ln
Density in Off-Ramp Influence Area, DR	13.9	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2406	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2406	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.331	
Average Speed in Ramp Influence Area, SR	62.8	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for Off-Ramp Junction, S	62.8	mi/h
Density Across All Lanes, D	19.2	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:19:41

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1203	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	20.4	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1632	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1632	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1203	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1203	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	20.4	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:42:03

FREEWAY MERGE ANALYSIS

File Name:	AM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	24.1	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	62.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp (Merge) Junction, S	62.5	mi/h
Density Across All Lanes, D	29.3	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1632	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1500	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1632	1150	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2406	1258	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	2406	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	3664	4646	No
vR	1258	2033	No
vR12	3664	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1258	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2406	pc/h
Length of Acceleration Lane, LA	1500	ft
Density in On-Ramp Influence Area, DR	24.1	pc/mi/ln
Density in On-Ramp Influence Area, DR	23.2	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1500	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2406	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2406	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	3664	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.341	
Average Speed in Ramp Influence Area, SR	62.5	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	73.1	mi/h
Average Speed for On-Ramp Junction, S	62.5	mi/h
Density Across All Lanes, D	29.3	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:19:18

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	2050	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	59.4	mi/h
Density, D	34.5	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2782	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2782	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	2050	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	2050	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.4	mi/h
Density, D	34.5	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:42:28

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1509	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	69.1	mi/h
Density, D	21.8	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2047	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2047	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1509	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1509	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	69.1	mi/h
Density, D	21.8	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:44:55

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	6.3	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	60.0	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	60.0	mi/h
Density Across All Lanes, D	12.2	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1469		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	996		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1176		ft
Length of Second Deceleration Lane, LD2	-		ft
Junction Components	Freeway	Ramp	
Demand Volume, V	996	1051	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1468	1217	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	1468	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	1468	4646	No
vR	1217	2033	No
v12	1468	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1468	pc/h
Length of Deceleration Lane, LA	1176	ft
Density in Off-Ramp Influence Area, DR	6.3	pc/mi/ln
Density in Off-Ramp Influence Area, DR	5.7	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1468	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1468	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.422	
Average Speed in Ramp Influence Area, SR	60.0	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for Off-Ramp Junction, S	60.0	mi/h
Density Across All Lanes, D	12.2	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:38:39

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91D-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	734	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	12.4	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	996	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	996	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	734	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	734	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	12.4	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:43:25

FREEWAY MERGE ANALYSIS

File Name:	AM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	11.1	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	65.8	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.8	mi/h
Density Across All Lanes, D	13.1	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1469	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	996	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1227	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	996	217	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1468	251	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	1468	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	1719	4646	No
vR	251	2033	No
vR12	1719	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	251	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1468	pc/h
Length of Acceleration Lane, LA	1227	ft
Density in On-Ramp Influence Area, DR	11.1	pc/mi/ln
Density in On-Ramp Influence Area, DR	10.1	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1227	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1468	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1468	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	1719	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.235	
Average Speed in Ramp Influence Area, SR	65.8	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	65.8	mi/h
Density Across All Lanes, D	13.1	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:54:03

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	894	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.8	mi/h
Density, D	12.5	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1213	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1213	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	894	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	894	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.8	mi/h
Density, D	12.5	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:44:22

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1380	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	70.5	mi/h
Density, D	19.6	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1873	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1873	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1380	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1380	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	70.5	mi/h
Density, D	19.6	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:45:35

FREEWAY DIVERGE ANALYSIS

File Name:	PM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	16.6	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	62.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	62.7	mi/h
Density Across All Lanes, D	19.7	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1672		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	979		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1672	201	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2465	233	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	2465	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2465	4646	No
vR	233	2033	No
v12	2465	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2465	pc/h
Length of Deceleration Lane, LA	979	ft
Density in Off-Ramp Influence Area, DR	16.6	pc/mi/ln
Density in Off-Ramp Influence Area, DR	15.1	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2465	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2465	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.333	
Average Speed in Ramp Influence Area, SR	62.7	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	62.7	mi/h
Density Across All Lanes, D	19.7	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:15:58

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1232	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	20.9	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1672	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1672	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1232	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1232	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	20.9	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:47:12

FREEWAY MERGE ANALYSIS

File Name:	PM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	25.6	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	61.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	61.5	mi/h
Density Across All Lanes, D	31.3	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1672	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1500	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1672	1270	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2465	1390	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	2465	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	3855	4646	No
vR	1390	2033	No
vR12	3855	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1390	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2465	pc/h
Length of Acceleration Lane, LA	1500	ft
Density in On-Ramp Influence Area, DR	25.6	pc/mi/ln
Density in On-Ramp Influence Area, DR	24.6	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1500	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2465	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2465	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	3855	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.373	
Average Speed in Ramp Influence Area, SR	61.5	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	61.5	mi/h
Density Across All Lanes, D	31.3	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:54:28

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	2168	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	56.3	mi/h
Density, D	38.5	pc/mi/ln
Level of Service, LOS	E	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2942	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2942	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	2168	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	2168	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	56.3	mi/h
Density, D	38.5	pc/mi/ln
Level of Service, LOS	E	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:47:38

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	2128	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	57.3	mi/h
Density, D	37.1	pc/mi/ln
Level of Service, LOS	E	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2887	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2887	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	2128	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	2128	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	57.3	mi/h
Density, D	37.1	pc/mi/ln
Level of Service, LOS	E	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:51:42

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	12.2	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	59.0	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	59.0	mi/h
Density Across All Lanes, D	18.3	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1469		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1463		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1176		ft
Length of Second Deceleration Lane, LD2	-		ft
Junction Components	Freeway	Ramp	
Demand Volume, V	1463	1424	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2157	1558	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	2157	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2157	4646	No
vR	1558	2033	No
v12	2157	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2157	pc/h
Length of Deceleration Lane, LA	1176	ft
Density in Off-Ramp Influence Area, DR	12.2	pc/mi/ln
Density in Off-Ramp Influence Area, DR	11.7	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2157	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2157	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.453	
Average Speed in Ramp Influence Area, SR	59.0	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for Off-Ramp Junction, S	59.0	mi/h
Density Across All Lanes, D	18.3	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:39:59

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91D-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1078	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	18.3	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1463	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1463	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1078	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1078	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	18.3	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:48:44

FREEWAY MERGE ANALYSIS

File Name:	PM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	16.4	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	65.1	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.1	mi/h
Density Across All Lanes, D	18.3	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1469	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1463	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1227	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1463	205	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	3.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0300	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.943	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2157	229	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	2157	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2386	4646	No
vR	229	2033	No
vR12	2386	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	229	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2157	pc/h
Length of Acceleration Lane, LA	1227	ft
Density in On-Ramp Influence Area, DR	16.4	pc/mi/ln
Density in On-Ramp Influence Area, DR	15.5	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1227	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2157	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2157	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2386	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.256	
Average Speed in Ramp Influence Area, SR	65.1	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	65.1	mi/h
Density Across All Lanes, D	18.3	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:55:22

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1230	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.4	mi/h
Density, D	17.2	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1668	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1668	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1230	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1230	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.4	mi/h
Density, D	17.2	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 08:50:55

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	887	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.7	mi/h
Density, D	12.4	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	1804	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1804	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	887	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	887	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.7	mi/h
Density, D	12.4	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:36:48

FREEWAY DIVERGE ANALYSIS

File Name:	AM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	10.9	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	681	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	70.0	mi/h
Density Across All Lanes, D	11.5	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	3		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1632		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	55.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	910		ft
Length of Second Deceleration Lane, LD2	-		ft
Junction Components	Freeway	Ramp	
Demand Volume, V	1632	172	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	8.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0800	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.862	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2406	210	pc/h
Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Merge	
Distance to Ramp, LUP/LDOWN	27505	4602	ft
Demand Volume, V	261	1150	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	286	1259	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	2588.6	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.690	
Flow Rate in Lanes 1 and 2, v12	1725	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2406	6970	No
vR	210	2130	No
v12	1725	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1725	pc/h
Length of Deceleration Lane, LA	910	ft
Density in Off-Ramp Influence Area, DR	10.9	pc/mi/ln
Density in Off-Ramp Influence Area, DR	9.4	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2406	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1725	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.205	
Average Speed in Ramp Influence Area, SR	66.7	mi/h
Average Flow in Outer Lanes, vOA	681	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	70.0	mi/h
Density Across All Lanes, D	11.5	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:33:18

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	802	pc/h/ln
Adjusted Capacity, cadj	2292	pc/h/ln
Speed, S	66.8	mi/h
Density, D	12.0	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	2.30	ramps/mi
Demand Volume	1632	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	2.30	ramps/mi
TRD Adjustment	6.5	mi/h
Free-Flow Speed, FFS	68.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	66.8	mi/h
Capacity, c	2368	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1632	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	802	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	802	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln
Breakpoint, BP	1244	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	66.8	mi/h
Density, D	12.0	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:37:42

FREEWAY MERGE ANALYSIS

File Name:	AM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	20.6	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	958	pc/h/ln
Average Speed in Ramp Influence Area, SR	64.2	mi/h
Average Speed in Outer Lanes of Freeway, SO	71.5	mi/h
Average Speed for On-Ramp (Merge) Junction, S	66.0	mi/h
Density Across All Lanes, D	18.5	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1632	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	873	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1632	1150	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2406	1258	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	4602	27505	ft
Demand Volume, V	172	238	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	8.00	2.00	
Heavy Vehicle Adj., fHV	0.862	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	210	261	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1573.1	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1283.4	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.602	
Flow Rate in Lanes 1 and 2, v12	1448	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	3664	6970	No
vR	1258	2130	No
vR12	2706	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1258	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1448	pc/h
Length of Acceleration Lane, LA	873	ft
Density in On-Ramp Influence Area, DR	20.6	pc/mi/ln
Density in On-Ramp Influence Area, DR	19.8	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	873	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2406	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1448	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2706	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.286	
Average Speed in Ramp Influence Area, SR	64.2	mi/h
Average Flow in Outer Lanes, vOA	958	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	71.5	mi/h
Average Speed for On-Ramp Junction, S	66.0	mi/h
Density Across All Lanes, D	18.5	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 10:08:09

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1367	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	70.4	mi/h
Density, D	19.4	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.46	ramps/mi
Demand Volume	2782	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.46	ramps/mi
TRD Adjustment	1.7	mi/h
Free-Flow Speed, FFS	73.3	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.5	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2782	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1367	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1367	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1068	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	70.4	mi/h
Density, D	19.4	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:37:50

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1006	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.6	mi/h
Density, D	14.1	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2047	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2047	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1006	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1006	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.6	mi/h
Density, D	14.1	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:38:23

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	19.3	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	796	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.6	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	70.0	mi/h
Density Across All Lanes, D	13.2	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	3		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1883		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	55.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	217		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1883	164	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	20.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.2000	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.714	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2776	242	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Diverge	
Distance to Ramp, LUP/LDOWN	24535	993	ft
Demand Volume, V	205	887	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	5.00	
Heavy Vehicle Adj., fHV	0.962	0.909	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	224	1027	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	1927.1	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1056.8	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.686	
Flow Rate in Lanes 1 and 2, v12	1980	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2776	6970	No
vR	242	2130	No
v12	1980	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1980	pc/h
Length of Deceleration Lane, LA	217	ft
Density in Off-Ramp Influence Area, DR	19.3	pc/mi/ln
Density in Off-Ramp Influence Area, DR	13.8	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2776	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1980	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.208	
Average Speed in Ramp Influence Area, SR	66.6	mi/h
Average Flow in Outer Lanes, vOA	796	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	70.0	mi/h
Density Across All Lanes, D	13.2	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:33:53

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91DR-91DL.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	925	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	15.7	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1883	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1883	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	925	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	925	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	15.7	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:38:08

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffLoop.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	2.1	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	143	pc/h/ln
Average Speed in Ramp Influence Area, SR	56.6	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	58.3	mi/h
Density Across All Lanes, D	8.4	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	996	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	35.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	1500	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	996	887	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1468	1027	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Merge	
Distance to Ramp, LUP/LDOWN	993	1184	ft
Demand Volume, V	164	217	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	242	251	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.676	
Flow Rate in Lanes 1 and 2, v12	1325	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	1468	6970	No
vR	1027	1936	No
v12	1325	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2000	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	1936	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1325	pc/h
Length of Deceleration Lane, LA	1500	ft
Density in Off-Ramp Influence Area, DR	2.1	pc/mi/ln
Density in Off-Ramp Influence Area, DR	1.9	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	35.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1468	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1325	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.532	
Average Speed in Ramp Influence Area, SR	56.6	mi/h
Average Flow in Outer Lanes, vOA	143	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	58.3	mi/h
Density Across All Lanes, D	8.4	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:33:42

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91DL-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	489	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	8.3	pc/mi/ln
Level of Service, LOS	A	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	996	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	996	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	489	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	489	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	8.3	pc/mi/ln
Level of Service, LOS	A	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:37:58

FREEWAY MERGE ANALYSIS

File Name:	AM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	7.4	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	575	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.4	mi/h
Average Speed in Outer Lanes of Freeway, SO	72.8	mi/h
Average Speed for On-Ramp (Merge) Junction, S	68.4	mi/h
Density Across All Lanes, D	8.4	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1184	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	996	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1102	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	996	217	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	1468	251	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	1184	27580	ft
Demand Volume, V	887	30	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	5.00	2.00	
Heavy Vehicle Adj., fHV	0.909	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	1027	33	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1258.5	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	144.4	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.608	
Flow Rate in Lanes 1 and 2, v12	893	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	1719	6970	No
vR	251	2130	No
vR12	1144	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	251	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	893	pc/h
Length of Acceleration Lane, LA	1102	ft
Density in On-Ramp Influence Area, DR	7.4	pc/mi/ln
Density in On-Ramp Influence Area, DR	6.7	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	1102	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	1468	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	893	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	1144	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.215	
Average Speed in Ramp Influence Area, SR	66.4	mi/h
Average Flow in Outer Lanes, vOA	575	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	72.8	mi/h
Average Speed for On-Ramp Junction, S	68.4	mi/h
Density Across All Lanes, D	8.4	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 10:09:34

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	596	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.7	mi/h
Density, D	8.3	pc/mi/ln
Level of Service, LOS	A	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	1213	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1213	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	596	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	596	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.7	mi/h
Density, D	8.3	pc/mi/ln
Level of Service, LOS	A	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:38:16

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	920	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.7	mi/h
Density, D	12.8	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	1873	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1873	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	920	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	920	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.7	mi/h
Density, D	12.8	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:43:21

FREEWAY DIVERGE ANALYSIS

File Name:	PM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	11.3	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	696	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	70.0	mi/h
Density Across All Lanes, D	11.7	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1672	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	910	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1672	201	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2465	233	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Merge	
Distance to Ramp, LUP/LDOWN	27505	4602	ft
Demand Volume, V	68	1270	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	74	1390	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	676.8	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.688	
Flow Rate in Lanes 1 and 2, v12	1769	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2465	6970	No
vR	233	2130	No
v12	1769	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1769	pc/h
Length of Deceleration Lane, LA	910	ft
Density in Off-Ramp Influence Area, DR	11.3	pc/mi/ln
Density in Off-Ramp Influence Area, DR	10.3	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2465	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1769	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.207	
Average Speed in Ramp Influence Area, SR	66.7	mi/h
Average Flow in Outer Lanes, vOA	696	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	70.0	mi/h
Density Across All Lanes, D	11.7	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:35:13

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	822	pc/h/ln
Adjusted Capacity, cadj	2292	pc/h/ln
Speed, S	66.8	mi/h
Density, D	12.3	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	2.30	ramps/mi
Demand Volume	1672	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	2.30	ramps/mi
TRD Adjustment	6.5	mi/h
Free-Flow Speed, FFS	68.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	66.8	mi/h
Capacity, c	2368	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1672	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	822	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	822	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln
Breakpoint, BP	1244	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	66.8	mi/h
Density, D	12.3	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:43:36

FREEWAY MERGE ANALYSIS

File Name:	PM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	21.9	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	981	pc/h/ln
Average Speed in Ramp Influence Area, SR	63.9	mi/h
Average Speed in Outer Lanes of Freeway, SO	71.4	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.7	mi/h
Density Across All Lanes, D	19.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1672	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	873	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1672	1270	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2465	1390	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	4602	27505	ft
Demand Volume, V	201	301	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	5.00	2.00	
Heavy Vehicle Adj., fHV	0.909	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	233	330	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1613.9	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1623.1	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.602	
Flow Rate in Lanes 1 and 2, v12	1484	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	3855	6970	No
vR	1390	2130	No
vR12	2874	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1390	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1484	pc/h
Length of Acceleration Lane, LA	873	ft
Density in On-Ramp Influence Area, DR	21.9	pc/mi/ln
Density in On-Ramp Influence Area, DR	21.1	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	873	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2465	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1484	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2874	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.296	
Average Speed in Ramp Influence Area, SR	63.9	mi/h
Average Flow in Outer Lanes, vOA	981	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	71.4	mi/h
Average Speed for On-Ramp Junction, S	65.7	mi/h
Density Across All Lanes, D	19.6	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 10:09:51

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1446	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	69.7	mi/h
Density, D	20.7	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.46	ramps/mi
Demand Volume	2942	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.46	ramps/mi
TRD Adjustment	1.7	mi/h
Free-Flow Speed, FFS	73.3	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.5	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2942	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1446	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1446	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1068	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	69.7	mi/h
Density, D	20.7	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:43:44

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1419	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	70.0	mi/h
Density, D	20.3	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2887	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2887	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1419	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1419	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	70.0	mi/h
Density, D	20.3	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:45:56

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	26.3	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	1105	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	79.8	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	69.8	mi/h
Density Across All Lanes, D	18.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	3		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	2640		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	55.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	217		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2640	247	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3892	270	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Diverge	
Distance to Ramp, LUP/LDOWN	24535	993	ft
Demand Volume, V	214	1177	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	234	1289	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	1673.4	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1391.7	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.695	
Flow Rate in Lanes 1 and 2, v12	2787	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3892	6970	No
vR	270	2130	No
v12	2787	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2787	pc/h
Length of Deceleration Lane, LA	217	ft
Density in Off-Ramp Influence Area, DR	26.3	pc/mi/ln
Density in Off-Ramp Influence Area, DR	25.3	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3892	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2787	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.211	
Average Speed in Ramp Influence Area, SR	66.5	mi/h
Average Flow in Outer Lanes, vOA	1105	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	79.8	mi/h
Average Speed for Off-Ramp Junction, S	69.8	mi/h
Density Across All Lanes, D	18.6	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:35:52

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91DR-91DL.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1297	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	22.0	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	2640	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2640	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1297	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1297	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	22.0	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:45:38

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffLoop.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	6.7	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	307	pc/h/ln
Average Speed in Ramp Influence Area, SR	55.8	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	58.3	mi/h
Density Across All Lanes, D	12.3	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1463	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	35.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	1500	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1463	1177	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2157	1288	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Merge	
Distance to Ramp, LUP/LDOWN	993	1184	ft
Demand Volume, V	247	205	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	3.00	
Heavy Vehicle Adj., fHV	0.962	0.943	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	270	229	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.647	
Flow Rate in Lanes 1 and 2, v12	1850	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2157	6970	No
vR	1288	1936	No
v12	1850	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2000	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	1936	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1850	pc/h
Length of Deceleration Lane, LA	1500	ft
Density in Off-Ramp Influence Area, DR	6.7	pc/mi/ln
Density in Off-Ramp Influence Area, DR	6.4	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	35.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2157	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1850	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.556	
Average Speed in Ramp Influence Area, SR	55.8	mi/h
Average Flow in Outer Lanes, vOA	307	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	58.3	mi/h
Density Across All Lanes, D	12.3	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:35:44

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91DL-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	719	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	12.2	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1463	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1463	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	719	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	719	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	12.2	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:45:26

FREEWAY MERGE ANALYSIS

File Name:	PM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	10.5	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	846	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.2	mi/h
Average Speed in Outer Lanes of Freeway, SO	71.9	mi/h
Average Speed for On-Ramp (Merge) Junction, S	68.1	mi/h
Density Across All Lanes, D	11.7	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1184	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1463	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1102	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1463	205	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	3.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0300	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.943	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2157	229	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	1184	27580	ft
Demand Volume, V	1177	151	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	1289	165	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1401.2	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	726.6	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.608	
Flow Rate in Lanes 1 and 2, v12	1311	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2386	6970	No
vR	229	2130	No
vR12	1540	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	229	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1311	pc/h
Length of Acceleration Lane, LA	1102	ft
Density in On-Ramp Influence Area, DR	10.5	pc/mi/ln
Density in On-Ramp Influence Area, DR	9.9	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	1102	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2157	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1311	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	1540	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.221	
Average Speed in Ramp Influence Area, SR	66.2	mi/h
Average Flow in Outer Lanes, vOA	846	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	71.9	mi/h
Average Speed for On-Ramp Junction, S	68.1	mi/h
Density Across All Lanes, D	11.7	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 10:06:35

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2024)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	820	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.7	mi/h
Density, D	11.4	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	1668	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1668	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	820	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	820	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.7	mi/h
Density, D	11.4	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:45:46

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1868	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	63.5	mi/h
Density, D	29.4	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2535	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2535	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1868	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1868	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	63.5	mi/h
Density, D	29.4	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:04:05

FREEWAY DIVERGE ANALYSIS

File Name:	AM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	25.2	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	62.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	62.7	mi/h
Density Across All Lanes, D	27.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	2347		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	979		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2347	188	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	8.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0800	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.862	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3460	230	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	3460	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3460	4646	No
vR	230	2033	No
v12	3460	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	3460	pc/h
Length of Deceleration Lane, LA	979	ft
Density in Off-Ramp Influence Area, DR	25.2	pc/mi/ln
Density in Off-Ramp Influence Area, DR	21.7	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3460	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3460	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.333	
Average Speed in Ramp Influence Area, SR	62.7	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	62.7	mi/h
Density Across All Lanes, D	27.6	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:03:17

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1730	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	58.2	mi/h
Density, D	29.7	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	2347	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2347	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1730	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1730	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	58.2	mi/h
Density, D	29.7	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:05:16

FREEWAY MERGE ANALYSIS

File Name:	AM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	33.8	pc/mi/ln
Level of Service, LOS	F	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	50.8	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	-	mi/h
Density Across All Lanes, D	-	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2347	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1500	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2347	1322	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3460	1447	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	3460	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	4907	4646	Yes
vR	1447	2033	No
vR12	4907	4600	Yes

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1447	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3460	pc/h
Length of Acceleration Lane, LA	1500	ft
Density in On-Ramp Influence Area, DR	33.8	pc/mi/ln
Density in On-Ramp Influence Area, DR	-	veh/mi/ln
Level of Service, LOS	F	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1500	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3460	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3460	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	4907	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	-	
Average Speed in Ramp Influence Area, SR	50.8	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	-	mi/h
Density Across All Lanes, D	-	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:16:37

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	2704	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	-	mi/h
Density, D	-	pc/mi/ln
Level of Service, LOS	F	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	3669	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3669	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	2704	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	2704	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	-	mi/h
Density, D	-	pc/mi/ln
Level of Service, LOS	F	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:06:18

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1904	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	62.7	mi/h
Density, D	30.4	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2582	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2582	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1904	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1904	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	62.7	mi/h
Density, D	30.4	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:10:05

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	12.0	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	59.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	59.7	mi/h
Density Across All Lanes, D	17.8	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1469		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1444		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1176		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1444	1138	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2129	1318	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	2129	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2129	4646	No
vR	1318	2033	No
v12	2129	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2129	pc/h
Length of Deceleration Lane, LA	1176	ft
Density in Off-Ramp Influence Area, DR	12.0	pc/mi/ln
Density in Off-Ramp Influence Area, DR	10.9	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2129	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2129	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.431	
Average Speed in Ramp Influence Area, SR	59.7	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	59.7	mi/h
Density Across All Lanes, D	17.8	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:02:55

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91D-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1064	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	18.0	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1444	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1444	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1064	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1064	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	18.0	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:07:14

FREEWAY MERGE ANALYSIS

File Name:	AM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	16.6	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	65.1	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	65.1	mi/h
Density Across All Lanes, D	18.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1469	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1444	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1227	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1444	257	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2129	298	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	2129	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2427	4646	No
vR	298	2033	No
vR12	2427	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	298	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2129	pc/h
Length of Acceleration Lane, LA	1227	ft
Density in On-Ramp Influence Area, DR	16.6	pc/mi/ln
Density in On-Ramp Influence Area, DR	15.1	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1227	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2129	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2129	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2427	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.257	
Average Speed in Ramp Influence Area, SR	65.1	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	65.1	mi/h
Density Across All Lanes, D	18.6	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:17:35

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1254	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.3	mi/h
Density, D	17.6	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	1701	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1701	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1254	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1254	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.3	mi/h
Density, D	17.6	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:09:09

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1920	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	62.4	mi/h
Density, D	30.8	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2604	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2604	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1920	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1920	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	62.4	mi/h
Density, D	30.8	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:10:58

FREEWAY DIVERGE ANALYSIS

File Name:	PM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	25.5	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	62.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	62.7	mi/h
Density Across All Lanes, D	27.9	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2375	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	979	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2375	229	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3501	265	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	3501	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3501	4646	No
vR	265	2033	No
v12	3501	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	3501	pc/h
Length of Deceleration Lane, LA	979	ft
Density in Off-Ramp Influence Area, DR	25.5	pc/mi/ln
Density in Off-Ramp Influence Area, DR	23.2	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3501	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3501	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.336	
Average Speed in Ramp Influence Area, SR	62.7	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	62.7	mi/h
Density Across All Lanes, D	27.9	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:03:46

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1750	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	58.0	mi/h
Density, D	30.2	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	2375	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2375	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1750	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1750	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	58.0	mi/h
Density, D	30.2	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:11:47

FREEWAY MERGE ANALYSIS

File Name:	PM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	34.5	pc/mi/ln
Level of Service, LOS	F	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	49.1	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	-	mi/h
Density Across All Lanes, D	-	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2375	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1500	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2375	1375	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3501	1505	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	3501	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	5006	4646	Yes
vR	1505	2033	No
vR12	5006	4600	Yes

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1505	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3501	pc/h
Length of Acceleration Lane, LA	1500	ft
Density in On-Ramp Influence Area, DR	34.5	pc/mi/ln
Density in On-Ramp Influence Area, DR	-	veh/mi/ln
Level of Service, LOS	F	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1500	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3501	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3501	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	5006	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	-	
Average Speed in Ramp Influence Area, SR	49.1	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	-	mi/h
Density Across All Lanes, D	-	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:18:10

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	2764	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	-	mi/h
Density, D	-	pc/mi/ln
Level of Service, LOS	F	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	3750	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3750	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	2764	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	2764	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	-	mi/h
Density, D	-	pc/mi/ln
Level of Service, LOS	F	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:24:12

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	2745	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	-	mi/h
Density, D	-	pc/mi/ln
Level of Service, LOS	F	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	3724	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3724	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	2745	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	2745	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	-	mi/h
Density, D	-	pc/mi/ln
Level of Service, LOS	F	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:15:24

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	20.4	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Ramp Influence Area, SR	58.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	58.5	mi/h
Density Across All Lanes, D	26.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	2		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1469		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	2110		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	45.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1176		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2110	1614	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3111	1766	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	1.000	
Flow Rate in Lanes 1 and 2, v12	3111	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3111	4646	No
vR	1766	2033	No
v12	3111	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	3111	pc/h
Length of Deceleration Lane, LA	1176	ft
Density in Off-Ramp Influence Area, DR	20.4	pc/mi/ln
Density in Off-Ramp Influence Area, DR	19.6	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3111	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3111	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for Off-Ramp, DS	0.471	
Average Speed in Ramp Influence Area, SR	58.5	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	58.5	mi/h
Density Across All Lanes, D	26.6	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 09:03:38

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91D-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1556	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	26.4	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	2110	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2110	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1556	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1556	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	26.4	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:13:15

FREEWAY MERGE ANALYSIS

File Name:	PM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	24.0	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	63.0	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	63.0	mi/h
Density Across All Lanes, D	26.7	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1469	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2110	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	45.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1227	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2110	225	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	3.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0300	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.943	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3111	251	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	3111	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	3362	4646	No
vR	251	2033	No
vR12	3362	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	4800	2100	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	4646	2033	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	251	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3111	pc/h
Length of Acceleration Lane, LA	1227	ft
Density in On-Ramp Influence Area, DR	24.0	pc/mi/ln
Density in On-Ramp Influence Area, DR	22.6	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	45.0	mi/h
Length of Acceleration Lane, LA	1227	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3111	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3111	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	3362	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.326	
Average Speed in Ramp Influence Area, SR	63.0	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	63.0	mi/h
Density Across All Lanes, D	26.7	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:18:33

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	No Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	U.S. Customary

LOS and Performance Measures

Flow Rate, vp	1721	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	66.3	mi/h
Density, D	26.0	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	2	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.37	ramps/mi
Demand Volume	2335	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.37	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.8	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2335	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	2	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1721	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1721	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1057	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	66.3	mi/h
Density, D	26.0	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.7 on 4/9/2020 09:14:57

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1246	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.3	mi/h
Density, D	17.5	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	2535	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2535	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1246	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1246	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.3	mi/h
Density, D	17.5	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:50:02

FREEWAY DIVERGE ANALYSIS

File Name:	AM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	16.5	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	1089	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.7	mi/h
Average Speed in Outer Lanes of Freeway, SO	79.8	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	70.3	mi/h
Density Across All Lanes, D	16.4	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2347	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	910	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2347	188	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	8.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0800	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.862	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3460	230	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Merge	
Distance to Ramp, LUP/LDOWN	27505	4602	ft
Demand Volume, V	261	1322	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	286	1447	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	2146.7	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.663	
Flow Rate in Lanes 1 and 2, v12	2371	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3460	6970	No
vR	230	2130	No
v12	2371	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2371	pc/h
Length of Deceleration Lane, LA	910	ft
Density in Off-Ramp Influence Area, DR	16.5	pc/mi/ln
Density in Off-Ramp Influence Area, DR	14.2	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3460	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2371	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.207	
Average Speed in Ramp Influence Area, SR	66.7	mi/h
Average Flow in Outer Lanes, vOA	1089	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	79.8	mi/h
Average Speed for Off-Ramp Junction, S	70.3	mi/h
Density Across All Lanes, D	16.4	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:47:27

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1153	pc/h/ln
Adjusted Capacity, cadj	2292	pc/h/ln
Speed, S	66.8	mi/h
Density, D	17.3	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	2.30	ramps/mi
Demand Volume	2347	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	2.30	ramps/mi
TRD Adjustment	6.5	mi/h
Free-Flow Speed, FFS	68.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	66.8	mi/h
Capacity, c	2368	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2347	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1153	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1153	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln
Breakpoint, BP	1244	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	66.8	mi/h
Density, D	17.3	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:49:47

FREEWAY MERGE ANALYSIS

File Name:	AM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	26.9	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	1377	pc/h/ln
Average Speed in Ramp Influence Area, SR	61.9	mi/h
Average Speed in Outer Lanes of Freeway, SO	69.9	mi/h
Average Speed for On-Ramp (Merge) Junction, S	64.0	mi/h
Density Across All Lanes, D	25.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2347	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	873	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2347	1322	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3460	1447	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	4602	27505	ft
Demand Volume, V	188	238	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	8.00	2.00	
Heavy Vehicle Adj., fHV	0.862	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	230	261	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1839.1	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1283.4	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.602	
Flow Rate in Lanes 1 and 2, v12	2083	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	4907	6970	No
vR	1447	2130	No
vR12	3530	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1447	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2083	pc/h
Length of Acceleration Lane, LA	873	ft
Density in On-Ramp Influence Area, DR	26.9	pc/mi/ln
Density in On-Ramp Influence Area, DR	25.9	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	873	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3460	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2083	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	3530	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.360	
Average Speed in Ramp Influence Area, SR	61.9	mi/h
Average Flow in Outer Lanes, vOA	1377	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	69.9	mi/h
Average Speed for On-Ramp Junction, S	64.0	mi/h
Density Across All Lanes, D	25.6	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:57:40

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1803	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	64.7	mi/h
Density, D	27.9	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.46	ramps/mi
Demand Volume	3669	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.46	ramps/mi
TRD Adjustment	1.7	mi/h
Free-Flow Speed, FFS	73.3	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.5	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3669	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1803	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1803	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1068	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	64.7	mi/h
Density, D	27.9	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:50:13

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1269	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.1	mi/h
Density, D	17.8	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	2582	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2582	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1269	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1269	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.1	mi/h
Density, D	17.8	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:53:03

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	23.9	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	1053	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.6	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.0	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	70.1	mi/h
Density Across All Lanes, D	16.9	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	3		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	2414		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	55.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	217		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2414	168	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	20.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.2000	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.714	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3559	248	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Diverge	
Distance to Ramp, LUP/LDOWN	24535	993	ft
Demand Volume, V	205	970	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	5.00	
Heavy Vehicle Adj., fHV	0.962	0.909	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	224	1123	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	1674.7	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1189.0	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.682	
Flow Rate in Lanes 1 and 2, v12	2506	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3559	6970	No
vR	248	2130	No
v12	2506	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2506	pc/h
Length of Deceleration Lane, LA	217	ft
Density in Off-Ramp Influence Area, DR	23.9	pc/mi/ln
Density in Off-Ramp Influence Area, DR	17.1	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3559	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2506	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.209	
Average Speed in Ramp Influence Area, SR	66.6	mi/h
Average Flow in Outer Lanes, vOA	1053	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.0	mi/h
Average Speed for Off-Ramp Junction, S	70.1	mi/h
Density Across All Lanes, D	16.9	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:47:08

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91DR-91DL.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1186	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	20.1	pc/mi/ln
Level of Service, LOS	C	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	2414	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2414	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1186	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1186	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	20.1	pc/mi/ln
Level of Service, LOS	C	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:53:13

FREEWAY DIVERGE ANALYSIS

File Name:	AM_WB_Diverge_91_OffLoop.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	6.1	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	347	pc/h/ln
Average Speed in Ramp Influence Area, SR	56.3	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	59.2	mi/h
Density Across All Lanes, D	12.0	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	3		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	1444		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	35.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	1500		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1444	970	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2129	1123	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Merge	
Distance to Ramp, LUP/LDOWN	993	1184	ft
Demand Volume, V	168	257	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	248	298	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.655	
Flow Rate in Lanes 1 and 2, v12	1782	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	2129	6970	No
vR	1123	1936	No
v12	1782	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2000	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	1936	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	1782	pc/h
Length of Deceleration Lane, LA	1500	ft
Density in Off-Ramp Influence Area, DR	6.1	pc/mi/ln
Density in Off-Ramp Influence Area, DR	5.5	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	35.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2129	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1782	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.541	
Average Speed in Ramp Influence Area, SR	56.3	mi/h
Average Flow in Outer Lanes, vOA	347	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	59.2	mi/h
Density Across All Lanes, D	12.0	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:47:39

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91DL-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	710	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	12.0	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	1444	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1444	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	710	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	710	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	12.0	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:52:34

FREEWAY MERGE ANALYSIS

File Name:	AM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	10.9	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	835	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.2	mi/h
Average Speed in Outer Lanes of Freeway, SO	71.9	mi/h
Average Speed for On-Ramp (Merge) Junction, S	68.1	mi/h
Density Across All Lanes, D	11.9	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1184	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	1444	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1102	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	1444	257	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	2129	298	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	1184	27580	ft
Demand Volume, V	970	30	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	5.00	2.00	
Heavy Vehicle Adj., fHV	0.909	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	1123	33	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1410.0	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	144.4	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.608	
Flow Rate in Lanes 1 and 2, v12	1294	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	2427	6970	No
vR	298	2130	No
vR12	1592	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	298	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1294	pc/h
Length of Acceleration Lane, LA	1102	ft
Density in On-Ramp Influence Area, DR	10.9	pc/mi/ln
Density in On-Ramp Influence Area, DR	9.9	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	1102	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	2129	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1294	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	1592	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.222	
Average Speed in Ramp Influence Area, SR	66.2	mi/h
Average Flow in Outer Lanes, vOA	835	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	71.9	mi/h
Average Speed for On-Ramp Junction, S	68.1	mi/h
Density Across All Lanes, D	11.9	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:58:50

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	AM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	AM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	836	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.7	mi/h
Density, D	11.7	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	1701	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	1701	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	836	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	836	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.7	mi/h
Density, D	11.7	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:52:49

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_85-91D.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1280	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.1	mi/h
Density, D	18.0	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	2604	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2604	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1280	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1280	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.1	mi/h
Density, D	18.0	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:54:35

FREEWAY DIVERGE ANALYSIS

File Name:	PM_EB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	16.7	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	1100	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.6	mi/h
Average Speed in Outer Lanes of Freeway, SO	79.8	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	70.3	mi/h
Density Across All Lanes, D	16.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2375	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	910	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2375	229	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	5.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0500	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.909	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3501	265	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Merge	
Distance to Ramp, LUP/LDOWN	27505	4602	ft
Demand Volume, V	68	1375	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	74	1505	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	566.6	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.660	
Flow Rate in Lanes 1 and 2, v12	2401	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3501	6970	No
vR	265	2130	No
v12	2401	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2401	pc/h
Length of Deceleration Lane, LA	910	ft
Density in Off-Ramp Influence Area, DR	16.7	pc/mi/ln
Density in Off-Ramp Influence Area, DR	15.2	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3501	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2401	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.210	
Average Speed in Ramp Influence Area, SR	66.6	mi/h
Average Flow in Outer Lanes, vOA	1100	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	79.8	mi/h
Average Speed for Off-Ramp Junction, S	70.3	mi/h
Density Across All Lanes, D	16.6	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:48:19

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91D_M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1167	pc/h/ln
Adjusted Capacity, cadj	2292	pc/h/ln
Speed, S	66.8	mi/h
Density, D	17.5	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	2.30	ramps/mi
Demand Volume	2375	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	2.30	ramps/mi
TRD Adjustment	6.5	mi/h
Free-Flow Speed, FFS	68.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	66.8	mi/h
Capacity, c	2368	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2375	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1167	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1167	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	66.8	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2292	pc/h/ln
Breakpoint, BP	1244	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	66.8	mi/h
Density, D	17.5	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:55:01

FREEWAY MERGE ANALYSIS

File Name:	PM_EB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	27.6	pc/mi/ln
Level of Service, LOS	C	
Average Flow in Outer Lanes, vOA	1393	pc/h/ln
Average Speed in Ramp Influence Area, SR	61.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	69.9	mi/h
Average Speed for On-Ramp (Merge) Junction, S	63.6	mi/h
Density Across All Lanes, D	26.2	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2375	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	873	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2375	1375	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3501	1505	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	4602	27505	ft
Demand Volume, V	229	301	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	5.00	2.00	
Heavy Vehicle Adj., fHV	0.909	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	265	330	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1860.3	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1623.1	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.602	
Flow Rate in Lanes 1 and 2, v12	2108	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	5006	6970	No
vR	1505	2130	No
vR12	3613	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	1505	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2108	pc/h
Length of Acceleration Lane, LA	873	ft
Density in On-Ramp Influence Area, DR	27.6	pc/mi/ln
Density in On-Ramp Influence Area, DR	26.6	veh/mi/ln
Level of Service, LOS	C	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	873	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3501	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2108	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	3613	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.372	
Average Speed in Ramp Influence Area, SR	61.5	mi/h
Average Flow in Outer Lanes, vOA	1393	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	69.9	mi/h
Average Speed for On-Ramp Junction, S	63.6	mi/h
Density Across All Lanes, D	26.2	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:57:57

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_EB_FWYSegment_91M-97.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1843	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	63.9	mi/h
Density, D	28.8	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.46	ramps/mi
Demand Volume	3750	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.46	ramps/mi
TRD Adjustment	1.7	mi/h
Free-Flow Speed, FFS	73.3	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.5	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3750	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1843	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1843	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.5	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1068	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	63.9	mi/h
Density, D	28.8	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:55:10

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_97-91DR.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1830	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	64.2	mi/h
Density, D	28.5	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.43	ramps/mi
Demand Volume	3724	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.43	ramps/mi
TRD Adjustment	1.6	mi/h
Free-Flow Speed, FFS	73.4	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.6	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3724	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1830	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1830	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.6	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1064	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	64.2	mi/h
Density, D	28.5	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:56:37

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	33.6	pc/mi/ln
Level of Service, LOS	D	
Average Flow in Outer Lanes, vOA	1478	pc/h/ln
Average Speed in Ramp Influence Area, SR	66.5	mi/h
Average Speed in Outer Lanes of Freeway, SO	78.3	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	69.5	mi/h
Density Across All Lanes, D	24.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data			
Number of Freeway Lanes	3		ln
Freeway Free-Flow Speed, FFS	75.0		mi/h
Segment Length	1500		ft
Multilane Highway or C-D Roadway?	Freeway		
Demand Volume, V	3473		veh/h
Peak Hour Factor, PHF	0.95		
Ramp Data			
Number of Ramp Lanes	1		ln
Ramp Free-Flow Speed, SFR	55.0		mi/h
Ramp Side	Right		
Length of First Deceleration Lane, LD or LD1	217		ft
Length of Second Deceleration Lane, LD2	-		ft

Junction Components	Freeway	Ramp	
Demand Volume, V	3473	251	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	5120	275	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Merge	Diverge	
Distance to Ramp, LUP/LDOWN	24535	993	ft
Demand Volume, V	214	1363	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	234	1492	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	1395.7	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	1686.6	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.695	
Flow Rate in Lanes 1 and 2, v12	3642	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	5120	6970	No
vR	275	2130	No
v12	3642	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	3642	pc/h
Length of Deceleration Lane, LA	217	ft
Density in Off-Ramp Influence Area, DR	33.6	pc/mi/ln
Density in Off-Ramp Influence Area, DR	32.3	veh/mi/ln
Level of Service, LOS	D	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	5120	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	3642	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.211	
Average Speed in Ramp Influence Area, SR	66.5	mi/h
Average Flow in Outer Lanes, vOA	1478	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	78.3	mi/h
Average Speed for Off-Ramp Junction, S	69.5	mi/h
Density Across All Lanes, D	24.6	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:48:46

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91DR-91DL.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1707	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	58.4	mi/h
Density, D	29.2	pc/mi/ln
Level of Service, LOS	D	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	3473	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	3473	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1707	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1707	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	58.4	mi/h
Density, D	29.2	pc/mi/ln
Level of Service, LOS	D	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:56:21

FREEWAY DIVERGE ANALYSIS

File Name:	PM_WB_Diverge_91_OffLoop.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in Off-Ramp (Diverge) Influence Area, DR	12.1	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	625	pc/h/ln
Average Speed in Ramp Influence Area, SR	55.2	mi/h
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp (Diverge) Junction, S	58.9	mi/h
Density Across All Lanes, D	17.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2110	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	35.0	mi/h
Ramp Side	Right	
Length of First Deceleration Lane, LD or LD1	1500	ft
Length of Second Deceleration Lane, LD2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2110	1363	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3111	1491	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Merge	
Distance to Ramp, LUP/LDOWN	993	1184	ft
Demand Volume, V	251	225	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	3.00	
Heavy Vehicle Adj., fHV	0.962	0.943	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	275	251	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for Off-Ramps		
Adjacent Upstream On-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFD	0.614	
Flow Rate in Lanes 1 and 2, v12	2486	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vF	3111	6970	No
vR	1491	1936	No
v12	2486	4400	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2000	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	1936	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate in Lanes 1 and 2, v12	2486	pc/h
Length of Deceleration Lane, LA	1500	ft
Density in Off-Ramp Influence Area, DR	12.1	pc/mi/ln
Density in Off-Ramp Influence Area, DR	11.6	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	35.0	mi/h
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3111	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	2486	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for Off-Ramp, DS	0.574	
Average Speed in Ramp Influence Area, SR	55.2	mi/h
Average Flow in Outer Lanes, vOA	625	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	80.2	mi/h
Average Speed for Off-Ramp Junction, S	58.9	mi/h
Density Across All Lanes, D	17.6	pc/mi/ln

This Freeway Diverge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:49:02

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91DL-91M.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1037	pc/h/ln
Adjusted Capacity, cadj	2217	pc/h/ln
Speed, S	59.0	mi/h
Density, D	17.6	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	6.00	ramps/mi
Demand Volume	2110	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	6.00	ramps/mi
TRD Adjustment	14.5	mi/h
Free-Flow Speed, FFS	60.5	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	59.0	mi/h
Capacity, c	2290	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2110	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1037	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1037	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	59.0	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2217	pc/h/ln
Breakpoint, BP	1537	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	59.0	mi/h
Density, D	17.6	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:55:59

FREEWAY MERGE ANALYSIS

File Name:	PM_WB_Merge_91OnRamp.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	15.2	pc/mi/ln
Level of Service, LOS	B	
Average Flow in Outer Lanes, vOA	1220	pc/h/ln
Average Speed in Ramp Influence Area, SR	65.8	mi/h
Average Speed in Outer Lanes of Freeway, SO	70.5	mi/h
Average Speed for On-Ramp (Merge) Junction, S	67.4	mi/h
Density Across All Lanes, D	16.6	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	3	ln
Freeway Free-Flow Speed, FFS	75.0	mi/h
Segment Length	1184	ft
Multilane Highway or C-D Roadway?	Freeway	
Demand Volume, V	2110	veh/h
Peak Hour Factor, PHF	0.95	
Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	55.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1102	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	2110	225	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	20.00	3.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.2000	0.0300	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.714	0.943	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	3111	251	pc/h

Adjacent Ramps	Upstream	Downstream	
Segment Type	Diverge	Diverge	
Distance to Ramp, LUP/LDOWN	1184	27580	ft
Demand Volume, V	1363	151	veh/h
Peak Hour Factor, PHF	0.95	0.95	
Percent Total Trucks	2.00	2.00	
Heavy Vehicle Adj., fHV	0.962	0.962	
Terrain Type	Rolling	Rolling	
Demand Flow Rate, v	1492	165	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	1610.1	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	726.6	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	0.608	
Flow Rate in Lanes 1 and 2, v12	1891	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	3362	6970	No
vR	251	2130	No
vR12	2142	4600	No

	Freeway	Ramp	
Unadjusted Capacity, cmd	7200	2200	pc/h
Driver Population	Mostly Familiar	Mostly Familiar	
Driver Population CAF	0.968	0.968	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.968	0.968	
Adjusted Capacity, cmda	6970	2130	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	251	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1891	pc/h
Length of Acceleration Lane, LA	1102	ft
Density in On-Ramp Influence Area, DR	15.2	pc/mi/ln
Density in On-Ramp Influence Area, DR	14.3	veh/mi/ln
Level of Service, LOS	B	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.0	mi/h
Ramp Free-Flow Speed, SFR	55.0	mi/h
Length of Acceleration Lane, LA	1102	ft
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Demand Flow Rate on Freeway, vF	3111	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	1891	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	2142	pc/h
Number of Outer Lanes on Freeway, NO	1	ln
Speed Index for On-Ramp, MS	0.236	
Average Speed in Ramp Influence Area, SR	65.8	mi/h
Average Flow in Outer Lanes, vOA	1220	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	70.5	mi/h
Average Speed for On-Ramp Junction, S	67.4	mi/h
Density Across All Lanes, D	16.6	pc/mi/ln

This Freeway Merge Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:58:17

BASIC FREEWAY SEGMENT ANALYSIS

File Name:	PM_WB_FWYSegment_91M-85.xuf
Analyst:	RKA
Agency:	RKA
Jurisdiction:	Lexington County
Date:	04/8/2020
Analysis Year:	Build (2044)
Time Period Analyzed:	PM Peak-Hour
Project Description:	I-26 at Columbia Avenue
Units:	United States Customary

LOS and Performance Measures

Flow Rate, vp	1147	pc/h/ln
Adjusted Capacity, cadj	2323	pc/h/ln
Speed, S	71.6	mi/h
Density, D	16.0	pc/mi/ln
Level of Service, LOS	B	

Step 1: Input Data

Number of Lanes, N	3	ln
Lane Width	12	ft
Segment Length	-	ft
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Right-Side Lateral Clearance	10	ft
Total Ramp Density, TRD	0.38	ramps/mi
Demand Volume	2335	veh/h
Peak Hour Factor, PHF	0.95	
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%

Step 2: Estimate and Adjust FFS

Estimating FFS		
Measured or Base FFS	Base	
Base Free-Flow Speed, BFFS	75.0	mi/h
Lane Width	12	ft
Lane Width Adjustment, fLW	0.0	mi/h
Right-Side Lateral Clearance	10	ft
Right-Side Lateral Clearance Adj., fRLC	0.0	mi/h
Total Ramp Density, TRD	0.38	ramps/mi
TRD Adjustment	1.4	mi/h
Free-Flow Speed, FFS	73.6	mi/h
Speed Adjustments		
Driver Population	Mostly Familiar	
Driver Population SAF	0.975	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	0.975	
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h

Step 3: Estimate and Adjust Capacity

Adjusted Free-flow Speed, FFSadj	71.7	mi/h
Capacity, c	2400	pc/h/ln
Capacity Adjustments		
Driver Population	Mostly Familiar	
Driver Population CAF	0.968	

Weather Type	Non-Severe Weather	
Weather Type CAF	1.000	
Incident Type	No Incident	
Incident Type CAF	1.000	
Final Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln

Step 4: Adjust Demand Volume

Demand Volume, V	2335	veh/h
Peak Hour Factor, PHF	0.95	
Number of Lanes, N	3	ln
Terrain Type	Rolling	
Percent Grade	-	%
Grade Length	-	mi
Percent Total Trucks	20.00	%
Percent Single-Unit Trucks, SUT	-	%
Percent Tractor-Trailers, TT	-	%
Proportion of Total Trucks, PT	0.2000	
Heavy Vehicle PCE, ET	3.000	
Heavy Vehicle Adjustment, fHV	0.714	
Demand Adjustment Factor, DAF	1.000	
Demand Flow Rate, vp	1147	pc/h/ln

Steps 5 and 6: Estimate Speed and Density and Determine LOS

Demand Flow Rate, vp	1147	pc/h/ln
Adjusted Free-Flow Speed, FFSadj	71.7	mi/h
Capacity Adjustment Factor, CAF	0.968	
Adjusted Capacity, cadj	2323	pc/h/ln
Breakpoint, BP	1061	pc/h/ln
Density at Capacity, Dc	45	pc/mi/ln
Mean Speed under Base Conditions, S	71.6	mi/h
Density, D	16.0	pc/mi/ln
Level of Service, LOS	B	

This Basic Freeway Segment text report was created in HCS™ Freeways Version 7.8 on 4/9/2020 08:56:30

APPENDIX E

Intersection Analysis Worksheets

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBT	WBR	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	12	4	62	1	7	0	22	1	326	645	19	694
Future Volume (vph)	12	4	62	1	7	0	22	1	326	645	19	694
Satd. Flow (prot)	0	1562	0	0	0	1617	0	0	1668	0	0	1806
Flt Permitted		0.993				0.988						0.999
Satd. Flow (perm)	0	1562	0	0	0	1617	0	0	1668	0	0	1806
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	17%	25%	5%	2%	2%	2%	5%	2%	7%	2%	2%	5%
Adj. Flow (vph)	13	4	70	1	8	0	25	1	366	725	21	780
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	0	0	0	33	0	0	1092	0	0	805
Sign Control		Stop				Stop			Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

Lane Group	SBR	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	4	1	2	1
Future Volume (vph)	4	1	2	1
Satd. Flow (prot)	0	1118	0	0
Flt Permitted		0.988		
Satd. Flow (perm)	0	1118	0	0
Peak Hour Factor	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	25%	2%	100%	2%
Adj. Flow (vph)	4	1	2	1
Shared Lane Traffic (%)				
Lane Group Flow (vph)	0	4	0	0
Sign Control		Stop		

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	416	1	14	86	275	0	0	301	68
Future Volume (vph)	0	0	0	416	1	14	86	275	0	0	301	68
Satd. Flow (prot)	0	0	0	0	1712	0	0	1758	0	0	1734	0
Flt Permitted					0.954			0.729				
Satd. Flow (perm)	0	0	0	0	1712	0	0	1297	0	0	1734	0
Satd. Flow (RTOR)					2						18	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	2%	2%	2%	5%	100%	14%	3%	8%	2%	2%	7%	6%
Adj. Flow (vph)	0	0	0	501	1	17	104	331	0	0	363	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	519	0	0	435	0	0	445	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Total Split (s)				39.0	39.0		51.0	51.0			51.0	
Total Lost Time (s)					6.0			6.3			6.3	
Act Effct Green (s)					29.2			44.8			44.8	
Actuated g/C Ratio					0.34			0.52			0.52	
v/c Ratio					0.89			0.65			0.49	
Control Delay					46.6			21.7			15.9	
Queue Delay					0.0			0.0			0.0	
Total Delay					46.6			21.7			15.9	
LOS					D			C			B	
Approach Delay					46.6			21.7			15.9	
Approach LOS					D			C			B	
Queue Length 50th (ft)					263			177			154	
Queue Length 95th (ft)					350			254			212	
Internal Link Dist (ft)		794			322			516			197	
Turn Bay Length (ft)												
Base Capacity (vph)					657			673			908	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.79			0.65			0.49	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.4	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 29.1	Intersection LOS: C
Intersection Capacity Utilization 78.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	416	1	14	86	275	0	0	301	68
Future Volume (veh/h)	0	0	0	416	1	14	86	275	0	0	301	68
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	418	1900	1781	1781	0	0	1796	1796
Adj Flow Rate, veh/h				501	1	17	104	331	0	0	363	82
Peak Hour Factor				0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %				0	100	0	8	8	0	0	7	7
Cap, veh/h				140	0	5	161	481	0	0	704	159
Arrive On Green				0.37	0.37	0.37	0.50	0.50	0.00	0.00	0.50	0.50
Sat Flow, veh/h				383	1	13	225	969	0	0	1418	320
Grp Volume(v), veh/h				519	0	0	435	0	0	0	0	445
Grp Sat Flow(s),veh/h/ln				397	0	0	1193	0	0	0	0	1739
Q Serve(g_s), s				33.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	15.6
Cycle Q Clear(g_c), s				33.0	0.0	0.0	30.6	0.0	0.0	0.0	0.0	15.6
Prop In Lane				0.97		0.03	0.24		0.00	0.00		0.18
Lane Grp Cap(c), veh/h				145	0	0	642	0	0	0	0	864
V/C Ratio(X)				3.57	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.52
Avail Cap(c_a), veh/h				145	0	0	642	0	0	0	0	864
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				28.5	0.0	0.0	19.9	0.0	0.0	0.0	0.0	15.3
Incr Delay (d2), s/veh				1173.3	0.0	0.0	5.7	0.0	0.0	0.0	0.0	2.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				50.2	0.0	0.0	8.2	0.0	0.0	0.0	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				1201.8	0.0	0.0	25.6	0.0	0.0	0.0	0.0	17.5
LnGrp LOS				F	A	A	C	A	A	A	A	B
Approach Vol, veh/h					519			435			445	
Approach Delay, s/veh					1201.8			25.6			17.5	
Approach LOS					F			C			B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	51.0	39.0	51.0
Change Period (Y+Rc), s	6.3	6.0	6.3
Max Green Setting (Gmax), s	44.7	33.0	44.7
Max Q Clear Time (g_c+I1), s	17.6	35.0	32.6
Green Ext Time (p_c), s	5.3	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	459.4
HCM 6th LOS	F

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	261	345	3	2	24
Future Volume (vph)	28	261	345	3	2	24
Satd. Flow (prot)	0	1760	1758	0	1467	0
Flt Permitted		0.995			0.996	
Satd. Flow (perm)	0	1760	1758	0	1467	0
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	11%	7%	8%	2%	100%	5%
Adj. Flow (vph)	37	343	454	4	3	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	380	458	0	35	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 47.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	261	345	3	2	24
Future Vol, veh/h	28	261	345	3	2	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	11	7	8	2	100	5
Mvmt Flow	37	343	454	4	3	32

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	458	0	-	0	873	456
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	417	-
Critical Hdwy	4.21	-	-	-	7.4	6.25
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	2.299	-	-	-	4.4	3.345
Pot Cap-1 Maneuver	1057	-	-	-	221	598
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1057	-	-	-	211	598
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1057	-	-	-	524
HCM Lane V/C Ratio	0.035	-	-	-	0.065
HCM Control Delay (s)	8.5	0	-	-	12.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	654	16	0	0	29	77
Future Volume (vph)	654	16	0	0	29	77
Satd. Flow (prot)	1857	0	0	0	1658	0
Flt Permitted					0.987	
Satd. Flow (perm)	1857	0	0	0	1658	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	743	18	0	0	33	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	761	0	0	0	121	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	654	16	0	0	29	77
Future Vol, veh/h	654	16	0	0	29	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	743	18	0	0	33	88

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		752	752
Stage 1	-	-		752	-
Stage 2	-	-		0	-
Critical Hdwy	-	-		6.42	6.22
Critical Hdwy Stg 1	-	-		5.42	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		3.518	3.318
Pot Cap-1 Maneuver	-	-		378	410
Stage 1	-	-		466	-
Stage 2	-	-		-	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		378	410
Mov Cap-2 Maneuver	-	-		378	-
Stage 1	-	-		466	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	17.8
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	401	-	-
HCM Lane V/C Ratio	0.3	-	-
HCM Control Delay (s)	17.8	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	1.2	-	-

Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	5	73	6	0	6	2	228	462	37	864	12
Future Volume (vph)	20	5	73	6	0	6	2	228	462	37	864	12
Satd. Flow (prot)	0	1607	0	0	1611	0	0	1684	0	0	1844	0
Flt Permitted		0.990									0.998	
Satd. Flow (perm)	0	1607	0	0	1611	0	0	1684	0	0	1844	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
Heavy Vehicles (%)	5%	20%	3%	17%	2%	2%	2%	2%	3%	2%	2%	50%
Adj. Flow (vph)	22	5	79	7	0	7	2	248	502	40	939	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	7	0	0	752	0	0	992	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 100.2%		ICU Level of Service G	
Analysis Period (min) 15			

Lane Group	NEL	NER	NER2
Lane Configurations			
Traffic Volume (vph)	4	8	5
Future Volume (vph)	4	8	5
Satd. Flow (prot)	1649	0	0
Flt Permitted	0.989		
Satd. Flow (perm)	1649	0	0
Peak Hour Factor	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%
Adj. Flow (vph)	4	9	5
Shared Lane Traffic (%)			
Lane Group Flow (vph)	18	0	0
Sign Control	Stop		

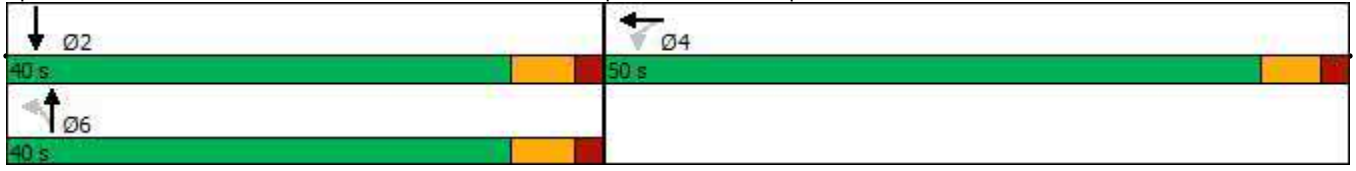
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	748	0	13	71	187	0	0	165	19
Future Volume (vph)	0	0	0	748	0	13	71	187	0	0	165	19
Satd. Flow (prot)	0	0	0	0	1772	0	0	1827	0	0	1837	0
Flt Permitted					0.953			0.855				
Satd. Flow (perm)	0	0	0	0	1772	0	0	1584	0	0	1837	0
Satd. Flow (RTOR)					40						7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	796	0	14	76	199	0	0	176	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	810	0	0	275	0	0	196	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Total Split (s)				50.0	50.0		40.0	40.0			40.0	
Total Lost Time (s)					6.0			6.3			6.3	
Act Effct Green (s)					41.1			33.8			33.8	
Actuated g/C Ratio					0.47			0.39			0.39	
v/c Ratio					0.95			0.45			0.27	
Control Delay					42.5			23.6			19.8	
Queue Delay					0.0			0.0			0.0	
Total Delay					42.5			23.6			19.8	
LOS					D			C			B	
Approach Delay					42.5			23.6			19.8	
Approach LOS					D			C			B	
Queue Length 50th (ft)					391			116			74	
Queue Length 95th (ft)					#649			189			126	
Internal Link Dist (ft)		794			322			516			197	
Turn Bay Length (ft)												
Base Capacity (vph)					916			614			716	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.88			0.45			0.27	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 87.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 34.9	Intersection LOS: C
Intersection Capacity Utilization 81.3%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	748	0	13	71	187	0	0	165	19
Future Volume (veh/h)	0	0	0	748	0	13	71	187	0	0	165	19
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1870	1900	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				796	0	14	76	199	0	0	176	20
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				831	0	15	191	474	0	0	633	72
Arrive On Green				0.48	0.00	0.48	0.38	0.38	0.00	0.00	0.38	0.38
Sat Flow, veh/h				1747	0	31	360	1233	0	0	1649	187
Grp Volume(v), veh/h				810	0	0	275	0	0	0	0	196
Grp Sat Flow(s),veh/h/ln				1777	0	0	1594	0	0	0	0	1837
Q Serve(g_s), s				38.5	0.0	0.0	5.1	0.0	0.0	0.0	0.0	6.5
Cycle Q Clear(g_c), s				38.5	0.0	0.0	11.6	0.0	0.0	0.0	0.0	6.5
Prop In Lane				0.98		0.02	0.28		0.00	0.00		0.10
Lane Grp Cap(c), veh/h				846	0	0	665	0	0	0	0	705
V/C Ratio(X)				0.96	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.28
Avail Cap(c_a), veh/h				891	0	0	665	0	0	0	0	705
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				22.2	0.0	0.0	20.0	0.0	0.0	0.0	0.0	18.6
Incr Delay (d2), s/veh				20.1	0.0	0.0	1.9	0.0	0.0	0.0	0.0	1.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				18.4	0.0	0.0	4.3	0.0	0.0	0.0	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				42.3	0.0	0.0	21.9	0.0	0.0	0.0	0.0	19.6
LnGrp LOS				D	A	A	C	A	A	A	A	B
Approach Vol, veh/h					810			275			196	
Approach Delay, s/veh					42.3			21.9			19.6	
Approach LOS					D			C			B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	40.0	47.7	40.0
Change Period (Y+Rc), s	6.3	6.0	6.3
Max Green Setting (Gmax), s	33.7	44.0	33.7
Max Q Clear Time (g_c+I1), s	8.5	40.5	13.6
Green Ext Time (p_c), s	1.9	1.2	2.7

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	184	156	5	1	28
Future Volume (vph)	16	184	156	5	1	28
Satd. Flow (prot)	0	1839	1855	0	1528	0
Flt Permitted		0.996			0.999	
Satd. Flow (perm)	0	1839	1855	0	1528	0
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Heavy Vehicles (%)	2%	3%	2%	2%	2%	8%
Adj. Flow (vph)	24	271	229	7	1	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	295	236	0	42	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 32.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	184	156	5	1	28
Future Vol, veh/h	16	184	156	5	1	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	3	2	2	2	8
Mvmt Flow	24	271	229	7	1	41

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	236	0	-	0	552	233
Stage 1	-	-	-	-	233	-
Stage 2	-	-	-	-	319	-
Critical Hdwy	4.12	-	-	-	6.42	6.28
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.372
Pot Cap-1 Maneuver	1331	-	-	-	495	791
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	737	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1331	-	-	-	485	791
Mov Cap-2 Maneuver	-	-	-	-	485	-
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	737	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1331	-	-	-	774
HCM Lane V/C Ratio	0.018	-	-	-	0.055
HCM Control Delay (s)	7.8	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	477	35	0	0	6	12
Future Volume (vph)	477	35	0	0	6	12
Satd. Flow (prot)	1845	0	0	0	1634	0
Flt Permitted					0.984	
Satd. Flow (perm)	1845	0	0	0	1634	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	3%	2%	2%	8%	2%
Adj. Flow (vph)	513	38	0	0	6	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	551	0	0	0	19	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 37.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	477	35	0	0	6	12
Future Vol, veh/h	477	35	0	0	6	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	3	2	2	8	2
Mvmt Flow	513	38	0	0	6	13

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		532	532
Stage 1	-	-		532	-
Stage 2	-	-		0	-
Critical Hdwy	-	-		6.48	6.22
Critical Hdwy Stg 1	-	-		5.48	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		3.572	3.318
Pot Cap-1 Maneuver	-	-		498	547
Stage 1	-	-		577	-
Stage 2	-	-		-	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		498	547
Mov Cap-2 Maneuver	-	-		498	-
Stage 1	-	-		577	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	12.1
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	530	-	-
HCM Lane V/C Ratio	0.037	-	-
HCM Control Delay (s)	12.1	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBT	WBR	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	34	4	134	1	7	0	23	1	593	942	147	1372
Future Volume (vph)	34	4	134	1	7	0	23	1	593	942	147	1372
Satd. Flow (prot)	0	1562	0	0	0	1615	0	0	1676	0	0	1805
Flt Permitted		0.990				0.988						0.995
Satd. Flow (perm)	0	1562	0	0	0	1615	0	0	1676	0	0	1805
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	25%	5%	2%	2%	2%	5%	2%	7%	2%	2%	5%
Adj. Flow (vph)	38	4	149	1	8	0	26	1	659	1047	163	1524
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	192	0	0	0	34	0	0	1707	0	0	1691
Sign Control		Stop				Stop			Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 199.5%		ICU Level of Service H	
Analysis Period (min) 15			

Lane Group	SBR	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	4	1	2	1
Future Volume (vph)	4	1	2	1
Satd. Flow (prot)	0	1118	0	0
Flt Permitted		0.988		
Satd. Flow (perm)	0	1118	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	2%	100%	2%
Adj. Flow (vph)	4	1	2	1
Shared Lane Traffic (%)				
Lane Group Flow (vph)	0	4	0	0
Sign Control		Stop		

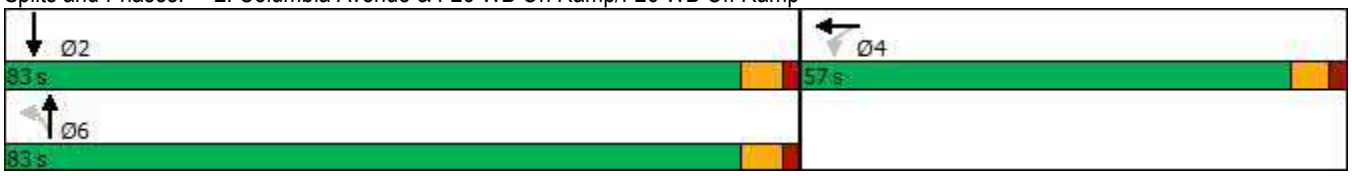
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	895	1	163	127	524	0	0	628	90
Future Volume (vph)	0	0	0	895	1	163	127	524	0	0	628	90
Satd. Flow (prot)	0	0	0	0	1675	0	0	1758	0	0	1748	0
Flt Permitted					0.959			0.302				
Satd. Flow (perm)	0	0	0	0	1675	0	0	536	0	0	1748	0
Satd. Flow (RTOR)					7						8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	5%	100%	14%	3%	8%	2%	2%	7%	6%
Adj. Flow (vph)	0	0	0	994	1	181	141	582	0	0	698	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1176	0	0	723	0	0	798	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Total Split (s)				57.0	57.0		83.0	83.0			83.0	
Total Lost Time (s)					6.0			6.3			6.3	
Act Effct Green (s)					51.0			76.7			76.7	
Actuated g/C Ratio					0.36			0.55			0.55	
v/c Ratio					1.92			2.47			0.83	
Control Delay					444.9			690.2			35.2	
Queue Delay					0.0			0.0			0.0	
Total Delay					444.9			690.2			35.2	
LOS					F			F			D	
Approach Delay					444.9			690.2			35.2	
Approach LOS					F			F			D	
Queue Length 50th (ft)					~1653			~830			578	
Queue Length 95th (ft)					#1921			#1077			786	
Internal Link Dist (ft)		794			322			516			197	
Turn Bay Length (ft)												
Base Capacity (vph)					614			293			961	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					1.92			2.47			0.83	

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 2.47
Intersection Signal Delay: 389.4 Intersection LOS: F
Intersection Capacity Utilization 148.2% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	895	1	163	127	524	0	0	628	90
Future Volume (veh/h)	0	0	0	895	1	163	127	524	0	0	628	90
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	418	1900	1781	1781	0	0	1796	1796
Adj Flow Rate, veh/h				994	1	181	141	582	0	0	698	100
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	100	0	8	8	0	0	7	7
Cap, veh/h				120	0	22	75	237	0	0	842	121
Arrive On Green				0.36	0.36	0.36	0.55	0.55	0.00	0.00	0.55	0.55
Sat Flow, veh/h				330	0	60	81	433	0	0	1537	220
Grp Volume(v), veh/h				1176	0	0	723	0	0	0	0	798
Grp Sat Flow(s),veh/h/ln				391	0	0	515	0	0	0	0	1757
Q Serve(g_s), s				51.0	0.0	0.0	24.0	0.0	0.0	0.0	0.0	52.7
Cycle Q Clear(g_c), s				51.0	0.0	0.0	76.7	0.0	0.0	0.0	0.0	52.7
Prop In Lane				0.85		0.15	0.20		0.00	0.00		0.13
Lane Grp Cap(c), veh/h				142	0	0	313	0	0	0	0	962
V/C Ratio(X)				8.26	0.00	0.00	2.31	0.00	0.00	0.00	0.00	0.83
Avail Cap(c_a), veh/h				142	0	0	313	0	0	0	0	962
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				44.5	0.0	0.0	48.4	0.0	0.0	0.0	0.0	26.2
Incr Delay (d2), s/veh				3282.9	0.0	0.0	600.8	0.0	0.0	0.0	0.0	8.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				134.5	0.0	0.0	63.4	0.0	0.0	0.0	0.0	23.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				3327.4	0.0	0.0	649.1	0.0	0.0	0.0	0.0	34.4
LnGrp LOS				F	A	A	F	A	A	A	A	C
Approach Vol, veh/h					1176			723			798	
Approach Delay, s/veh					3327.4			649.1			34.4	
Approach LOS					F			F			C	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	83.0	57.0	83.0
Change Period (Y+Rc), s	6.3	6.0	6.3
Max Green Setting (Gmax), s	76.7	51.0	76.7
Max Q Clear Time (g_c+I1), s	54.7	53.0	78.7
Green Ext Time (p_c), s	10.2	0.0	0.0

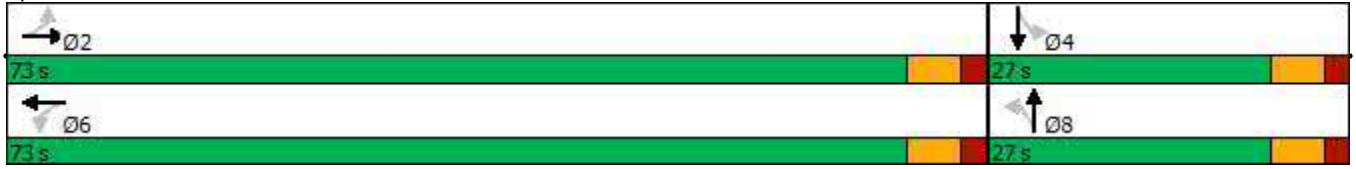
Intersection Summary	
HCM 6th Ctrl Delay	1635.1
HCM 6th LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	277	190	0	366	3	163	0	0	2	0	189
Future Volume (vph)	220	277	190	0	366	3	163	0	0	2	0	189
Satd. Flow (prot)	0	1684	0	0	1758	0	0	1770	0	0	1554	0
Flt Permitted		0.695						0.477			0.997	
Satd. Flow (perm)	0	1190	0	0	1758	0	0	889	0	0	1549	0
Satd. Flow (RTOR)		42			1						210	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	11%	7%	2%	2%	8%	2%	2%	2%	2%	100%	2%	5%
Adj. Flow (vph)	244	308	211	0	407	3	181	0	0	2	0	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	763	0	0	410	0	0	181	0	0	212	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	73.0	73.0		73.0	73.0		27.0	27.0		27.0	27.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effct Green (s)		63.2			63.2			21.1			21.1	
Actuated g/C Ratio		0.66			0.66			0.22			0.22	
v/c Ratio		0.96			0.36			0.93			0.42	
Control Delay		39.8			8.3			89.9			7.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		39.8			8.3			89.9			7.8	
LOS		D			A			F			A	
Approach Delay		39.8			8.3			89.9			7.8	
Approach LOS		D			A			F			A	
Queue Length 50th (ft)		373			100			115			1	
Queue Length 95th (ft)		#696			149			#253			60	
Internal Link Dist (ft)		174			688			518			356	
Turn Bay Length (ft)												
Base Capacity (vph)		844			1229			194			503	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.90			0.33			0.93			0.42	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 96.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 33.0	Intersection LOS: C
Intersection Capacity Utilization 98.6%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 3: Columbia Avenue & Comalander Drive



HCM 6th Signalized Intersection Summary
3: Columbia Avenue & Comalander Drive

2024 No Build Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	277	190	0	366	3	163	0	0	2	0	189
Future Volume (veh/h)	220	277	190	0	366	3	163	0	0	2	0	189
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1781	1781	1781	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	244	308	211	0	407	3	181	0	0	2	0	210
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7	8	8	8	2	2	2	2	2	2
Cap, veh/h	290	329	218	0	1177	9	248	0	0	38	2	347
Arrive On Green	0.67	0.67	0.67	0.00	0.67	0.67	0.21	0.00	0.00	0.21	0.00	0.21
Sat Flow, veh/h	364	493	328	0	1766	13	826	0	0	4	12	1635
Grp Volume(v), veh/h	763	0	0	0	0	410	181	0	0	212	0	0
Grp Sat Flow(s),veh/h/ln	1184	0	0	0	0	1779	826	0	0	1651	0	0
Q Serve(g_s), s	51.5	0.0	0.0	0.0	0.0	9.9	9.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	61.4	0.0	0.0	0.0	0.0	9.9	21.0	0.0	0.0	12.0	0.0	0.0
Prop In Lane	0.32		0.28	0.00		0.01	1.00		0.00	0.01		0.99
Lane Grp Cap(c), veh/h	837	0	0	0	0	1185	248	0	0	387	0	0
V/C Ratio(X)	0.91	0.00	0.00	0.00	0.00	0.35	0.73	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	852	0	0	0	0	1206	248	0	0	387	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.0	0.0	0.0	0.0	0.0	7.2	41.1	0.0	0.0	35.4	0.0	0.0
Incr Delay (d2), s/veh	13.8	0.0	0.0	0.0	0.0	0.2	10.3	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.6	0.0	0.0	0.0	0.0	3.3	5.1	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	0.0	0.0	0.0	0.0	7.3	51.4	0.0	0.0	37.0	0.0	0.0
LnGrp LOS	C	A	A	A	A	A	D	A	A	D	A	A
Approach Vol, veh/h		763			410			181			212	
Approach Delay, s/veh		32.8			7.3			51.4			37.0	
Approach LOS		C			A			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		71.9		27.0		71.9		27.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		67.0		21.0		67.0		21.0				
Max Q Clear Time (g_c+I1), s		63.4		14.0		11.9		23.0				
Green Ext Time (p_c), s		2.5		0.4		5.5		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			28.8									
HCM 6th LOS			C									

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1078	17	0	0	30	82
Future Volume (vph)	1078	17	0	0	30	82
Satd. Flow (prot)	1859	0	0	0	1657	0
Flt Permitted					0.987	
Satd. Flow (perm)	1859	0	0	0	1657	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1198	19	0	0	33	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1217	0	0	0	124	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 71.1%		ICU Level of Service C	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1078	17	0	0	30	82
Future Vol, veh/h	1078	17	0	0	30	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1198	19	0	0	33	91

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		1208	1208
Stage 1	-	-		1208	-
Stage 2	-	-		0	-
Critical Hdwy	-	-		6.42	6.22
Critical Hdwy Stg 1	-	-		5.42	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		3.518	3.318
Pot Cap-1 Maneuver	-	-		202	223
Stage 1	-	-		283	-
Stage 2	-	-		-	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		202	223
Mov Cap-2 Maneuver	-	-		202	-
Stage 1	-	-		283	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	41.8
HCM LOS		E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	217	-	-
HCM Lane V/C Ratio	0.573	-	-
HCM Control Delay (s)	41.8	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	3.2	-	-

Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	5	137	6	0	6	2	658	1053	237	1591	13
Future Volume (vph)	54	5	137	6	0	6	2	658	1053	237	1591	13
Satd. Flow (prot)	0	1624	0	0	1611	0	0	1698	0	0	1844	0
Flt Permitted		0.987									0.994	
Satd. Flow (perm)	0	1624	0	0	1611	0	0	1698	0	0	1844	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
Heavy Vehicles (%)	5%	20%	3%	17%	2%	2%	2%	2%	3%	2%	2%	50%
Adj. Flow (vph)	59	5	149	7	0	7	2	715	1145	258	1729	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	220	0	0	7	0	0	1862	0	0	2001	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 232.3%	ICU Level of Service H
Analysis Period (min) 15	

Lane Group	NEL	NER	NER2
Lane Configurations			
Traffic Volume (vph)	4	8	5
Future Volume (vph)	4	8	5
Satd. Flow (prot)	1649	0	0
Flt Permitted	0.989		
Satd. Flow (perm)	1649	0	0
Peak Hour Factor	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%
Adj. Flow (vph)	4	9	5
Shared Lane Traffic (%)			
Lane Group Flow (vph)	18	0	0
Sign Control	Stop		

Intersection Summary

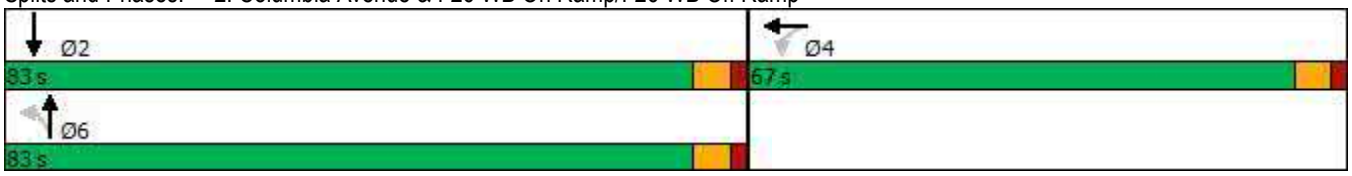
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1185	0	247	159	563	0	0	656	47
Future Volume (vph)	0	0	0	1185	0	247	159	563	0	0	656	47
Satd. Flow (prot)	0	0	0	0	1747	0	0	1834	0	0	1846	0
Flt Permitted					0.960			0.283				
Satd. Flow (perm)	0	0	0	0	1747	0	0	525	0	0	1846	0
Satd. Flow (RTOR)					24						4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	1261	0	263	169	599	0	0	698	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1524	0	0	768	0	0	748	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Total Split (s)				67.0	67.0		83.0	83.0			83.0	
Total Lost Time (s)					6.0			6.3			6.3	
Act Effct Green (s)					61.0			76.7			76.7	
Actuated g/C Ratio					0.41			0.51			0.51	
v/c Ratio					2.10			2.87			0.79	
Control Delay					526.6			867.8			37.5	
Queue Delay					0.0			0.0			0.0	
Total Delay					526.6			867.8			37.5	
LOS					F			F			D	
Approach Delay					526.6			867.8			37.5	
Approach LOS					F			F			D	
Queue Length 50th (ft)					~2364			~1034			585	
Queue Length 95th (ft)					#2633			#1289			767	
Internal Link Dist (ft)		794			322			516			197	
Turn Bay Length (ft)												
Base Capacity (vph)					724			268			945	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					2.10			2.87			0.79	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 2.87	
Intersection Signal Delay: 492.5	Intersection LOS: F
Intersection Capacity Utilization 172.0%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1185	0	247	159	563	0	0	656	47
Future Volume (veh/h)	0	0	0	1185	0	247	159	563	0	0	656	47
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1870	1900	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				1261	0	263	169	599	0	0	698	50
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				587	0	122	84	218	0	0	882	63
Arrive On Green				0.41	0.00	0.41	0.51	0.51	0.00	0.00	0.51	0.51
Sat Flow, veh/h				1443	0	301	106	427	0	0	1725	124
Grp Volume(v), veh/h				1524	0	0	768	0	0	0	0	748
Grp Sat Flow(s),veh/h/ln				1744	0	0	533	0	0	0	0	1848
Q Serve(g_s), s				61.0	0.0	0.0	26.9	0.0	0.0	0.0	0.0	49.8
Cycle Q Clear(g_c), s				61.0	0.0	0.0	76.7	0.0	0.0	0.0	0.0	49.8
Prop In Lane				0.83		0.17	0.22		0.00	0.00		0.07
Lane Grp Cap(c), veh/h				709	0	0	302	0	0	0	0	945
V/C Ratio(X)				2.15	0.00	0.00	2.54	0.00	0.00	0.00	0.00	0.79
Avail Cap(c_a), veh/h				709	0	0	302	0	0	0	0	945
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				44.5	0.0	0.0	57.5	0.0	0.0	0.0	0.0	30.1
Incr Delay (d2), s/veh				521.7	0.0	0.0	704.1	0.0	0.0	0.0	0.0	6.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				128.0	0.0	0.0	70.7	0.0	0.0	0.0	0.0	23.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				566.2	0.0	0.0	761.6	0.0	0.0	0.0	0.0	36.8
LnGrp LOS				F	A	A	F	A	A	A	A	D
Approach Vol, veh/h					1524			768			748	
Approach Delay, s/veh					566.2			761.6			36.8	
Approach LOS					F			F			D	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	83.0	67.0	83.0
Change Period (Y+Rc), s	6.3	6.0	6.3
Max Green Setting (Gmax), s	76.7	61.0	76.7
Max Q Clear Time (g_c+I1), s	51.8	63.0	78.7
Green Ext Time (p_c), s	10.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	485.3
HCM 6th LOS	F

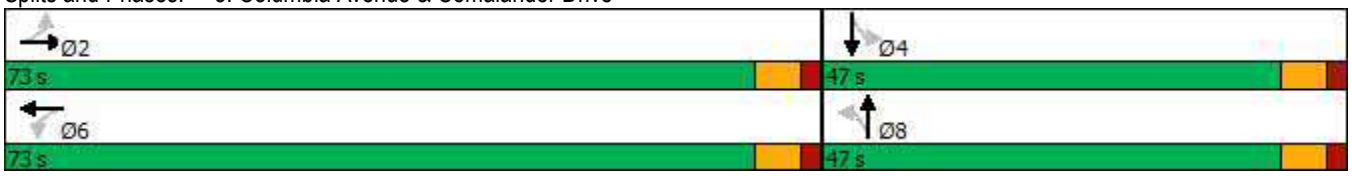
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	316	195	299	0	165	5	254	0	0	1	0	284
Future Volume (vph)	316	195	299	0	165	5	254	0	0	1	0	284
Satd. Flow (prot)	0	1732	0	0	1855	0	0	1770	0	0	1522	0
Flt Permitted		0.788						0.435			0.999	
Satd. Flow (perm)	0	1391	0	0	1855	0	0	810	0	0	1521	0
Satd. Flow (RTOR)		40			2						316	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	8%
Adj. Flow (vph)	351	217	332	0	183	6	282	0	0	1	0	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	900	0	0	189	0	0	282	0	0	317	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	73.0	73.0		73.0	73.0		47.0	47.0		47.0	47.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effct Green (s)		67.0			67.0			41.0			41.0	
Actuated g/C Ratio		0.56			0.56			0.34			0.34	
v/c Ratio		1.13			0.18			1.02			0.44	
Control Delay		101.4			13.5			99.8			5.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		101.4			13.5			99.8			5.1	
LOS		F			B			F			A	
Approach Delay		101.4			13.5			99.8			5.1	
Approach LOS		F			B			F			A	
Queue Length 50th (ft)		~799			68			~232			1	
Queue Length 95th (ft)		#1050			108			#406			62	
Internal Link Dist (ft)		174			688			673			356	
Turn Bay Length (ft)												
Base Capacity (vph)		794			1036			276			727	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.13			0.18			1.02			0.44	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 73.2	Intersection LOS: E
Intersection Capacity Utilization 106.7%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Columbia Avenue & Comalander Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	195	299	0	165	5	254	0	0	1	0	284
Future Volume (veh/h)	316	195	299	0	165	5	254	0	0	1	0	284
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	351	217	332	0	183	6	282	0	0	1	0	316
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	328	177	270	0	1005	33	305	0	0	30	1	554
Arrive On Green	0.56	0.56	0.56	0.00	0.56	0.56	0.34	0.00	0.00	0.34	0.00	0.34
Sat Flow, veh/h	512	316	484	0	1801	59	717	0	0	1	4	1622
Grp Volume(v), veh/h	900	0	0	0	0	189	282	0	0	317	0	0
Grp Sat Flow(s),veh/h/ln	1313	0	0	0	0	1860	717	0	0	1627	0	0
Q Serve(g_s), s	61.0	0.0	0.0	0.0	0.0	6.0	21.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	67.0	0.0	0.0	0.0	0.0	6.0	41.0	0.0	0.0	19.7	0.0	0.0
Prop In Lane	0.39		0.37	0.00		0.03	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	775	0	0	0	0	1038	305	0	0	586	0	0
V/C Ratio(X)	1.16	0.00	0.00	0.00	0.00	0.18	0.92	0.00	0.00	0.54	0.00	0.00
Avail Cap(c_a), veh/h	775	0	0	0	0	1038	305	0	0	586	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.1	0.0	0.0	0.0	0.0	13.0	46.7	0.0	0.0	32.5	0.0	0.0
Incr Delay (d2), s/veh	86.9	0.0	0.0	0.0	0.0	0.1	32.6	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	40.9	0.0	0.0	0.0	0.0	2.5	11.3	0.0	0.0	7.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	118.0	0.0	0.0	0.0	0.0	13.1	79.2	0.0	0.0	33.5	0.0	0.0
LnGrp LOS	F	A	A	A	A	B	E	A	A	C	A	A
Approach Vol, veh/h		900			189			282			317	
Approach Delay, s/veh		118.0			13.1			79.2			33.5	
Approach LOS		F			B			E			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		73.0		47.0		73.0		47.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		67.0		41.0		67.0		41.0				
Max Q Clear Time (g_c+I1), s		69.0		21.7		8.0		43.0				
Green Ext Time (p_c), s		0.0		1.0		2.2		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			83.9									
HCM 6th LOS			F									

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1266	37	0	0	6	13
Future Volume (vph)	1266	37	0	0	6	13
Satd. Flow (prot)	1855	0	0	0	1632	0
Flt Permitted					0.985	
Satd. Flow (perm)	1855	0	0	0	1632	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	3%	2%	2%	8%	2%
Adj. Flow (vph)	1361	40	0	0	6	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1401	0	0	0	20	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 78.9%		ICU Level of Service D	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1266	37	0	0	6	13
Future Vol, veh/h	1266	37	0	0	6	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	3	2	2	8	2
Mvmt Flow	1361	40	0	0	6	14

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		1381	1381
Stage 1	-	-		1381	-
Stage 2	-	-		0	-
Critical Hdwy	-	-		6.48	6.22
Critical Hdwy Stg 1	-	-		5.48	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		3.572	3.318
Pot Cap-1 Maneuver	-	-		154	176
Stage 1	-	-		226	-
Stage 2	-	-		-	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		154	176
Mov Cap-2 Maneuver	-	-		154	-
Stage 1	-	-		226	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	29.4
HCM LOS		D

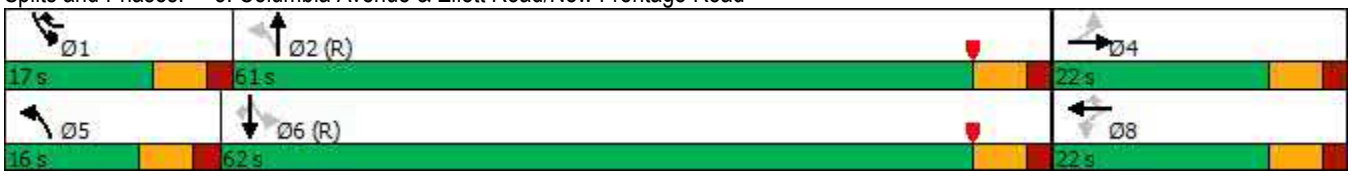
Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	168	-	-
HCM Lane V/C Ratio	0.122	-	-
HCM Control Delay (s)	29.4	-	-
HCM Lane LOS	D	-	-
HCM 95th %tile Q(veh)	0.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	0	25	118	0	284	126	1291	168	157	1166	180
Future Volume (vph)	39	0	25	118	0	284	126	1291	168	157	1166	180
Satd. Flow (prot)	1770	1583	0	0	1770	1583	1770	3334	0	1719	3539	1583
Flt Permitted	0.634				0.739		0.155			0.069		
Satd. Flow (perm)	1181	1583	0	0	1377	1583	289	3334	0	125	3539	1583
Satd. Flow (RTOR)		209				33		22				168
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	7%	2%	5%	2%	2%
Adj. Flow (vph)	43	0	28	131	0	316	140	1434	187	174	1296	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	28	0	0	131	316	140	1621	0	174	1296	200
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Total Split (s)	22.0	22.0		22.0	22.0	17.0	16.0	61.0		17.0	62.0	62.0
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	13.5	13.5			13.5	29.3	66.6	58.7		70.5	60.7	60.7
Actuated g/C Ratio	0.14	0.14			0.14	0.29	0.67	0.59		0.70	0.61	0.61
v/c Ratio	0.27	0.07			0.71	0.65	0.45	0.82		0.72	0.60	0.19
Control Delay	42.2	0.4			61.5	33.6	9.6	21.9		40.8	10.7	1.6
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	42.2	0.4			61.5	33.6	9.6	21.9		40.8	10.7	1.6
LOS	D	A			E	C	A	C		D	B	A
Approach Delay		25.7			41.8			20.9			12.8	
Approach LOS		C			D			C			B	
Queue Length 50th (ft)	25	0			80	150	22	431		46	267	12
Queue Length 95th (ft)	57	0			142	239	41	561		#152	231	11
Internal Link Dist (ft)		199			1080			1866			829	
Turn Bay Length (ft)	220					250	150			300		150
Base Capacity (vph)	188	428			220	506	346	1967		265	2147	1026
Starvation Cap Reductn	0	0			0	0	0	0		0	0	0
Spillback Cap Reductn	0	0			0	0	0	0		0	0	0
Storage Cap Reductn	0	0			0	0	0	0		0	0	0
Reduced v/c Ratio	0.23	0.07			0.60	0.62	0.40	0.82		0.66	0.60	0.19

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 19.9 — Intersection LOS: B
Intersection Capacity Utilization 77.9% — ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Columbia Avenue & Ellett Road/New Frontage Road



HCM 6th Signalized Intersection Summary
3: Columbia Avenue & Ellett Road/New Frontage Road

2024 Build Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	0	25	118	0	284	126	1291	168	157	1166	180
Future Volume (veh/h)	39	0	25	118	0	284	126	1291	168	157	1166	180
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1796	1796	1826	1870	1870
Adj Flow Rate, veh/h	43	0	28	131	0	0	140	1434	187	174	1296	200
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	7	5	2	2
Cap, veh/h	296	0	207	231	0		312	1924	249	261	2276	1015
Arrive On Green	0.13	0.00	0.13	0.13	0.00	0.00	0.05	0.63	0.63	0.06	0.64	0.64
Sat Flow, veh/h	1418	0	1585	1217	0	1585	1781	3040	392	1739	3554	1585
Grp Volume(v), veh/h	43	0	28	131	0	0	140	799	822	174	1296	200
Grp Sat Flow(s),veh/h/ln	1418	0	1585	1217	0	1585	1781	1706	1726	1739	1777	1585
Q Serve(g_s), s	0.0	0.0	1.6	9.3	0.0	0.0	2.7	32.3	33.4	3.5	20.6	5.2
Cycle Q Clear(g_c), s	2.2	0.0	1.6	10.8	0.0	0.0	2.7	32.3	33.4	3.5	20.6	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.23	1.00		1.00
Lane Grp Cap(c), veh/h	296	0	207	231	0		312	1080	1093	261	2276	1015
V/C Ratio(X)	0.15	0.00	0.14	0.57	0.00		0.45	0.74	0.75	0.67	0.57	0.20
Avail Cap(c_a), veh/h	338	0	254	272	0		403	1080	1093	354	2276	1015
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.80	0.80	0.80
Uniform Delay (d), s/veh	38.7	0.0	38.5	43.3	0.0	0.0	8.8	12.7	12.9	17.6	10.2	7.4
Incr Delay (d2), s/veh	0.2	0.0	0.3	2.2	0.0	0.0	1.0	4.5	4.8	2.3	0.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.6	3.3	0.0	0.0	1.0	12.0	12.6	2.7	7.3	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.0	0.0	38.8	45.5	0.0	0.0	9.8	17.2	17.7	19.9	11.0	7.7
LnGrp LOS	D	A	D	D	A		A	B	B	B	B	A
Approach Vol, veh/h		71			131	A		1761			1670	
Approach Delay, s/veh		38.9			45.5			16.8			11.5	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	69.3		19.1	10.9	70.1		19.1				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	11.0	55.0		16.0	10.0	56.0		16.0				
Max Q Clear Time (g_c+I1), s	5.5	35.4		4.2	4.7	22.6		12.8				
Green Ext Time (p_c), s	0.2	16.2		0.2	0.2	21.0		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		15.9	
HCM 6th LOS		B	

Notes

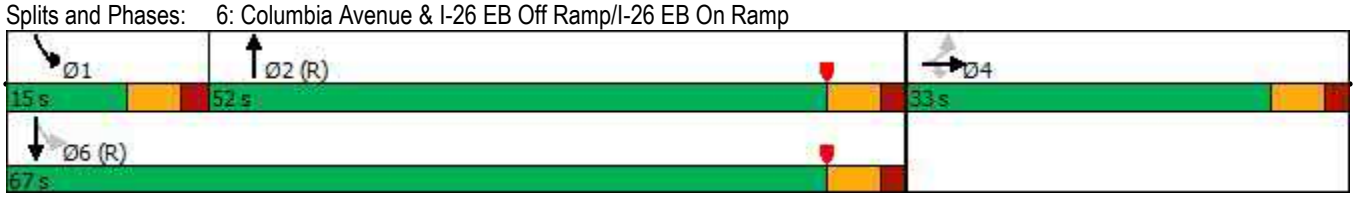
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	4	134	0	0	0	0	616	1000	146	1369	0
Future Volume (vph)	34	4	134	0	0	0	0	616	1000	146	1369	0
Satd. Flow (prot)	0	1783	1583	0	0	0	0	1776	1583	1770	3438	0
Flt Permitted		0.957								0.281		
Satd. Flow (perm)	0	1783	1583	0	0	0	0	1776	1583	523	3438	0
Satd. Flow (RTOR)			98						643			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	5%	2%
Adj. Flow (vph)	38	4	149	0	0	0	0	684	1111	162	1521	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	149	0	0	0	0	684	1111	162	1521	0
Turn Type	Perm	NA	Perm					NA	Free	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						Free	6		
Total Split (s)	33.0	33.0	33.0					52.0		15.0	67.0	
Total Lost Time (s)		6.0	6.0					6.0		6.0	6.0	
Act Effct Green (s)		9.5	9.5					64.7	100.0	78.5	78.5	
Actuated g/C Ratio		0.10	0.10					0.65	1.00	0.78	0.78	
v/c Ratio		0.25	0.63					0.60	0.70	0.32	0.56	
Control Delay		43.8	28.3					12.4	5.0	4.7	5.5	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		43.8	28.3					12.4	5.0	4.7	5.5	
LOS		D	C					B	A	A	A	
Approach Delay		31.7						7.9			5.5	
Approach LOS		C						A			A	
Queue Length 50th (ft)		25	31					225	147	18	148	
Queue Length 95th (ft)		55	88					m264	340	45	264	
Internal Link Dist (ft)		846			705			829			562	
Turn Bay Length (ft)										225		
Base Capacity (vph)		481	498					1148	1583	525	2699	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.09	0.30					0.60	0.70	0.31	0.56	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow, Master Intersection
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 8.0 — Intersection LOS: A
Intersection Capacity Utilization 59.7% — ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp



HCM 6th Signalized Intersection Summary
6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp

2024 Build Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	4	134	0	0	0	0	616	1000	146	1369	0
Future Volume (veh/h)	34	4	134	0	0	0	0	616	1000	146	1369	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1796	1870	1870	1826	0
Adj Flow Rate, veh/h	38	4	149				0	684	0	162	1521	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	7	2	2	5	0
Cap, veh/h	191	20	187				0	1173		493	2645	0
Arrive On Green	0.12	0.12	0.12				0.00	0.65	0.00	0.05	0.76	0.00
Sat Flow, veh/h	1619	170	1585				0	1796	1585	1781	3561	0
Grp Volume(v), veh/h	42	0	149				0	684	0	162	1521	0
Grp Sat Flow(s),veh/h/ln	1789	0	1585				0	1796	1585	1781	1735	0
Q Serve(g_s), s	2.1	0.0	9.2				0.0	21.3	0.0	2.8	18.6	0.0
Cycle Q Clear(g_c), s	2.1	0.0	9.2				0.0	21.3	0.0	2.8	18.6	0.0
Prop In Lane	0.90		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	211	0	187				0	1173		493	2645	0
V/C Ratio(X)	0.20	0.00	0.80				0.00	0.58		0.33	0.58	0.00
Avail Cap(c_a), veh/h	483	0	428				0	1173		565	2645	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.53	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.9	0.0	43.0				0.0	9.7	0.0	7.7	5.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	7.6				0.0	1.1	0.0	0.4	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	3.8				0.0	7.6	0.0	0.9	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	0.0	50.6				0.0	10.9	0.0	8.1	5.9	0.0
LnGrp LOS	D	A	D				A	B		A	A	A
Approach Vol, veh/h		191						684	A		1683	
Approach Delay, s/veh		48.3						10.9			6.2	
Approach LOS		D						B			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.9	71.3		17.8		82.2
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	9.0	46.0		27.0		61.0
Max Q Clear Time (g_c+I1), s	4.8	23.3		11.2		20.6
Green Ext Time (p_c), s	0.2	8.4		0.7		27.2

Intersection Summary	
HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1	163	126	524	0	0	628	90
Future Volume (vph)	0	0	0	0	1	163	126	524	0	0	628	90
Satd. Flow (prot)	0	0	0	0	1444	0	1770	1863	0	0	1776	1524
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	1444	0	1770	1863	0	0	1776	1524
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	14%	2%	2%	2%	2%	7%	6%
Adj. Flow (vph)	0	0	0	0	1	181	140	582	0	0	698	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	182	0	140	582	0	0	698	100
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 94.6%		ICU Level of Service F	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	1	163	126	524	0	0	628	90
Future Vol, veh/h	0	0	0	0	1	163	126	524	0	0	628	90
Conflicting Peds, #/hr	0	0	0	0	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	-	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	14	2	2	2	2	7	6
Mvmt Flow	0	0	0	0	1	181	140	582	0	0	698	100

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1610	1660	582	798	0	-	-	-	0
Stage 1	862	862	-	-	-	-	-	-	-
Stage 2	748	798	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.34	4.12	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.426	2.218	-	-	-	-	-
Pot Cap-1 Maneuver	115	97	491	824	-	0	0	-	-
Stage 1	414	372	-	-	-	0	0	-	-
Stage 2	468	398	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	95	0	491	824	-	-	-	-	-
Mov Cap-2 Maneuver	95	0	-	-	-	-	-	-	-
Stage 1	344	0	-	-	-	-	-	-	-
Stage 2	468	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.6	2	0
HCM LOS	C		

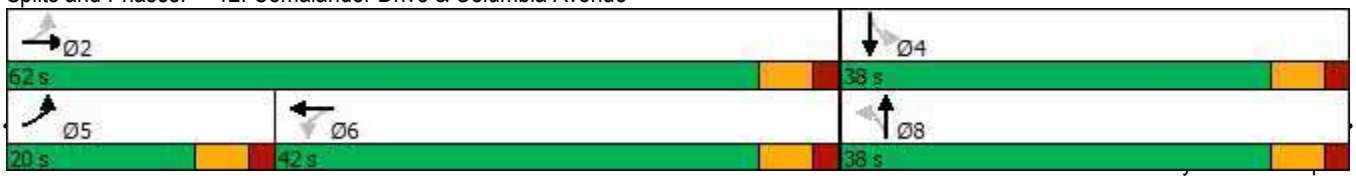
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	824	-	491	-	-
HCM Lane V/C Ratio	0.17	-	0.371	-	-
HCM Control Delay (s)	10.3	-	16.6	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.6	-	1.7	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	277	190	0	366	3	163	0	0	2	0	189
Future Volume (vph)	220	277	190	0	366	3	163	0	0	2	0	189
Satd. Flow (prot)	1626	1700	0	0	1758	0	0	1770	0	0	1554	0
Flt Permitted	0.260							0.567			0.997	
Satd. Flow (perm)	445	1700	0	0	1758	0	0	1056	0	0	1549	0
Satd. Flow (RTOR)		56									210	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	11%	7%	2%	2%	8%	2%	2%	2%	2%	100%	2%	5%
Adj. Flow (vph)	244	308	211	0	407	3	181	0	0	2	0	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	244	519	0	0	410	0	0	181	0	0	212	0
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	20.0	62.0		42.0	42.0		38.0	38.0		38.0	38.0	
Total Lost Time (s)	6.0	6.0			6.0			6.0			6.0	
Act Effct Green (s)	42.1	42.1			22.7			18.5			18.5	
Actuated g/C Ratio	0.57	0.57			0.31			0.25			0.25	
v/c Ratio	0.52	0.52			0.76			0.68			0.39	
Control Delay	13.2	11.4			33.6			40.2			6.2	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	13.2	11.4			33.6			40.2			6.2	
LOS	B	B			C			D			A	
Approach Delay		12.0			33.6			40.2			6.2	
Approach LOS		B			C			D			A	
Queue Length 50th (ft)	48	109			164			74			1	
Queue Length 95th (ft)	121	264			322			166			51	
Internal Link Dist (ft)		1379			1087			620			485	
Turn Bay Length (ft)	250											
Base Capacity (vph)	495	1340			917			489			831	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.49	0.39			0.45			0.37			0.26	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 73.4
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 20.1 — Intersection LOS: C
Intersection Capacity Utilization 86.5% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 12: Comalander Drive & Columbia Avenue



HCM 6th Signalized Intersection Summary
12: Comalander Drive & Columbia Avenue

2024 Build Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	277	190	0	366	3	163	0	0	2	0	189
Future Volume (veh/h)	220	277	190	0	366	3	163	0	0	2	0	189
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1796	1796	1781	1781	1781	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	244	308	211	0	407	3	181	0	0	2	0	210
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	11	7	7	8	8	8	2	2	2	2	2	2
Cap, veh/h	460	562	385	0	571	4	364	0	0	69	2	332
Arrive On Green	0.13	0.57	0.57	0.00	0.32	0.32	0.21	0.00	0.00	0.21	0.00	0.21
Sat Flow, veh/h	1654	993	680	0	1766	13	1094	0	0	4	11	1581
Grp Volume(v), veh/h	244	0	519	0	0	410	181	0	0	212	0	0
Grp Sat Flow(s),veh/h/ln	1654	0	1674	0	0	1779	1094	0	0	1596	0	0
Q Serve(g_s), s	4.7	0.0	10.4	0.0	0.0	10.8	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.7	0.0	10.4	0.0	0.0	10.8	8.6	0.0	0.0	6.5	0.0	0.0
Prop In Lane	1.00		0.41	0.00		0.01	1.00		0.00	0.01		0.99
Lane Grp Cap(c), veh/h	460	0	947	0	0	576	364	0	0	403	0	0
V/C Ratio(X)	0.53	0.00	0.55	0.00	0.00	0.71	0.50	0.00	0.00	0.53	0.00	0.00
Avail Cap(c_a), veh/h	677	0	1751	0	0	1197	819	0	0	1017	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.2	0.0	7.3	0.0	0.0	15.9	20.2	0.0	0.0	19.3	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.5	0.0	0.0	1.7	1.1	0.0	0.0	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.7	0.0	0.0	4.0	2.0	0.0	0.0	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	0.0	7.8	0.0	0.0	17.6	21.3	0.0	0.0	20.3	0.0	0.0
LnGrp LOS	B	A	A	A	A	B	C	A	A	C	A	A
Approach Vol, veh/h		763			410			181			212	
Approach Delay, s/veh		8.9			17.6			21.3			20.3	
Approach LOS		A			B			C			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		36.3		17.2	13.0	23.3		17.2				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		56.0		32.0	14.0	36.0		32.0				
Max Q Clear Time (g_c+I1), s		12.4		8.5	6.7	12.8		10.6				
Green Ext Time (p_c), s		7.5		0.7	0.4	4.5		0.7				

Intersection Summary												
HCM 6th Ctrl Delay			14.1									
HCM 6th LOS			B									

Lane Group	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	0	887	0	650	628	0
Future Volume (vph)	0	887	0	650	628	0
Satd. Flow (prot)	0	1565	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1565	0	1863	1863	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%
Adj. Flow (vph)	0	986	0	722	698	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	986	0	722	698	0
Sign Control	Free			Free	Free	

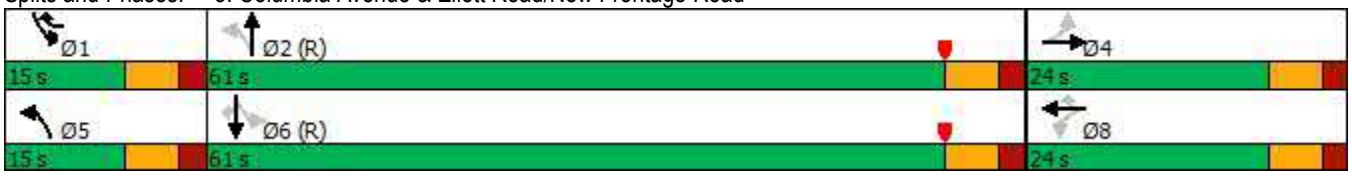
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 94.6%		ICU Level of Service F	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	0	109	109	0	179	28	1351	147	144	1538	58
Future Volume (vph)	167	0	109	109	0	179	28	1351	147	144	1538	58
Satd. Flow (prot)	1770	1583	0	0	1770	1583	1770	3483	0	1770	3539	1583
Flt Permitted	0.679				0.679		0.071			0.065		
Satd. Flow (perm)	1265	1583	0	0	1265	1583	132	3483	0	121	3539	1583
Satd. Flow (RTOR)		167				33		18				98
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Adj. Flow (vph)	186	0	121	121	0	199	31	1501	163	160	1709	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	121	0	0	121	199	31	1664	0	160	1709	64
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Total Split (s)	24.0	24.0		24.0	24.0	15.0	15.0	61.0		15.0	61.0	61.0
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	17.1	17.1			17.1	31.4	62.6	56.6		68.9	63.5	63.5
Actuated g/C Ratio	0.17	0.17			0.17	0.31	0.63	0.57		0.69	0.64	0.64
v/c Ratio	0.87	0.30			0.56	0.38	0.17	0.84		0.72	0.76	0.06
Control Delay	75.6	4.1			48.6	24.0	7.3	23.3		44.3	12.3	0.2
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	75.6	4.1			48.6	24.0	7.3	23.3		44.3	12.3	0.2
LOS	E	A			D	C	A	C		D	B	A
Approach Delay		47.4			33.3			23.1			14.6	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	115	0			71	79	5	448		62	446	0
Queue Length 95th (ft)	#234	22			131	140	13	563		m#139	407	m0
Internal Link Dist (ft)		199			1080			1871			829	
Turn Bay Length (ft)	220					250	150			300		150
Base Capacity (vph)	227	421			227	529	233	1978		231	2248	1041
Starvation Cap Reductn	0	0			0	0	0	0		0	0	0
Spillback Cap Reductn	0	0			0	0	0	0		0	0	0
Storage Cap Reductn	0	0			0	0	0	0		0	0	0
Reduced v/c Ratio	0.82	0.29			0.53	0.38	0.13	0.84		0.69	0.76	0.06

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 21.7 Intersection LOS: C
Intersection Capacity Utilization 80.9% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Columbia Avenue & Ellett Road/New Frontage Road



HCM 6th Signalized Intersection Summary
3: Columbia Avenue & Ellett Road/New Frontage Road

2024 Build Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	0	109	109	0	179	28	1351	147	144	1538	58
Future Volume (veh/h)	167	0	109	109	0	179	28	1351	147	144	1538	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	186	0	121	121	0	0	31	1501	163	160	1709	64
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	386	0	285	215	0		191	1889	203	237	2172	969
Arrive On Green	0.18	0.00	0.18	0.18	0.00	0.00	0.03	0.58	0.58	0.06	0.61	0.61
Sat Flow, veh/h	1418	0	1585	792	0	1585	1781	3236	348	1781	3554	1585
Grp Volume(v), veh/h	186	0	121	121	0	0	31	818	846	160	1709	64
Grp Sat Flow(s),veh/h/ln	1418	0	1585	792	0	1585	1781	1777	1808	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	6.8	9.3	0.0	0.0	0.7	35.5	36.6	3.6	36.0	1.6
Cycle Q Clear(g_c), s	9.6	0.0	6.8	16.1	0.0	0.0	0.7	35.5	36.6	3.6	36.0	1.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	386	0	285	215	0		191	1037	1055	237	2172	969
V/C Ratio(X)	0.48	0.00	0.42	0.56	0.00		0.16	0.79	0.80	0.67	0.79	0.07
Avail Cap(c_a), veh/h	386	0	285	215	0		300	1037	1055	297	2172	969
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.72	0.72	0.72
Uniform Delay (d), s/veh	37.5	0.0	36.4	43.6	0.0	0.0	13.9	16.0	16.3	19.7	14.6	7.9
Incr Delay (d2), s/veh	0.9	0.0	1.0	3.4	0.0	0.0	0.4	6.1	6.4	3.1	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	2.7	3.1	0.0	0.0	0.3	14.6	15.4	2.3	13.3	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	0.0	37.4	46.9	0.0	0.0	14.3	22.1	22.7	22.8	16.7	8.0
LnGrp LOS	D	A	D	D	A		B	C	C	C	B	A
Approach Vol, veh/h		307			121	A		1695			1933	
Approach Delay, s/veh		38.1			46.9			22.3			16.9	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	64.4		24.0	8.9	67.1		24.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	55.0		18.0	9.0	55.0		18.0				
Max Q Clear Time (g_c+I1), s	5.6	38.6		11.6	2.7	38.0		18.1				
Green Ext Time (p_c), s	0.1	14.1		0.9	0.0	14.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp

2024 Build Conditions
PM Peak Hour

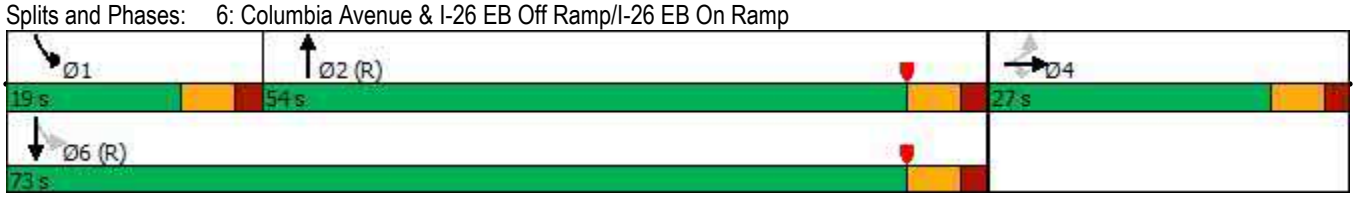
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	5	142	0	0	0	0	667	1030	235	1598	0
Future Volume (vph)	54	5	142	0	0	0	0	667	1030	235	1598	0
Satd. Flow (prot)	0	1710	1553	0	0	0	0	1863	1568	1770	3539	0
Flt Permitted		0.957								0.218		
Satd. Flow (perm)	0	1710	1553	0	0	0	0	1863	1568	406	3539	0
Satd. Flow (RTOR)			98						611			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	20%	4%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Adj. Flow (vph)	60	6	158	0	0	0	0	741	1144	261	1776	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	158	0	0	0	0	741	1144	261	1776	0
Turn Type	Perm	NA	Perm					NA	Free	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						Free	6		
Total Split (s)	27.0	27.0	27.0					54.0		19.0	73.0	
Total Lost Time (s)		6.0	6.0					6.0		6.0	6.0	
Act Effct Green (s)		10.2	10.2					59.5	100.0	77.8	77.8	
Actuated g/C Ratio		0.10	0.10					0.60	1.00	0.78	0.78	
v/c Ratio		0.38	0.64					0.67	0.73	0.54	0.65	
Control Delay		46.6	29.6					15.7	6.6	7.7	6.9	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		46.6	29.6					15.7	6.6	7.7	6.9	
LOS		D	C					B	A	A	A	
Approach Delay		34.6						10.2			7.0	
Approach LOS		C						B			A	
Queue Length 50th (ft)		40	37					185	218	33	202	
Queue Length 95th (ft)		77	96					m434	503	74	358	
Internal Link Dist (ft)		846			705			829			562	
Turn Bay Length (ft)										225		
Base Capacity (vph)		359	403					1108	1568	511	2752	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.18	0.39					0.67	0.73	0.51	0.65	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow, Master Intersection
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 9.9 — Intersection LOS: A
Intersection Capacity Utilization 67.3% — ICU Level of Service C
Analysis Period (min) 15

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

Splits and Phases: 6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp



HCM 6th Signalized Intersection Summary
6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp

2024 Build Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	5	142	0	0	0	0	667	1030	235	1598	0
Future Volume (veh/h)	54	5	142	0	0	0	0	667	1030	235	1598	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1604	1841				0	1870	1856	1870	1870	0
Adj Flow Rate, veh/h	60	6	158				0	741	0	261	1776	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	20	4				0	2	3	2	2	0
Cap, veh/h	174	17	195				0	1163		471	2683	0
Arrive On Green	0.12	0.12	0.12				0.00	0.62	0.00	0.07	0.76	0.00
Sat Flow, veh/h	1394	139	1560				0	1870	1572	1781	3647	0
Grp Volume(v), veh/h	66	0	158				0	741	0	261	1776	0
Grp Sat Flow(s),veh/h/ln	1534	0	1560				0	1870	1572	1781	1777	0
Q Serve(g_s), s	3.9	0.0	9.9				0.0	24.8	0.0	4.9	24.5	0.0
Cycle Q Clear(g_c), s	3.9	0.0	9.9				0.0	24.8	0.0	4.9	24.5	0.0
Prop In Lane	0.91		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	192	0	195				0	1163		471	2683	0
V/C Ratio(X)	0.34	0.00	0.81				0.00	0.64		0.55	0.66	0.00
Avail Cap(c_a), veh/h	322	0	328				0	1163		572	2683	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.50	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.0	0.0	42.6				0.0	11.8	0.0	10.4	6.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	7.8				0.0	1.3	0.0	1.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	4.1				0.0	9.5	0.0	1.9	7.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	0.0	50.4				0.0	13.2	0.0	11.4	7.3	0.0
LnGrp LOS	D	A	D				A	B		B	A	A
Approach Vol, veh/h		224						741	A		2037	
Approach Delay, s/veh		47.7						13.2			7.8	
Approach LOS		D						B			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.3	68.2		18.5		81.5
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	13.0	48.0		21.0		67.0
Max Q Clear Time (g_c+I1), s	6.9	26.8		11.9		26.5
Green Ext Time (p_c), s	0.4	9.0		0.7		31.8

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	247	158	563	0	0	656	47
Future Volume (vph)	0	0	0	0	0	247	158	563	0	0	656	47
Satd. Flow (prot)	0	0	0	0	1611	0	1736	1863	0	0	1863	1583
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	1611	0	1736	1863	0	0	1863	1583
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	0	274	176	626	0	0	729	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	274	0	176	626	0	0	729	52
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 114.1%		ICU Level of Service H	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	247	158	563	0	0	656	47
Future Vol, veh/h	0	0	0	0	0	247	158	563	0	0	656	47
Conflicting Peds, #/hr	0	0	0	0	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	-	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	4	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	274	176	626	0	0	729	52

Major/Minor	Minor1		Major1		Major2				
Conflicting Flow All	1733	1759	626	781	0	-	-	-	0
Stage 1	978	978	-	-	-	-	-	-	-
Stage 2	755	781	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	97	85	484	828	-	0	0	-	-
Stage 1	364	329	-	-	-	0	0	-	-
Stage 2	464	405	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	76	0	484	828	-	-	-	-	-
Mov Cap-2 Maneuver	76	0	-	-	-	-	-	-	-
Stage 1	286	0	-	-	-	-	-	-	-
Stage 2	464	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.7	2.3	0
HCM LOS	C		

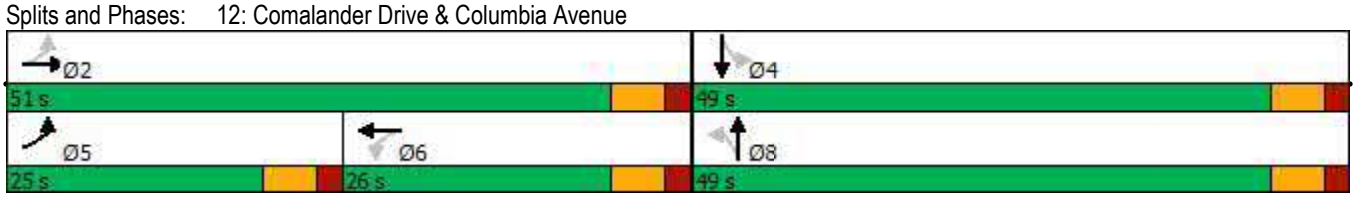
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	828	-	484	-	-
HCM Lane V/C Ratio	0.212	-	0.567	-	-
HCM Control Delay (s)	10.5	-	21.7	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.8	-	3.5	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	316	195	299	0	165	5	254	0	0	1	0	284
Future Volume (vph)	316	195	299	0	165	5	254	0	0	1	0	284
Satd. Flow (prot)	1770	1687	0	0	1855	0	0	1770	0	0	1522	0
Flt Permitted	0.399							0.495			0.999	
Satd. Flow (perm)	743	1687	0	0	1855	0	0	922	0	0	1521	0
Satd. Flow (RTOR)		100			1						316	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	8%
Adj. Flow (vph)	351	217	332	0	183	6	282	0	0	1	0	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	351	549	0	0	189	0	0	282	0	0	317	0
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	25.0	51.0		26.0	26.0		49.0	49.0		49.0	49.0	
Total Lost Time (s)	6.0	6.0			6.0			6.0			6.0	
Act Effct Green (s)	36.8	36.8			13.4			27.9			27.9	
Actuated g/C Ratio	0.48	0.48			0.17			0.36			0.36	
v/c Ratio	0.61	0.64			0.59			0.85			0.42	
Control Delay	20.2	18.1			40.2			47.3			4.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	20.2	18.1			40.2			47.3			4.1	
LOS	C	B			D			D			A	
Approach Delay		18.9			40.2			47.3			4.1	
Approach LOS		B			D			D			A	
Queue Length 50th (ft)	106	156			87			125			0	
Queue Length 95th (ft)	226	344			178			#261			50	
Internal Link Dist (ft)		1379			1070			620			485	
Turn Bay Length (ft)	250											
Base Capacity (vph)	620	1113			507			542			1024	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.57	0.49			0.37			0.52			0.31	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 77.4
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 23.2 — Intersection LOS: C
Intersection Capacity Utilization 89.3% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Comalander Drive & Columbia Avenue



HCM 6th Signalized Intersection Summary
12: Comalander Drive & Columbia Avenue

2024 Build Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	316	195	299	0	165	5	254	0	0	1	0	284
Future Volume (veh/h)	316	195	299	0	165	5	254	0	0	1	0	284
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	351	217	332	0	183	6	282	0	0	1	0	316
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	531	293	449	0	268	9	442	0	0	59	2	571
Arrive On Green	0.20	0.44	0.44	0.00	0.15	0.15	0.36	0.00	0.00	0.36	0.00	0.36
Sat Flow, veh/h	1781	661	1012	0	1801	59	898	0	0	1	4	1582
Grp Volume(v), veh/h	351	0	549	0	0	189	282	0	0	317	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1673	0	0	1860	898	0	0	1587	0	0
Q Serve(g_s), s	9.4	0.0	16.7	0.0	0.0	5.9	9.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.4	0.0	16.7	0.0	0.0	5.9	18.8	0.0	0.0	9.8	0.0	0.0
Prop In Lane	1.00		0.60	0.00		0.03	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	531	0	742	0	0	277	442	0	0	632	0	0
V/C Ratio(X)	0.66	0.00	0.74	0.00	0.00	0.68	0.64	0.00	0.00	0.50	0.00	0.00
Avail Cap(c_a), veh/h	732	0	1228	0	0	606	803	0	0	1171	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.5	0.0	14.1	0.0	0.0	24.7	19.5	0.0	0.0	15.7	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	1.5	0.0	0.0	3.0	1.5	0.0	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	5.5	0.0	0.0	2.6	3.6	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.9	0.0	15.6	0.0	0.0	27.7	21.0	0.0	0.0	16.3	0.0	0.0
LnGrp LOS	B	A	B	A	A	C	C	A	A	B	A	A
Approach Vol, veh/h		900			189			282			317	
Approach Delay, s/veh		16.1			27.7			21.0			16.3	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		33.2		28.1	18.1	15.1		28.1				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		45.0		43.0	19.0	20.0		43.0				
Max Q Clear Time (g_c+I1), s		18.7		11.8	11.4	7.9		20.8				
Green Ext Time (p_c), s		7.1		1.1	0.7	1.2		1.3				

Intersection Summary												
HCM 6th Ctrl Delay			18.3									
HCM 6th LOS			B									

Lane Group	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	0	1177	0	721	656	0
Future Volume (vph)	0	1177	0	721	656	0
Satd. Flow (prot)	0	1611	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1308	0	801	729	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1308	0	801	729	0
Sign Control	Free			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBT	WBR	NBL2	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	37	5	152	1	10	0	30	1	691	1135	153	1580
Future Volume (vph)	37	5	152	1	10	0	30	1	691	1135	153	1580
Satd. Flow (prot)	0	1561	0	0	0	1619	0	0	1675	0	0	1806
Flt Permitted		0.991				0.988						0.996
Satd. Flow (perm)	0	1561	0	0	0	1619	0	0	1675	0	0	1806
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	25%	5%	2%	2%	2%	5%	2%	7%	2%	2%	5%
Adj. Flow (vph)	41	6	169	1	11	0	33	1	768	1261	170	1756
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	217	0	0	0	44	0	0	2030	0	0	1932
Sign Control		Stop				Stop			Free			Free

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 229.1%		ICU Level of Service H	
Analysis Period (min) 15			

Lane Group	SBR	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	5	1	3	1
Future Volume (vph)	5	1	3	1
Satd. Flow (prot)	0	1043	0	0
Flt Permitted		0.990		
Satd. Flow (perm)	0	1043	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	25%	2%	100%	2%
Adj. Flow (vph)	6	1	3	1
Shared Lane Traffic (%)				
Lane Group Flow (vph)	0	5	0	0
Sign Control		Stop		

Intersection Summary

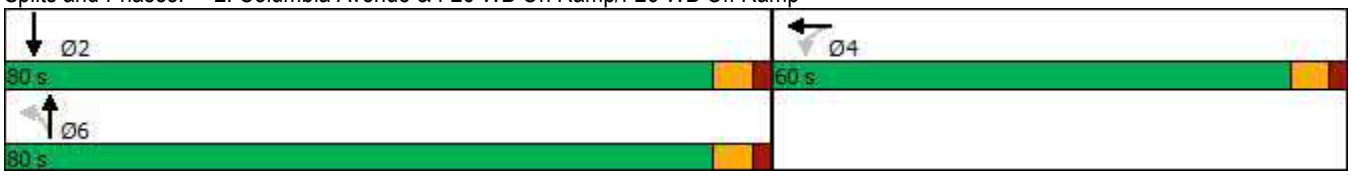
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1019	1	167	153	606	0	0	719	110
Future Volume (vph)	0	0	0	1019	1	167	153	606	0	0	719	110
Satd. Flow (prot)	0	0	0	0	1681	0	0	1758	0	0	1746	0
Flt Permitted					0.959			0.096				
Satd. Flow (perm)	0	0	0	0	1681	0	0	170	0	0	1746	0
Satd. Flow (RTOR)					7						8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	5%	100%	14%	3%	8%	2%	2%	7%	6%
Adj. Flow (vph)	0	0	0	1132	1	186	170	673	0	0	799	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1319	0	0	843	0	0	921	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Total Split (s)				60.0	60.0		80.0	80.0			80.0	
Total Lost Time (s)					6.0			6.3			6.3	
Act Effct Green (s)					54.0			73.7			73.7	
Actuated g/C Ratio					0.39			0.53			0.53	
v/c Ratio					2.02			9.47			1.00	
Control Delay					491.1			3840.9			62.3	
Queue Delay					0.0			0.0			0.0	
Total Delay					491.1			3840.9			62.3	
LOS					F			F			E	
Approach Delay					491.1			3840.9			62.3	
Approach LOS					F			F			E	
Queue Length 50th (ft)					~1890			~1447			809	
Queue Length 95th (ft)					#2160			#1704			#1125	
Internal Link Dist (ft)		794			322			516			197	
Turn Bay Length (ft)												
Base Capacity (vph)					652			89			922	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					2.02			9.47			1.00	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 9.47	
Intersection Signal Delay: 1278.9	Intersection LOS: F
Intersection Capacity Utilization 167.1%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1019	1	167	153	606	0	0	719	110
Future Volume (veh/h)	0	0	0	1019	1	167	153	606	0	0	719	110
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	418	1900	1781	1781	0	0	1796	1796
Adj Flow Rate, veh/h				1132	1	186	170	673	0	0	799	122
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	100	0	8	8	0	0	7	7
Cap, veh/h				130	0	21	32	33	0	0	801	122
Arrive On Green				0.39	0.39	0.39	0.53	0.53	0.00	0.00	0.53	0.53
Sat Flow, veh/h				336	0	55	1	64	0	0	1522	232
Grp Volume(v), veh/h				1319	0	0	843	0	0	0	0	921
Grp Sat Flow(s),veh/h/ln				391	0	0	65	0	0	0	0	1754
Q Serve(g_s), s				54.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	73.3
Cycle Q Clear(g_c), s				54.0	0.0	0.0	73.7	0.0	0.0	0.0	0.0	73.3
Prop In Lane				0.86		0.14	0.20		0.00	0.00		0.13
Lane Grp Cap(c), veh/h				151	0	0	65	0	0	0	0	924
V/C Ratio(X)				8.74	0.00	0.00	12.94	0.00	0.00	0.00	0.00	1.00
Avail Cap(c_a), veh/h				151	0	0	65	0	0	0	0	924
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				43.0	0.0	0.0	36.2	0.0	0.0	0.0	0.0	33.0
Incr Delay (d2), s/veh				3496.3	0.0	0.0	5401.5	0.0	0.0	0.0	0.0	29.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				151.6	0.0	0.0	99.0	0.0	0.0	0.0	0.0	37.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				3539.3	0.0	0.0	5437.7	0.0	0.0	0.0	0.0	62.0
LnGrp LOS				F	A	A	F	A	A	A	A	E
Approach Vol, veh/h					1319			843			921	
Approach Delay, s/veh					3539.3			5437.7			62.0	
Approach LOS					F			F			E	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	80.0	60.0	80.0
Change Period (Y+Rc), s	6.3	6.0	6.3
Max Green Setting (Gmax), s	73.7	54.0	73.7
Max Q Clear Time (g_c+I1), s	75.3	56.0	75.7
Green Ext Time (p_c), s	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	3019.6
HCM 6th LOS	F

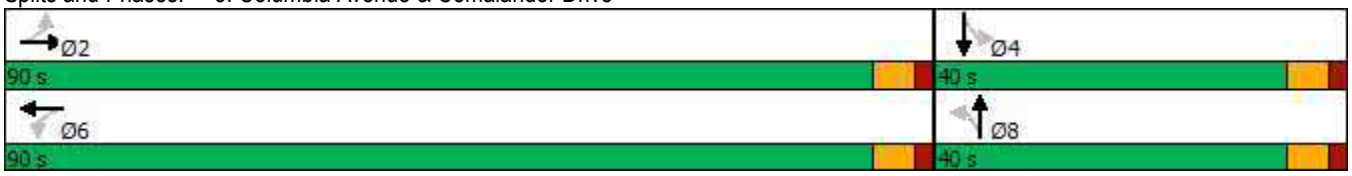
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	355	190	0	469	4	163	0	0	3	0	197
Future Volume (vph)	228	355	190	0	469	4	163	0	0	3	0	197
Satd. Flow (prot)	0	1692	0	0	1758	0	0	1770	0	0	1548	0
Flt Permitted		0.622						0.440			0.996	
Satd. Flow (perm)	0	1069	0	0	1758	0	0	820	0	0	1544	0
Satd. Flow (RTOR)		26			1						219	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	11%	7%	2%	2%	8%	2%	2%	2%	2%	100%	2%	5%
Adj. Flow (vph)	253	394	211	0	521	4	181	0	0	3	0	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	858	0	0	525	0	0	181	0	0	222	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	90.0	90.0		90.0	90.0		40.0	40.0		40.0	40.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effct Green (s)		84.2			84.2			29.0			29.0	
Actuated g/C Ratio		0.67			0.67			0.23			0.23	
v/c Ratio		1.18			0.44			0.95			0.42	
Control Delay		117.6			11.8			102.1			7.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		117.6			11.8			102.1			7.7	
LOS		F			B			F			A	
Approach Delay		117.6			11.8			102.1			7.7	
Approach LOS		F			B			F			A	
Queue Length 50th (ft)		~875			203			145			2	
Queue Length 95th (ft)		#1140			287			#280			65	
Internal Link Dist (ft)		174			688			381			356	
Turn Bay Length (ft)												
Base Capacity (vph)		727			1182			223			579	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.18			0.44			0.81			0.38	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 125.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 71.3	Intersection LOS: E
Intersection Capacity Utilization 109.2%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Columbia Avenue & Comalander Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	228	355	190	0	469	4	163	0	0	3	0	197
Future Volume (veh/h)	228	355	190	0	469	4	163	0	0	3	0	197
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1781	1781	1781	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	253	394	211	0	521	4	181	0	0	3	0	219
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	7	7	7	8	8	8	2	2	2	2	2	2
Cap, veh/h	235	317	168	0	1165	9	254	0	0	30	4	398
Arrive On Green	0.66	0.66	0.66	0.00	0.66	0.66	0.25	0.00	0.00	0.25	0.00	0.25
Sat Flow, veh/h	301	481	255	0	1765	14	803	0	0	6	16	1617
Grp Volume(v), veh/h	858	0	0	0	0	525	181	0	0	222	0	0
Grp Sat Flow(s),veh/h/ln	1038	0	0	0	0	1779	803	0	0	1640	0	0
Q Serve(g_s), s	65.9	0.0	0.0	0.0	0.0	18.1	13.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	84.0	0.0	0.0	0.0	0.0	18.1	29.2	0.0	0.0	15.6	0.0	0.0
Prop In Lane	0.29		0.25	0.00		0.01	1.00		0.00	0.01		0.99
Lane Grp Cap(c), veh/h	721	0	0	0	0	1174	254	0	0	432	0	0
V/C Ratio(X)	1.19	0.00	0.00	0.00	0.00	0.45	0.71	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	721	0	0	0	0	1174	279	0	0	465	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	31.7	0.0	0.0	0.0	0.0	10.5	50.5	0.0	0.0	42.1	0.0	0.0
Incr Delay (d2), s/veh	98.9	0.0	0.0	0.0	0.0	0.3	7.5	0.0	0.0	0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	41.9	0.0	0.0	0.0	0.0	6.7	6.2	0.0	0.0	6.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	130.6	0.0	0.0	0.0	0.0	10.7	57.9	0.0	0.0	43.0	0.0	0.0
LnGrp LOS	F	A	A	A	A	B	E	A	A	D	A	A
Approach Vol, veh/h		858			525			181			222	
Approach Delay, s/veh		130.6			10.7			57.9			43.0	
Approach LOS		F			B			E			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		90.0		37.3		90.0		37.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		84.0		34.0		84.0		34.0				
Max Q Clear Time (g_c+I1), s		86.0		17.6		20.1		31.2				
Green Ext Time (p_c), s		0.0		0.6		7.7		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		77.1
HCM 6th LOS		E

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1274	22	0	0	39	105
Future Volume (vph)	1274	22	0	0	39	105
Satd. Flow (prot)	1859	0	0	0	1657	0
Flt Permitted					0.987	
Satd. Flow (perm)	1859	0	0	0	1657	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1416	24	0	0	43	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1440	0	0	0	160	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	12.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1274	22	0	0	39	105
Future Vol, veh/h	1274	22	0	0	39	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1416	24	0	0	43	117

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		1428	1428
Stage 1	-	-		1428	-
Stage 2	-	-		0	-
Critical Hdwy	-	-		6.42	6.22
Critical Hdwy Stg 1	-	-		5.42	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		3.518	3.318
Pot Cap-1 Maneuver	-	-		149	165
Stage 1	-	-		221	-
Stage 2	-	-		-	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		149	165
Mov Cap-2 Maneuver	-	-		149	-
Stage 1	-	-		221	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	128.1
HCM LOS		F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	160	-	-
HCM Lane V/C Ratio	1	-	-
HCM Control Delay (s)	128.1	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	7.7	-	-

Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	7	159	8	0	8	3	726	1191	248	1850	16
Future Volume (vph)	60	7	159	8	0	8	3	726	1191	248	1850	16
Satd. Flow (prot)	0	1622	0	0	1611	0	0	1696	0	0	1843	0
Flt Permitted		0.987									0.994	
Satd. Flow (perm)	0	1622	0	0	1611	0	0	1696	0	0	1843	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
Heavy Vehicles (%)	5%	20%	3%	17%	2%	2%	2%	2%	3%	2%	2%	50%
Adj. Flow (vph)	65	8	173	9	0	9	3	789	1295	270	2011	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	255	0	0	9	0	0	2087	0	0	2298	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 260.8%		ICU Level of Service H	
Analysis Period (min) 15			

Lane Group	NEL	NER	NER2
Lane Configurations			
Traffic Volume (vph)	5	11	7
Future Volume (vph)	5	11	7
Satd. Flow (prot)	1645	0	0
Flt Permitted	0.990		
Satd. Flow (perm)	1645	0	0
Peak Hour Factor	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%
Adj. Flow (vph)	5	12	8
Shared Lane Traffic (%)			
Lane Group Flow (vph)	25	0	0
Sign Control	Stop		

Intersection Summary

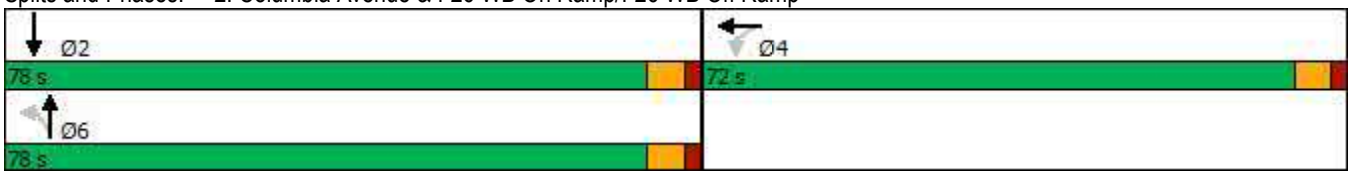
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1409	0	251	180	619	0	0	705	53
Future Volume (vph)	0	0	0	1409	0	251	180	619	0	0	705	53
Satd. Flow (prot)	0	0	0	0	1751	0	0	1834	0	0	1846	0
Flt Permitted					0.959			0.138				
Satd. Flow (perm)	0	0	0	0	1751	0	0	256	0	0	1846	0
Satd. Flow (RTOR)					24						3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	1499	0	267	191	659	0	0	750	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1766	0	0	850	0	0	806	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					4			6			2	
Permitted Phases				4			6					
Total Split (s)				72.0	72.0		78.0	78.0			78.0	
Total Lost Time (s)					6.0			6.3			6.3	
Act Effct Green (s)					66.0			71.7			71.7	
Actuated g/C Ratio					0.44			0.48			0.48	
v/c Ratio					2.26			6.97			0.91	
Control Delay					591.8			2710.5			52.0	
Queue Delay					0.0			0.0			0.0	
Total Delay					591.8			2710.5			52.0	
LOS					F			F			D	
Approach Delay					591.8			2710.5			52.0	
Approach LOS					F			F			D	
Queue Length 50th (ft)					~2800			~1500			716	
Queue Length 95th (ft)					#3065			#1761			#994	
Internal Link Dist (ft)		794			322			516			197	
Turn Bay Length (ft)												
Base Capacity (vph)					783			122			883	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					2.26			6.97			0.91	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 6.97	
Intersection Signal Delay: 991.0	Intersection LOS: F
Intersection Capacity Utilization 191.7%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp



HCM 6th Signalized Intersection Summary
2: Columbia Avenue & I-26 WB On Ramp/I-26 WB Off Ramp

2044 No Build
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1409	0	251	180	619	0	0	705	53
Future Volume (veh/h)	0	0	0	1409	0	251	180	619	0	0	705	53
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1870	1900	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				1499	0	267	191	659	0	0	750	56
Peak Hour Factor				0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %				0	2	0	2	2	0	0	2	2
Cap, veh/h				653	0	116	52	89	0	0	822	61
Arrive On Green				0.44	0.00	0.44	0.48	0.48	0.00	0.00	0.48	0.48
Sat Flow, veh/h				1484	0	264	47	187	0	0	1719	128
Grp Volume(v), veh/h				1766	0	0	850	0	0	0	0	806
Grp Sat Flow(s),veh/h/ln				1749	0	0	233	0	0	0	0	1847
Q Serve(g_s), s				66.0	0.0	0.0	11.1	0.0	0.0	0.0	0.0	60.6
Cycle Q Clear(g_c), s				66.0	0.0	0.0	71.7	0.0	0.0	0.0	0.0	60.6
Prop In Lane				0.85		0.15	0.22		0.00	0.00		0.07
Lane Grp Cap(c), veh/h				769	0	0	141	0	0	0	0	883
V/C Ratio(X)				2.30	0.00	0.00	6.03	0.00	0.00	0.00	0.00	0.91
Avail Cap(c_a), veh/h				769	0	0	141	0	0	0	0	883
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				42.0	0.0	0.0	64.7	0.0	0.0	0.0	0.0	36.3
Incr Delay (d2), s/veh				587.0	0.0	0.0	2278.4	0.0	0.0	0.0	0.0	15.3
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				152.6	0.0	0.0	94.7	0.0	0.0	0.0	0.0	30.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				629.0	0.0	0.0	2343.2	0.0	0.0	0.0	0.0	51.6
LnGrp LOS				F	A	A	F	A	A	A	A	D
Approach Vol, veh/h					1766			850			806	
Approach Delay, s/veh					629.0			2343.2			51.6	
Approach LOS					F			F			D	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	78.0	72.0	78.0
Change Period (Y+Rc), s	6.3	6.0	6.3
Max Green Setting (Gmax), s	71.7	66.0	71.7
Max Q Clear Time (g_c+I1), s	62.6	68.0	73.7
Green Ext Time (p_c), s	5.5	0.0	0.0

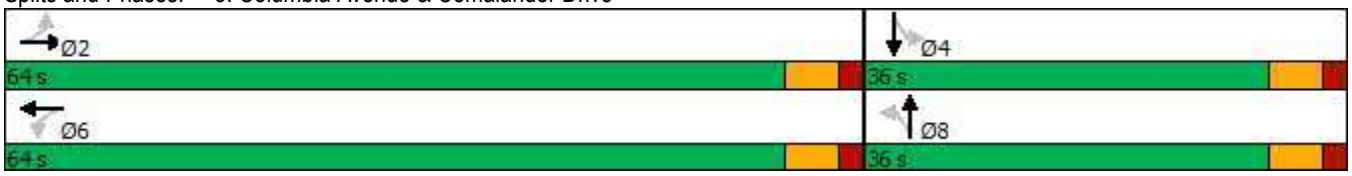
Intersection Summary	
HCM 6th Ctrl Delay	918.8
HCM 6th LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	250	299	0	212	7	254	0	0	1	0	292
Future Volume (vph)	321	250	299	0	212	7	254	0	0	1	0	292
Satd. Flow (prot)	0	1740	0	0	1855	0	0	1770	0	0	1522	0
Flt Permitted		0.769						0.404			0.999	
Satd. Flow (perm)	0	1363	0	0	1855	0	0	753	0	0	1520	0
Satd. Flow (RTOR)		45			3						324	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	8%
Adj. Flow (vph)	357	278	332	0	236	8	282	0	0	1	0	324
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	967	0	0	244	0	0	282	0	0	325	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	64.0	64.0		64.0	64.0		36.0	36.0		36.0	36.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Act Effct Green (s)		58.0			58.0			30.0			30.0	
Actuated g/C Ratio		0.58			0.58			0.30			0.30	
v/c Ratio		1.20			0.23			1.25			0.48	
Control Delay		122.2			10.7			177.7			5.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		122.2			10.7			177.7			5.7	
LOS		F			B			F			A	
Approach Delay		122.2			10.7			177.7			5.7	
Approach LOS		F			B			F			A	
Queue Length 50th (ft)		~741			69			~226			0	
Queue Length 95th (ft)		#986			110			#387			63	
Internal Link Dist (ft)		174			688			417			356	
Turn Bay Length (ft)												
Base Capacity (vph)		809			1077			225			682	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.20			0.23			1.25			0.48	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.25
Intersection Signal Delay: 95.0 Intersection LOS: F
Intersection Capacity Utilization 113.0% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Columbia Avenue & Comalander Drive



HCM 6th Signalized Intersection Summary
3: Columbia Avenue & Comalander Drive

2044 No Build
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	250	299	0	212	7	254	0	0	1	0	292
Future Volume (veh/h)	321	250	299	0	212	7	254	0	0	1	0	292
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	357	278	332	0	236	8	282	0	0	1	0	324
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	212	253	0	1043	35	266	0	0	36	1	487
Arrive On Green	0.58	0.58	0.58	0.00	0.58	0.58	0.30	0.00	0.00	0.30	0.00	0.30
Sat Flow, veh/h	469	365	436	0	1798	61	647	0	0	1	4	1624
Grp Volume(v), veh/h	967	0	0	0	0	244	282	0	0	325	0	0
Grp Sat Flow(s),veh/h/ln	1271	0	0	0	0	1859	647	0	0	1629	0	0
Q Serve(g_s), s	51.7	0.0	0.0	0.0	0.0	6.3	12.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	58.0	0.0	0.0	0.0	0.0	6.3	30.0	0.0	0.0	18.0	0.0	0.0
Prop In Lane	0.37		0.34	0.00		0.03	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	786	0	0	0	0	1078	266	0	0	525	0	0
V/C Ratio(X)	1.23	0.00	0.00	0.00	0.00	0.23	1.06	0.00	0.00	0.62	0.00	0.00
Avail Cap(c_a), veh/h	786	0	0	0	0	1078	266	0	0	525	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.8	0.0	0.0	0.0	0.0	10.2	41.8	0.0	0.0	30.8	0.0	0.0
Incr Delay (d2), s/veh	114.5	0.0	0.0	0.0	0.0	0.1	72.0	0.0	0.0	2.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	43.1	0.0	0.0	0.0	0.0	2.4	11.9	0.0	0.0	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	140.3	0.0	0.0	0.0	0.0	10.3	113.8	0.0	0.0	33.0	0.0	0.0
LnGrp LOS	F	A	A	A	A	B	F	A	A	C	A	A
Approach Vol, veh/h		967			244			282			325	
Approach Delay, s/veh		140.3			10.3			113.8			33.0	
Approach LOS		F			B			F			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	64.0	36.0	64.0	36.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	58.0	30.0	58.0	30.0
Max Q Clear Time (g_c+I1), s	60.0	20.0	8.3	32.0
Green Ext Time (p_c), s	0.0	0.8	2.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	99.5
HCM 6th LOS	F

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1409	48	0	0	8	16
Future Volume (vph)	1409	48	0	0	8	16
Satd. Flow (prot)	1855	0	0	0	1637	0
Flt Permitted					0.983	
Satd. Flow (perm)	1855	0	0	0	1637	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	3%	2%	2%	8%	2%
Adj. Flow (vph)	1515	52	0	0	9	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1567	0	0	0	26	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 87.1%		ICU Level of Service E	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1409	48	0	0	8	16
Future Vol, veh/h	1409	48	0	0	8	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	3	2	2	8	2
Mvmt Flow	1515	52	0	0	9	17

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		1541	1541
Stage 1	-	-		1541	-
Stage 2	-	-		0	-
Critical Hdwy	-	-		6.48	6.22
Critical Hdwy Stg 1	-	-		5.48	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		3.572	3.318
Pot Cap-1 Maneuver	-	-		123	142
Stage 1	-	-		188	-
Stage 2	-	-		-	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		123	142
Mov Cap-2 Maneuver	-	-		123	-
Stage 1	-	-		188	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	37.9
HCM LOS		E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	135	-	-
HCM Lane V/C Ratio	0.191	-	-
HCM Control Delay (s)	37.9	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	0.7	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	25	121	0	313	126	1525	173	157	1345	181
Future Volume (vph)	40	0	25	121	0	313	126	1525	173	157	1345	181
Satd. Flow (prot)	1770	1583	0	0	1770	1583	1770	3339	0	1719	3539	1583
Flt Permitted	0.629				0.739		0.104			0.067		
Satd. Flow (perm)	1172	1583	0	0	1377	1583	194	3339	0	121	3539	1583
Satd. Flow (RTOR)		179				33		19				143
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	7%	2%	5%	2%	2%
Adj. Flow (vph)	44	0	28	134	0	348	140	1694	192	174	1494	201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	28	0	0	134	348	140	1886	0	174	1494	201
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Total Split (s)	24.0	24.0		24.0	24.0	16.0	15.0	60.0		16.0	61.0	61.0
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	14.3	14.3			14.3	30.0	65.9	58.0		69.6	59.8	59.8
Actuated g/C Ratio	0.14	0.14			0.14	0.30	0.66	0.58		0.70	0.60	0.60
v/c Ratio	0.27	0.07			0.68	0.70	0.55	0.97		0.72	0.71	0.20
Control Delay	40.8	0.4			57.9	35.4	18.0	36.5		43.8	12.7	1.4
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	40.8	0.4			57.9	35.4	18.0	36.5		43.8	12.7	1.4
LOS	D	A			E	D	B	D		D	B	A
Approach Delay		25.0			41.6			35.2			14.3	
Approach LOS		C			D			D			B	
Queue Length 50th (ft)	25	0			82	171	22	~620		50	344	11
Queue Length 95th (ft)	56	0			141	264	73	#827		m#155	464	9
Internal Link Dist (ft)		199			1080			1870			829	
Turn Bay Length (ft)	220					250	150			300		150
Base Capacity (vph)	210	431			247	508	273	1943		251	2115	1004
Starvation Cap Reductn	0	0			0	0	0	0		0	0	0
Spillback Cap Reductn	0	0			0	0	0	0		0	0	0
Storage Cap Reductn	0	0			0	0	0	0		0	0	0
Reduced v/c Ratio	0.21	0.06			0.54	0.69	0.51	0.97		0.69	0.71	0.20

Intersection Summary

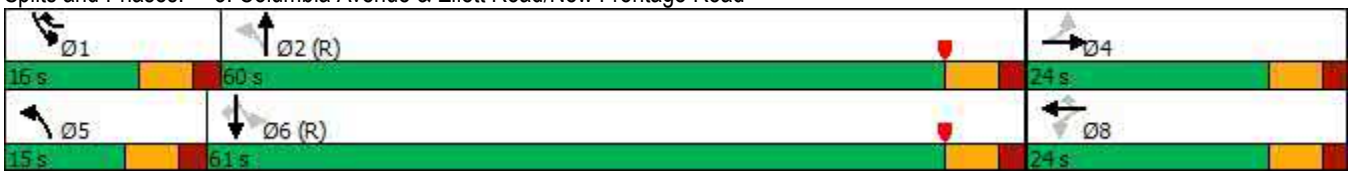
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 10 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 27.0 — Intersection LOS: C
Intersection Capacity Utilization 86.2% — ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 3: Columbia Avenue & Ellett Road/New Frontage Road



HCM 6th Signalized Intersection Summary
3: Columbia Avenue & Ellett Road/New Frontage Road

2044 Build Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	0	25	121	0	313	126	1525	173	157	1345	181
Future Volume (veh/h)	40	0	25	121	0	313	126	1525	173	157	1345	181
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1796	1796	1826	1870	1870
Adj Flow Rate, veh/h	44	0	28	134	0	0	140	1694	192	174	1494	201
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	7	5	2	2
Cap, veh/h	302	0	212	236	0		268	1949	217	209	2264	1010
Arrive On Green	0.13	0.00	0.13	0.13	0.00	0.00	0.05	0.63	0.63	0.06	0.64	0.64
Sat Flow, veh/h	1418	0	1585	1221	0	1585	1781	3096	345	1739	3554	1585
Grp Volume(v), veh/h	44	0	28	134	0	0	140	921	965	174	1494	201
Grp Sat Flow(s),veh/h/ln	1418	0	1585	1221	0	1585	1781	1706	1734	1739	1777	1585
Q Serve(g_s), s	0.0	0.0	1.6	9.5	0.0	0.0	2.7	43.4	46.5	3.5	26.3	5.3
Cycle Q Clear(g_c), s	2.2	0.0	1.6	11.0	0.0	0.0	2.7	43.4	46.5	3.5	26.3	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	302	0	212	236	0		268	1075	1092	209	2264	1010
V/C Ratio(X)	0.15	0.00	0.13	0.57	0.00		0.52	0.86	0.88	0.83	0.66	0.20
Avail Cap(c_a), veh/h	367	0	285	299	0		341	1075	1092	285	2264	1010
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.73	0.73	0.73
Uniform Delay (d), s/veh	38.5	0.0	38.2	43.0	0.0	0.0	11.9	14.9	15.5	23.5	11.4	7.5
Incr Delay (d2), s/veh	0.2	0.0	0.3	2.2	0.0	0.0	1.6	8.8	10.5	10.8	1.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.6	3.3	0.0	0.0	1.2	17.0	18.8	3.1	9.3	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	0.0	38.5	45.2	0.0	0.0	13.5	23.7	25.9	34.2	12.5	7.9
LnGrp LOS	D	A	D	D	A		B	C	C	C	B	A
Approach Vol, veh/h		72			134	A		2026			1869	
Approach Delay, s/veh		38.6			45.2			24.1			14.0	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	69.0		19.4	10.9	69.7		19.4				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	10.0	54.0		18.0	9.0	55.0		18.0				
Max Q Clear Time (g_c+I1), s	5.5	48.5		4.2	4.7	28.3		13.0				
Green Ext Time (p_c), s	0.2	5.3		0.2	0.1	20.3		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		20.4	
HCM 6th LOS		C	

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

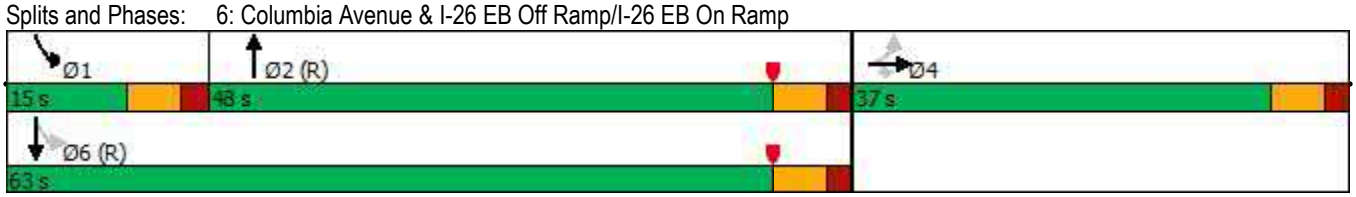
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	5	146	0	0	0	0	715	1164	152	1537	0
Future Volume (vph)	37	5	146	0	0	0	0	715	1164	152	1537	0
Satd. Flow (prot)	0	1785	1583	0	0	0	0	1776	1583	1770	3438	0
Flt Permitted		0.958								0.200		
Satd. Flow (perm)	0	1785	1583	0	0	0	0	1776	1583	373	3438	0
Satd. Flow (RTOR)			98						645			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	5%	2%
Adj. Flow (vph)	41	6	162	0	0	0	0	794	1293	169	1708	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	162	0	0	0	0	794	1293	169	1708	0
Turn Type	Perm	NA	Perm					NA	Free	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						Free	6		
Total Split (s)	37.0	37.0	37.0					48.0		15.0	63.0	
Total Lost Time (s)		6.0	6.0					6.0		6.0	6.0	
Act Effct Green (s)		10.2	10.2					61.4	100.0	77.8	77.8	
Actuated g/C Ratio		0.10	0.10					0.61	1.00	0.78	0.78	
v/c Ratio		0.26	0.65					0.73	0.82	0.39	0.64	
Control Delay		43.0	30.3					19.6	9.2	5.9	6.8	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		43.0	30.3					19.6	9.2	5.9	6.8	
LOS		D	C					B	A	A	A	
Approach Delay		33.2						13.1			6.8	
Approach LOS		C						B			A	
Queue Length 50th (ft)		28	39					317	456	20	195	
Queue Length 95th (ft)		60	99					m354	m583	47	349	
Internal Link Dist (ft)		846			705			829			562	
Turn Bay Length (ft)										225		
Base Capacity (vph)		553	558					1089	1583	445	2675	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.08	0.29					0.73	0.82	0.38	0.64	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow, Master Intersection
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 11.3 — Intersection LOS: B
Intersection Capacity Utilization 65.2% — ICU Level of Service C
Analysis Period (min) 15

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

Splits and Phases: 6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp



HCM 6th Signalized Intersection Summary
6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp

2044 Build Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	5	146	0	0	0	0	715	1164	152	1537	0
Future Volume (veh/h)	37	5	146	0	0	0	0	715	1164	152	1537	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1796	1870	1870	1826	0
Adj Flow Rate, veh/h	41	6	162				0	794	0	169	1708	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2				0	7	2	2	5	0
Cap, veh/h	199	29	202				0	1152		408	2612	0
Arrive On Green	0.13	0.13	0.13				0.00	0.64	0.00	0.05	0.75	0.00
Sat Flow, veh/h	1563	229	1585				0	1796	1585	1781	3561	0
Grp Volume(v), veh/h	47	0	162				0	794	0	169	1708	0
Grp Sat Flow(s),veh/h/ln	1792	0	1585				0	1796	1585	1781	1735	0
Q Serve(g_s), s	2.4	0.0	9.9				0.0	28.4	0.0	3.0	24.0	0.0
Cycle Q Clear(g_c), s	2.4	0.0	9.9				0.0	28.4	0.0	3.0	24.0	0.0
Prop In Lane	0.87		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	228	0	202				0	1152		408	2612	0
V/C Ratio(X)	0.21	0.00	0.80				0.00	0.69		0.41	0.65	0.00
Avail Cap(c_a), veh/h	556	0	491				0	1152		477	2612	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.28	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.1	0.0	42.4				0.0	11.5	0.0	10.7	6.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	7.3				0.0	1.0	0.0	0.7	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	4.1				0.0	10.1	0.0	1.3	6.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	0.0	49.7				0.0	12.5	0.0	11.4	7.3	0.0
LnGrp LOS	D	A	D				A	B		B	A	A
Approach Vol, veh/h		209						794	A		1877	
Approach Delay, s/veh		47.4						12.5			7.7	
Approach LOS		D						B			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	11.1	70.2		18.7		81.3
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	9.0	42.0		31.0		57.0
Max Q Clear Time (g_c+I1), s	5.0	30.4		11.9		26.0
Green Ext Time (p_c), s	0.2	6.6		0.8		24.8

Intersection Summary		
HCM 6th Ctrl Delay		11.9
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1	167	146	606	0	0	719	110
Future Volume (vph)	0	0	0	0	1	167	146	606	0	0	719	110
Satd. Flow (prot)	0	0	0	0	1444	0	1770	1863	0	0	1776	1524
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	1444	0	1770	1863	0	0	1776	1524
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	14%	2%	2%	2%	2%	7%	6%
Adj. Flow (vph)	0	0	0	0	1	186	162	673	0	0	799	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	187	0	162	673	0	0	799	122
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 104.6%		ICU Level of Service G	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	1	167	146	606	0	0	719	110
Future Vol, veh/h	0	0	0	0	1	167	146	606	0	0	719	110
Conflicting Peds, #/hr	0	0	0	0	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	-	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	14	2	2	2	2	7	6
Mvmt Flow	0	0	0	0	1	186	162	673	0	0	799	122

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	1857	1918	673	921	0	-	-	-	0
Stage 1	997	997	-	-	-	-	-	-	-
Stage 2	860	921	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.34	4.12	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.426	2.218	-	-	-	-	-
Pot Cap-1 Maneuver	81	67	435	741	-	0	0	-	-
Stage 1	357	322	-	-	-	0	0	-	-
Stage 2	414	349	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	63	0	435	741	-	-	-	-	-
Mov Cap-2 Maneuver	63	0	-	-	-	-	-	-	-
Stage 1	279	0	-	-	-	-	-	-	-
Stage 2	414	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.4	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	741	-	435	-	-
HCM Lane V/C Ratio	0.219	-	0.429	-	-
HCM Control Delay (s)	11.2	-	19.4	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.8	-	2.1	-	-

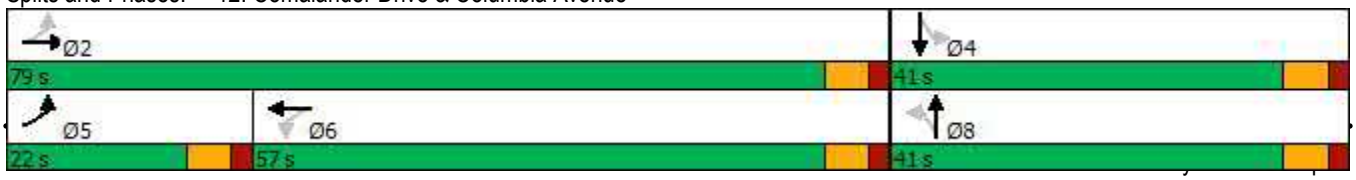
Lanes, Volumes, Timings
12: Comalander Drive & Columbia Avenue

2044 Build Conditions
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	355	190	0	469	4	163	0	0	3	0	197
Future Volume (vph)	228	355	190	0	469	4	163	0	0	3	0	197
Satd. Flow (prot)	1626	1711	0	0	1758	0	0	1770	0	0	1548	0
Flt Permitted	0.200							0.508			0.996	
Satd. Flow (perm)	342	1711	0	0	1758	0	0	946	0	0	1544	0
Satd. Flow (RTOR)		41									219	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	11%	7%	2%	2%	8%	2%	2%	2%	2%	100%	2%	5%
Adj. Flow (vph)	253	394	211	0	521	4	181	0	0	3	0	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	605	0	0	525	0	0	181	0	0	222	0
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	22.0	79.0		57.0	57.0		41.0	41.0		41.0	41.0	
Total Lost Time (s)	6.0	6.0			6.0			6.0			6.0	
Act Effct Green (s)	54.7	54.7			33.3			22.4			22.4	
Actuated g/C Ratio	0.61	0.61			0.37			0.25			0.25	
v/c Ratio	0.60	0.57			0.81			0.77			0.41	
Control Delay	16.2	13.1			36.7			56.0			7.0	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	16.2	13.1			36.7			56.0			7.0	
LOS	B	B			D			E			A	
Approach Delay		14.0			36.7			56.0			7.0	
Approach LOS		B			D			E			A	
Queue Length 50th (ft)	60	171			264			95			1	
Queue Length 95th (ft)	137	351			460			210			59	
Internal Link Dist (ft)		1379			1069			620			485	
Turn Bay Length (ft)	250											
Base Capacity (vph)	452	1402			1067			393			770	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.56	0.43			0.49			0.46			0.29	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 89.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 24.1		Intersection LOS: C	
Intersection Capacity Utilization 96.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 12: Comalander Drive & Columbia Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	228	355	190	0	469	4	163	0	0	3	0	197
Future Volume (veh/h)	228	355	190	0	469	4	163	0	0	3	0	197
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1796	1796	1781	1781	1781	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	253	394	211	0	521	4	181	0	0	3	0	219
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	11	7	7	8	8	8	2	2	2	2	2	2
Cap, veh/h	410	655	351	0	683	5	326	0	0	55	4	362
Arrive On Green	0.12	0.60	0.60	0.00	0.39	0.39	0.23	0.00	0.00	0.23	0.00	0.23
Sat Flow, veh/h	1654	1101	589	0	1765	14	962	0	0	6	16	1591
Grp Volume(v), veh/h	253	0	605	0	0	525	181	0	0	222	0	0
Grp Sat Flow(s),veh/h/ln	1654	0	1690	0	0	1779	962	0	0	1613	0	0
Q Serve(g_s), s	5.7	0.0	15.3	0.0	0.0	17.4	4.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.7	0.0	15.3	0.0	0.0	17.4	12.8	0.0	0.0	8.5	0.0	0.0
Prop In Lane	1.00		0.35	0.00		0.01	1.00		0.00	0.01		0.99
Lane Grp Cap(c), veh/h	410	0	1006	0	0	688	326	0	0	421	0	0
V/C Ratio(X)	0.62	0.00	0.60	0.00	0.00	0.76	0.56	0.00	0.00	0.53	0.00	0.00
Avail Cap(c_a), veh/h	603	0	1821	0	0	1339	661	0	0	878	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.6	0.0	8.7	0.0	0.0	18.1	25.7	0.0	0.0	23.5	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.6	0.0	0.0	1.8	1.5	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	4.4	0.0	0.0	6.6	2.8	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	0.0	9.2	0.0	0.0	19.9	27.2	0.0	0.0	24.5	0.0	0.0
LnGrp LOS	B	A	A	A	A	B	C	A	A	C	A	A
Approach Vol, veh/h		858			525			181			222	
Approach Delay, s/veh		10.7			19.9			27.2			24.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		46.3		21.4	14.1	32.2		21.4				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		73.0		35.0	16.0	51.0		35.0				
Max Q Clear Time (g_c+I1), s		17.3		10.5	7.7	19.4		14.8				
Green Ext Time (p_c), s		9.7		0.7	0.5	6.8		0.7				

Intersection Summary												
HCM 6th Ctrl Delay			16.8									
HCM 6th LOS			B									

Lane Group	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	0	970	0	752	719	0
Future Volume (vph)	0	970	0	752	719	0
Satd. Flow (prot)	0	1565	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1565	0	1863	1863	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%
Adj. Flow (vph)	0	1078	0	836	799	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1078	0	836	799	0
Sign Control	Free			Free	Free	

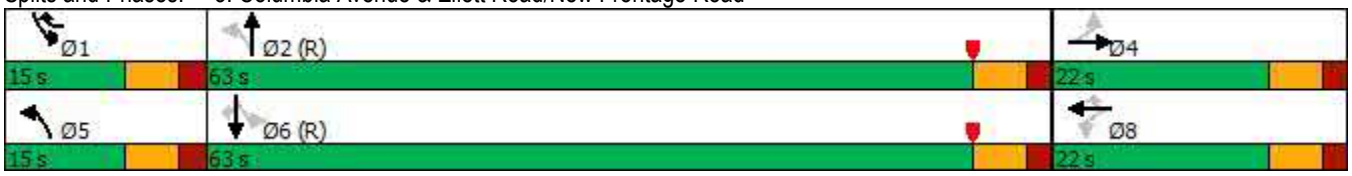
Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 104.6%		ICU Level of Service G	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	0	111	109	0	184	29	1499	157	145	1777	63
Future Volume (vph)	171	0	111	109	0	184	29	1499	157	145	1777	63
Satd. Flow (prot)	1770	1583	0	0	1770	1583	1770	3486	0	1770	3539	1583
Flt Permitted	0.677				0.671		0.069			0.064		
Satd. Flow (perm)	1261	1583	0	0	1250	1583	129	3486	0	119	3539	1583
Satd. Flow (RTOR)		157				33		18				98
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Adj. Flow (vph)	190	0	123	121	0	204	32	1666	174	161	1974	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	123	0	0	121	204	32	1840	0	161	1974	70
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Total Split (s)	22.0	22.0		22.0	22.0	15.0	15.0	63.0		15.0	63.0	63.0
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	16.0	16.0			16.0	30.4	63.6	57.6		70.0	64.6	64.6
Actuated g/C Ratio	0.16	0.16			0.16	0.30	0.64	0.58		0.70	0.65	0.65
v/c Ratio	0.95	0.32			0.60	0.40	0.18	0.91		0.73	0.86	0.07
Control Delay	94.2	5.3			53.1	25.6	6.9	27.6		41.1	14.4	0.7
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	94.2	5.3			53.1	25.6	6.9	27.6		41.1	14.4	0.7
LOS	F	A			D	C	A	C		D	B	A
Approach Delay		59.3			35.8			27.2			15.9	
Approach LOS		E			D			C			B	
Queue Length 50th (ft)	121	0			73	84	5	521		60	569	0
Queue Length 95th (ft)	#256	29			#143	150	13	#727		m105	#777	m1
Internal Link Dist (ft)		199			1080			1865			829	
Turn Bay Length (ft)	220					250	150			300		150
Base Capacity (vph)	201	385			200	513	233	2014		231	2286	1057
Starvation Cap Reductn	0	0			0	0	0	0		0	0	0
Spillback Cap Reductn	0	0			0	0	0	0		0	0	0
Storage Cap Reductn	0	0			0	0	0	0		0	0	0
Reduced v/c Ratio	0.95	0.32			0.60	0.40	0.14	0.91		0.70	0.86	0.07

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 24.7 Intersection LOS: C
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Columbia Avenue & Ellett Road/New Frontage Road



HCM 6th Signalized Intersection Summary
3: Columbia Avenue & Ellett Road/New Frontage Road

2044 Build
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	0	111	109	0	184	29	1499	157	145	1777	63
Future Volume (veh/h)	171	0	111	109	0	184	29	1499	157	145	1777	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	0	123	121	0	0	32	1666	174	161	1974	70
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	357	0	254	185	0		159	1969	203	214	2241	999
Arrive On Green	0.16	0.00	0.16	0.16	0.00	0.00	0.03	0.61	0.61	0.05	0.63	0.63
Sat Flow, veh/h	1418	0	1585	708	0	1585	1781	3252	335	1781	3554	1585
Grp Volume(v), veh/h	190	0	123	121	0	0	32	900	940	161	1974	70
Grp Sat Flow(s),veh/h/ln	1418	0	1585	708	0	1585	1781	1777	1810	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	7.1	8.9	0.0	0.0	0.7	40.5	42.7	3.4	46.2	1.7
Cycle Q Clear(g_c), s	10.0	0.0	7.1	16.0	0.0	0.0	0.7	40.5	42.7	3.4	46.2	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	357	0	254	185	0		159	1076	1096	214	2241	999
V/C Ratio(X)	0.53	0.00	0.49	0.65	0.00		0.20	0.84	0.86	0.75	0.88	0.07
Avail Cap(c_a), veh/h	357	0	254	185	0		267	1076	1096	277	2241	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.59	0.59	0.59
Uniform Delay (d), s/veh	39.5	0.0	38.2	45.8	0.0	0.0	18.1	15.8	16.2	22.2	15.4	7.1
Incr Delay (d2), s/veh	1.5	0.0	1.4	7.9	0.0	0.0	0.6	7.7	8.7	4.9	3.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	2.8	3.4	0.0	0.0	0.4	16.6	18.0	2.5	16.9	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	0.0	39.7	53.8	0.0	0.0	18.7	23.5	24.9	27.1	18.7	7.2
LnGrp LOS	D	A	D	D	A		B	C	C	C	B	A
Approach Vol, veh/h		313			121	A		1872			2205	
Approach Delay, s/veh		40.5			53.8			24.1			18.9	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	66.5		22.0	8.9	69.1		22.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	57.0		16.0	9.0	57.0		16.0				
Max Q Clear Time (g_c+I1), s	5.4	44.7		12.0	2.7	48.2		18.0				
Green Ext Time (p_c), s	0.1	11.4		0.6	0.0	8.4		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		23.5	
HCM 6th LOS		C	

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lanes, Volumes, Timings
6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp

2044 Build
PM Peak Hour

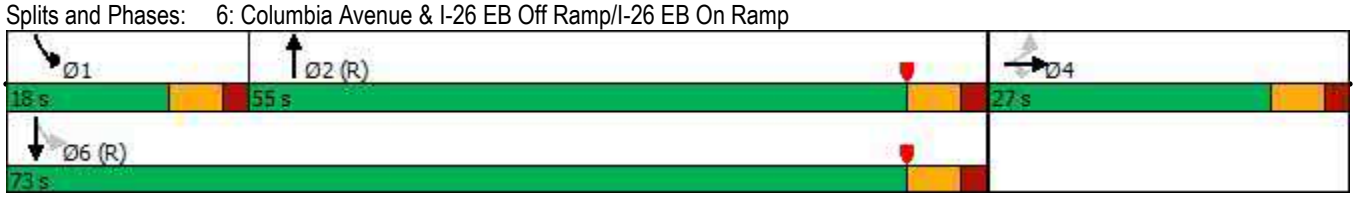
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	7	162	0	0	0	0	731	1123	245	1823	0
Future Volume (vph)	60	7	162	0	0	0	0	731	1123	245	1823	0
Satd. Flow (prot)	0	1706	1553	0	0	0	0	1863	1568	1770	3539	0
Flt Permitted		0.957								0.145		
Satd. Flow (perm)	0	1706	1553	0	0	0	0	1863	1568	270	3539	0
Satd. Flow (RTOR)			98						609			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	20%	4%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Adj. Flow (vph)	67	8	180	0	0	0	0	812	1248	272	2026	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	180	0	0	0	0	812	1248	272	2026	0
Turn Type	Perm	NA	Perm					NA	Free	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						Free	6		
Total Split (s)	27.0	27.0	27.0					55.0		18.0	73.0	
Total Lost Time (s)		6.0	6.0					6.0		6.0	6.0	
Act Effct Green (s)		11.5	11.5					55.4	100.0	76.5	76.5	
Actuated g/C Ratio		0.12	0.12					0.55	1.00	0.76	0.76	
v/c Ratio		0.38	0.68					0.79	0.80	0.63	0.75	
Control Delay		44.7	32.3					19.8	8.6	15.7	9.7	
Queue Delay		0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay		44.7	32.3					19.8	8.6	15.7	9.7	
LOS		D	C					B	A	B	A	
Approach Delay		35.9						13.0			10.4	
Approach LOS		D						B			B	
Queue Length 50th (ft)		45	50					220	306	39	294	
Queue Length 95th (ft)		82	112					m431	m535	146	538	
Internal Link Dist (ft)		846			705			829			562	
Turn Bay Length (ft)										225		
Base Capacity (vph)		358	403					1031	1568	437	2706	
Starvation Cap Reductn		0	0					0	0	0	0	
Spillback Cap Reductn		0	0					0	0	0	0	
Storage Cap Reductn		0	0					0	0	0	0	
Reduced v/c Ratio		0.21	0.45					0.79	0.80	0.62	0.75	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow, Master Intersection
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 13.0 — Intersection LOS: B
Intersection Capacity Utilization 71.2% — ICU Level of Service C
Analysis Period (min) 15

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

Splits and Phases: 6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp



HCM 6th Signalized Intersection Summary
6: Columbia Avenue & I-26 EB Off Ramp/I-26 EB On Ramp

2044 Build
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	7	162	0	0	0	0	731	1123	245	1823	0
Future Volume (veh/h)	60	7	162	0	0	0	0	731	1123	245	1823	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1604	1841				0	1870	1856	1870	1870	0
Adj Flow Rate, veh/h	67	8	180				0	812	0	272	2026	0
Peak Hour Factor	0.90	0.90	0.90				0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	20	4				0	2	3	2	2	0
Cap, veh/h	191	23	217				0	1128		411	2633	0
Arrive On Green	0.14	0.14	0.14				0.00	0.60	0.00	0.08	0.74	0.00
Sat Flow, veh/h	1371	164	1560				0	1870	1572	1781	3647	0
Grp Volume(v), veh/h	75	0	180				0	812	0	272	2026	0
Grp Sat Flow(s),veh/h/ln	1535	0	1560				0	1870	1572	1781	1777	0
Q Serve(g_s), s	4.4	0.0	11.2				0.0	30.4	0.0	5.4	34.4	0.0
Cycle Q Clear(g_c), s	4.4	0.0	11.2				0.0	30.4	0.0	5.4	34.4	0.0
Prop In Lane	0.89		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	214	0	217				0	1128		411	2633	0
V/C Ratio(X)	0.35	0.00	0.83				0.00	0.72		0.66	0.77	0.00
Avail Cap(c_a), veh/h	322	0	328				0	1128		487	2633	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.37	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.0	0.0	41.9				0.0	13.9	0.0	14.1	7.8	0.0
Incr Delay (d2), s/veh	1.0	0.0	10.4				0.0	1.5	0.0	2.6	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	4.8				0.0	11.8	0.0	3.0	10.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.9	0.0	52.3				0.0	15.4	0.0	16.7	10.0	0.0
LnGrp LOS	D	A	D				A	B		B	B	A
Approach Vol, veh/h		255						812	A		2298	
Approach Delay, s/veh		48.7						15.4			10.8	
Approach LOS		D						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.8	66.3		19.9		80.1
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	12.0	49.0		21.0		67.0
Max Q Clear Time (g_c+I1), s	7.4	32.4		13.2		36.4
Green Ext Time (p_c), s	0.4	8.6		0.7		27.4

Intersection Summary		
HCM 6th Ctrl Delay		14.8
HCM 6th LOS		B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	251	172	619	0	0	705	53
Future Volume (vph)	0	0	0	0	0	251	172	619	0	0	705	53
Satd. Flow (prot)	0	0	0	0	1611	0	1736	1863	0	0	1863	1583
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	0	0	1611	0	1736	1863	0	0	1863	1583
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	0	0	0	0	0	279	191	688	0	0	783	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	279	0	191	688	0	0	783	59
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 128.2%		ICU Level of Service H	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	251	172	619	0	0	705	53
Future Vol, veh/h	0	0	0	0	0	251	172	619	0	0	705	53
Conflicting Peds, #/hr	0	0	0	0	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	-	-	-	-	-	-	200	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	4	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	279	191	688	0	0	783	59

Major/Minor	Minor1		Major1		Major2				
Conflicting Flow All	1883	1912	688	842	0	-	-	-	0
Stage 1	1070	1070	-	-	-	-	-	-	-
Stage 2	813	842	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	78	68	446	785	-	0	0	-	-
Stage 1	329	298	-	-	-	0	0	-	-
Stage 2	436	380	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	59	0	446	785	-	-	-	-	-
Mov Cap-2 Maneuver	59	0	-	-	-	-	-	-	-
Stage 1	249	0	-	-	-	-	-	-	-
Stage 2	436	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.6	2.4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	785	-	446	-	-
HCM Lane V/C Ratio	0.243	-	0.625	-	-
HCM Control Delay (s)	11.1	-	25.6	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	1	-	4.2	-	-

Lanes, Volumes, Timings
12: Comalander Drive & Columbia Avenue

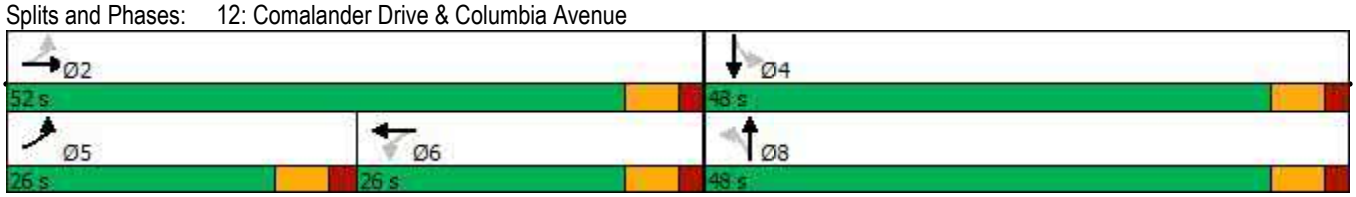
2044 Build
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	250	299	0	212	7	254	0	0	1	0	292
Future Volume (vph)	321	250	299	0	212	7	254	0	0	1	0	292
Satd. Flow (prot)	1770	1702	0	0	1855	0	0	1770	0	0	1522	0
Flt Permitted	0.321							0.483			0.999	
Satd. Flow (perm)	598	1702	0	0	1855	0	0	900	0	0	1520	0
Satd. Flow (RTOR)		80			2						324	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	8%
Adj. Flow (vph)	357	278	332	0	236	8	282	0	0	1	0	324
Shared Lane Traffic (%)												
Lane Group Flow (vph)	357	610	0	0	244	0	0	282	0	0	325	0
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	26.0	52.0		26.0	26.0		48.0	48.0		48.0	48.0	
Total Lost Time (s)	6.0	6.0			6.0			6.0			6.0	
Act Effct Green (s)	39.4	39.4			15.4			29.9			29.9	
Actuated g/C Ratio	0.48	0.48			0.19			0.37			0.37	
v/c Ratio	0.66	0.71			0.70			0.86			0.43	
Control Delay	22.2	21.5			44.7			50.3			4.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	22.2	21.5			44.7			50.3			4.1	
LOS	C	C			D			D			A	
Approach Delay		21.8			44.7			50.3			4.1	
Approach LOS		C			D			D			A	
Queue Length 50th (ft)	118	213			123			138			0	
Queue Length 95th (ft)	225	413			227			#285			51	
Internal Link Dist (ft)		1379			1301			620			485	
Turn Bay Length (ft)	250											
Base Capacity (vph)	589	1041			479			487			971	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.61	0.59			0.51			0.58			0.33	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 81.9
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 26.1 — Intersection LOS: C
Intersection Capacity Utilization 95.3% — ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Comalander Drive & Columbia Avenue



HCM 6th Signalized Intersection Summary
12: Comalander Drive & Columbia Avenue

2044 Build
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	250	299	0	212	7	254	0	0	1	0	292
Future Volume (veh/h)	321	250	299	0	212	7	254	0	0	1	0	292
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1856	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	357	278	332	0	236	8	282	0	0	1	0	324
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	503	350	418	0	315	11	424	0	0	53	2	588
Arrive On Green	0.19	0.45	0.45	0.00	0.17	0.17	0.37	0.00	0.00	0.37	0.00	0.37
Sat Flow, veh/h	1781	770	920	0	1798	61	860	0	0	1	4	1586
Grp Volume(v), veh/h	357	0	610	0	0	244	282	0	0	325	0	0
Grp Sat Flow(s),veh/h/ln	1781	0	1690	0	0	1859	860	0	0	1591	0	0
Q Serve(g_s), s	10.4	0.0	21.1	0.0	0.0	8.5	11.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.4	0.0	21.1	0.0	0.0	8.5	22.1	0.0	0.0	11.1	0.0	0.0
Prop In Lane	1.00		0.54	0.00		0.03	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	503	0	767	0	0	325	424	0	0	642	0	0
V/C Ratio(X)	0.71	0.00	0.79	0.00	0.00	0.75	0.67	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	683	0	1136	0	0	544	681	0	0	1028	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.8	0.0	15.9	0.0	0.0	26.8	21.9	0.0	0.0	17.0	0.0	0.0
Incr Delay (d2), s/veh	2.2	0.0	2.4	0.0	0.0	3.5	1.8	0.0	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	7.4	0.0	0.0	3.8	4.2	0.0	0.0	3.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.9	0.0	18.4	0.0	0.0	30.3	23.7	0.0	0.0	17.7	0.0	0.0
LnGrp LOS	B	A	B	A	A	C	C	A	A	B	A	A
Approach Vol, veh/h		967			244			282			325	
Approach Delay, s/veh		18.6			30.3			23.7			17.7	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		37.1		31.3	19.1	18.0		31.3				
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		46.0		42.0	20.0	20.0		42.0				
Max Q Clear Time (g_c+I1), s		23.1		13.1	12.4	10.5		24.1				
Green Ext Time (p_c), s		7.6		1.2	0.8	1.4		1.2				

Intersection Summary												
HCM 6th Ctrl Delay			20.8									
HCM 6th LOS			C									

Lane Group	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	0	1363	0	791	705	0
Future Volume (vph)	0	1363	0	791	705	0
Satd. Flow (prot)	0	1611	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	1863	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1514	0	879	783	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1514	0	879	783	0
Sign Control	Free			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 128.2%		ICU Level of Service H	
Analysis Period (min) 15			

MOVEMENT SUMMARY

Site: 101 [2024 Build AM Crooked Creek Road & New Frontage Road]

2024 Build AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: New Frontage Road											
3	L2	1	2.0	0.014	2.8	LOS A	0.1	1.5	0.02	0.00	21.3
18	R2	18	2.0	0.014	2.8	LOS A	0.1	1.5	0.02	0.00	33.8
Approach		20	2.0	0.014	2.8	LOS A	0.1	1.5	0.02	0.00	33.1
East: Crooked Creek Road											
1	L2	122	2.0	0.091	3.4	LOS A	0.4	10.4	0.02	0.00	32.8
6	T1	1	2.0	0.091	3.4	LOS A	0.4	10.4	0.02	0.00	31.6
Approach		123	2.0	0.091	3.4	LOS A	0.4	10.4	0.02	0.00	32.8
West: Crooked Creek Road											
2	T1	1	2.0	0.002	3.0	LOS A	0.0	0.2	0.25	0.09	34.5
12	R2	1	2.0	0.002	3.0	LOS A	0.0	0.2	0.25	0.09	29.8
Approach		2	2.0	0.002	3.0	LOS A	0.0	0.2	0.25	0.09	31.9
All Vehicles		145	2.0	0.091	3.3	LOS A	0.4	10.4	0.02	0.00	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2024 Build PM Crooked Creek Road & New Frontage Road]

2024 Build PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: New Frontage Road											
3	L2	1	3.0	0.031	2.9	LOS A	0.1	3.3	0.02	0.00	21.3
18	R2	40	3.0	0.031	2.9	LOS A	0.1	3.3	0.02	0.00	33.7
Approach		41	3.0	0.031	2.9	LOS A	0.1	3.3	0.02	0.00	33.4
East: Crooked Creek Road											
1	L2	21	3.0	0.016	2.8	LOS A	0.1	1.7	0.02	0.00	33.1
6	T1	1	2.0	0.016	2.8	LOS A	0.1	1.7	0.02	0.00	32.1
Approach		22	3.0	0.016	2.8	LOS A	0.1	1.7	0.02	0.00	33.1
West: Crooked Creek Road											
2	T1	1	2.0	0.002	2.7	LOS A	0.0	0.2	0.09	0.02	34.7
12	R2	1	2.0	0.002	2.7	LOS A	0.0	0.2	0.09	0.02	30.0
Approach		2	2.0	0.002	2.7	LOS A	0.0	0.2	0.09	0.02	32.2
All Vehicles		65	3.0	0.031	2.9	LOS A	0.1	3.3	0.02	0.00	33.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2044 Build AM Crooked Creek Road & New Frontage Road]

2044 Build AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: New Frontage Road											
3	L2	1	2.0	0.018	2.8	LOS A	0.1	2.0	0.02	0.00	21.3
18	R2	24	2.0	0.018	2.8	LOS A	0.1	2.0	0.02	0.00	33.8
Approach		25	2.0	0.018	2.8	LOS A	0.1	2.0	0.02	0.00	33.3
East: Crooked Creek Road											
1	L2	157	2.0	0.117	3.6	LOS A	0.5	13.8	0.02	0.00	32.7
6	T1	1	2.0	0.117	3.6	LOS A	0.5	13.8	0.02	0.00	31.5
Approach		158	2.0	0.117	3.6	LOS A	0.5	13.8	0.02	0.00	32.7
West: Crooked Creek Road											
2	T1	1	2.0	0.002	3.1	LOS A	0.0	0.2	0.28	0.11	34.4
12	R2	1	2.0	0.002	3.1	LOS A	0.0	0.2	0.28	0.11	29.7
Approach		2	2.0	0.002	3.1	LOS A	0.0	0.2	0.28	0.11	31.9
All Vehicles		185	2.0	0.117	3.5	LOS A	0.5	13.8	0.02	0.00	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2044 Build PM Crooked Creek Road & New Frontage Road]

2044 Build PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: New Frontage Road											
3	L2	1	3.0	0.040	3.0	LOS A	0.2	4.3	0.02	0.00	21.3
18	R2	52	3.0	0.040	3.0	LOS A	0.2	4.3	0.02	0.00	33.7
Approach		53	3.0	0.040	3.0	LOS A	0.2	4.3	0.02	0.00	33.4
East: Crooked Creek Road											
1	L2	26	3.0	0.020	2.8	LOS A	0.1	2.2	0.02	0.00	33.1
6	T1	1	2.0	0.020	2.8	LOS A	0.1	2.2	0.02	0.00	32.1
Approach		27	3.0	0.020	2.8	LOS A	0.1	2.2	0.02	0.00	33.0
West: Crooked Creek Road											
2	T1	1	2.0	0.002	2.7	LOS A	0.0	0.2	0.10	0.02	34.7
12	R2	1	2.0	0.002	2.7	LOS A	0.0	0.2	0.10	0.02	30.0
Approach		2	2.0	0.002	2.7	LOS A	0.0	0.2	0.10	0.02	32.1
All Vehicles		83	3.0	0.040	2.9	LOS A	0.2	4.3	0.02	0.00	33.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX F

Arterial Analysis Worksheets

Arterial Level of Service: EB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-26 WB Off Ramp	2	20.4	32.5	0.1	13
	5	1.9	7.2	0.1	26
	6	0.8	16.9	0.2	33
Comalander Drive	3	0.8	5.7	0.0	30
Total		23.9	62.3	0.4	21

Arterial Level of Service: WB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	3	0.5	15.4	0.1	35
	6	0.2	5.2	0.0	33
	5	2.2	18.3	0.2	31
I-26 WB On Ramp	2	16.7	22.1	0.1	9
I-26 EB Off Ramp	1	17.6	29.2	0.1	14
Total		37.0	90.2	0.5	21

Arterial Level of Service: EB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-26 WB Off Ramp	2	24.1	36.3	0.1	11
	5	2.0	7.4	0.1	26
	6	0.7	16.8	0.2	33
Comalander Drive	3	0.5	5.4	0.0	32
Total		27.3	65.8	0.4	20

Arterial Level of Service: WB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	3	0.3	15.1	0.1	35
	6	0.1	5.1	0.0	34
	5	0.4	16.6	0.2	34
I-26 WB On Ramp	2	17.2	22.7	0.1	8
I-26 EB Off Ramp	1	9.1	20.3	0.1	20
Total		27.2	79.9	0.5	23

Arterial Level of Service: EB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-26 WB Off Ramp	2	123.8	143.0	0.1	3
	5	69.7	75.0	0.1	3
	20	76.9	82.8	0.1	3
	6	129.8	139.6	0.1	3
	3	83.6	140.4	0.0	2
Total		483.9	580.8	0.4	3

Arterial Level of Service: WB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	3	3518.3	27221.7	0.1	0
	6	1411.1	1411.3	0.0	0
	20	3505.4	3505.8	0.1	0
	5	3263.1	3263.4	0.1	0
I-26 WB On Ramp	2	3359.0	5015.9	0.1	0
I-26 EB Off Ramp	1	1239.5	2410.6	0.1	0
Total		16296.4	42828.7	0.5	0

Arterial Level of Service: EB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-26 WB Off Ramp	2	43.5	55.2	0.1	7
	5	5.6	10.9	0.1	17
	17	8.0	14.1	0.1	15
	6	20.0	29.9	0.1	12
	3	28.3	34.7	0.0	5
Total		105.4	144.9	0.4	9

Arterial Level of Service: WB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	3	1872.2	5144.6	0.1	0
	6	346.1	349.9	0.0	0
	17	940.6	948.0	0.1	0
	5	639.9	644.9	0.1	0
I-26 WB On Ramp	2	549.1	983.3	0.1	0
I-26 EB Off Ramp	1	432.3	599.1	0.1	1
Total		4780.2	8669.8	0.5	0

Arterial Level of Service: NB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
New Frontage Road	3	18.0	55.7	0.4	24
I-26 EB On Ramp	6	9.4	26.4	0.2	23
I-26 WB Off Loop	29	2.0	14.5	0.1	30
I-26 WB Off Ramp	9	0.8	6.8	0.1	33
Comalander Drive	12	11.1	38.6	0.3	26
Total		41.2	141.9	1.0	25

Arterial Level of Service: SB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	12	17.4	39.8	0.2	20
I-26 WB On Ramp	9	4.3	32.4	0.3	31
I-26 WB Off Loop	29	0.6	6.7	0.1	33
I-26 EB Off Ramp	6	3.5	16.0	0.1	27
Ellett Road	3	8.5	25.5	0.2	24
Total		34.3	120.4	0.9	26

Arterial Level of Service: NB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
New Frontage Road	3	17.4	55.0	0.4	24
I-26 EB On Ramp	6	12.6	30.3	0.2	20
I-26 WB Off Loop	29	2.5	15.6	0.1	28
I-26 WB Off Ramp	9	1.1	7.0	0.1	32
Comalander Drive	12	18.2	46.1	0.3	22
Total		51.7	154.0	1.0	23

Arterial Level of Service: SB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	12	26.7	48.6	0.2	16
I-26 WB On Ramp	9	4.1	31.9	0.3	31
I-26 WB Off Loop	29	0.7	7.1	0.1	31
I-26 EB Off Ramp	6	5.1	17.6	0.1	25
Ellett Road	3	7.9	25.4	0.2	24
Total		44.5	130.7	0.8	23

Arterial Level of Service: EB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-26 WB Off Ramp	2	169.3	192.7	0.1	2
	5	7.5	12.8	0.1	15
	20	11.3	17.2	0.1	12
	6	32.5	42.5	0.1	8
	3	35.8	46.2	0.0	4
Total		256.5	311.4	0.4	5

Arterial Level of Service: WB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	3	252.2	1669.1	0.1	2
	6	58.4	63.2	0.0	3
	20	136.2	146.0	0.1	2
	5	78.0	83.8	0.1	2
I-26 WB On Ramp	2	73.2	110.9	0.1	2
I-26 EB Off Ramp	1	46.8	101.4	0.1	7
Total		644.7	2174.5	0.5	3

Arterial Level of Service: EB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
I-26 WB Off Ramp	2	75.1	86.7	0.1	5
	5	24.6	30.0	0.1	6
	17	31.4	37.5	0.1	6
	6	53.0	62.9	0.1	6
	3	38.9	53.0	0.0	4
Total		223.0	270.0	0.4	5

Arterial Level of Service: WB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	3	3576.7	14814.8	0.1	0
	6	1408.6	1408.8	0.0	0
	17	3328.0	3328.8	0.1	0
	5	3031.4	3032.1	0.1	0
I-26 WB On Ramp	2	2984.6	5656.1	0.1	0
I-26 EB Off Ramp	1	474.2	1079.5	0.1	1
Total		14803.4	29320.1	0.5	0

Arterial Level of Service: NB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
New Frontage Road	3	26.7	64.4	0.4	21
I-26 EB On Ramp	6	13.0	30.0	0.2	21
I-26 WB Off Loop	29	2.5	15.1	0.1	29
I-26 WB Off Ramp	9	1.0	6.9	0.1	32
Comalander Drive	12	12.8	40.2	0.3	25
Total		56.0	156.6	1.0	23

Arterial Level of Service: SB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	12	20.6	42.7	0.2	19
I-26 WB On Ramp	9	4.7	32.8	0.3	30
I-26 WB Off Loop	29	0.9	7.0	0.1	32
I-26 EB Off Ramp	6	4.7	17.3	0.1	25
Ellett Road	3	9.8	26.8	0.2	23
Total		40.6	126.7	0.8	24

Arterial Level of Service: NB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
New Frontage Road	3	23.9	61.6	0.4	22
I-26 EB On Ramp	6	13.7	31.3	0.2	20
I-26 WB Off Loop	29	2.5	15.6	0.1	28
I-26 WB Off Ramp	9	1.0	6.9	0.1	32
Comalander Drive	12	16.8	44.5	0.3	22
Total		58.0	160.0	1.0	23

Arterial Level of Service: SB Columbia Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Comalander Drive	12	27.0	53.2	0.3	18
I-26 WB On Ramp	9	4.3	31.9	0.3	31
I-26 WB Off Loop	29	0.9	7.2	0.1	31
I-26 EB Off Ramp	6	6.5	19.0	0.1	23
Ellett Road	3	8.2	25.8	0.2	24
Total		46.9	137.1	0.9	23

APPENDIX G

Crash Analysis Worksheets

Crash Summary

I- 26 (INTERSTATE 26) from MPT 89.750 to MPT 92.000

LEXINGTON COUNTY

01/01/2014 - 09/30/2019 (5.7 years)

Length = 2.250 miles

AADT = 47,777

Functional Class = Rural -- Principal Arterial - Interstate

Crashes by Injury Class

Fatality Crashes	4
Injury Crashes	28
PDO Crashes	140
Total Crashes	**172**

Crashes by Manner Of Collision

Rear End	70
Angle	16
Sideswipe	26
Head On	2
Run Off Road	49
Animal	3
Bicycle	0
Pedestrian	2
Other	4
Total Crashes	**172**

Special Contributing Factors

Night	43
Day	129
Wet	43
Dry	129

I- 26 (INTERSTATE 26) from MPT 89.750 to MPT 92.000

LEXINGTON COUNTY

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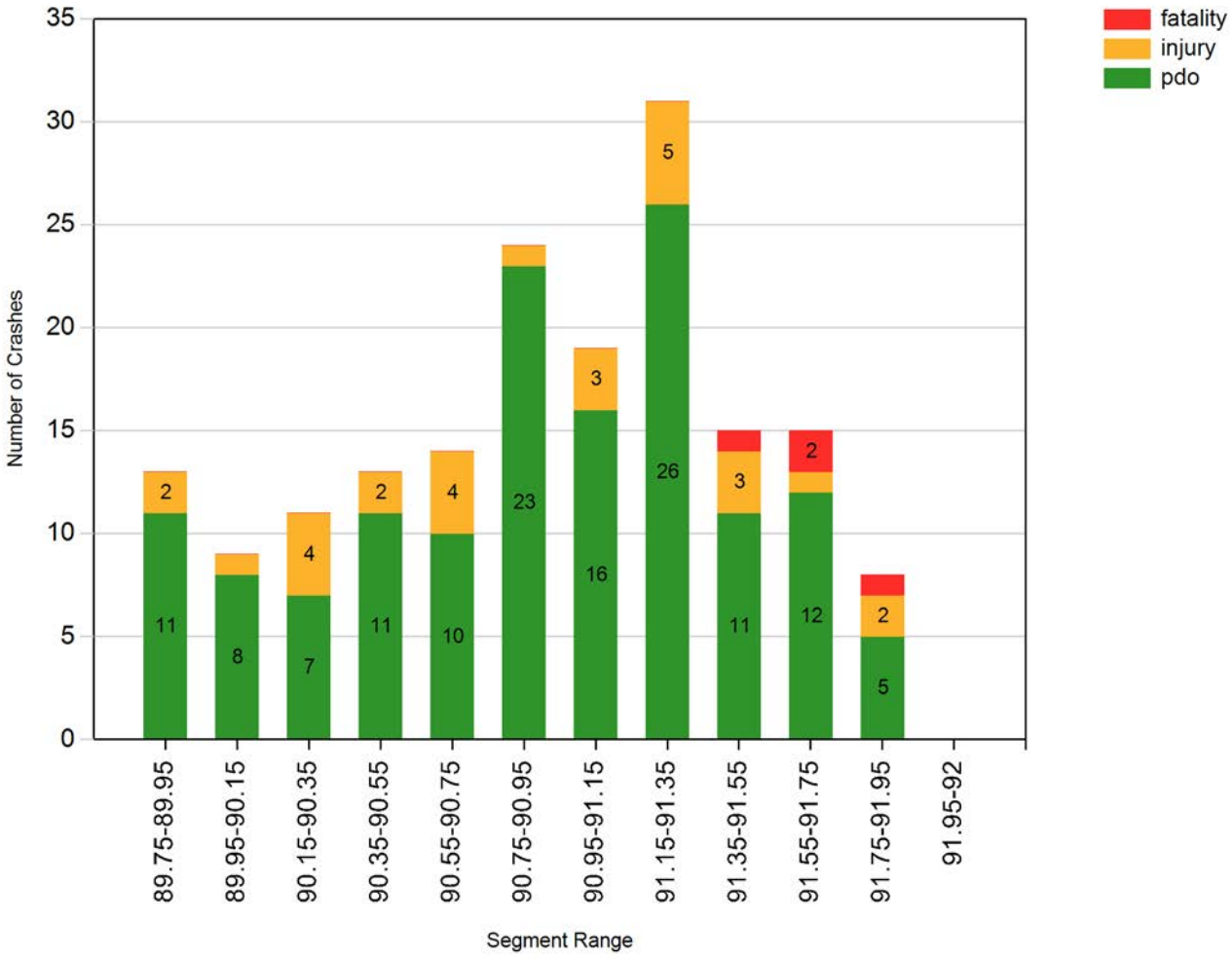


I- 26 (INTERSTATE 26) from MPT 89.750 to MPT 92.000

LEXINGTON COUNTY

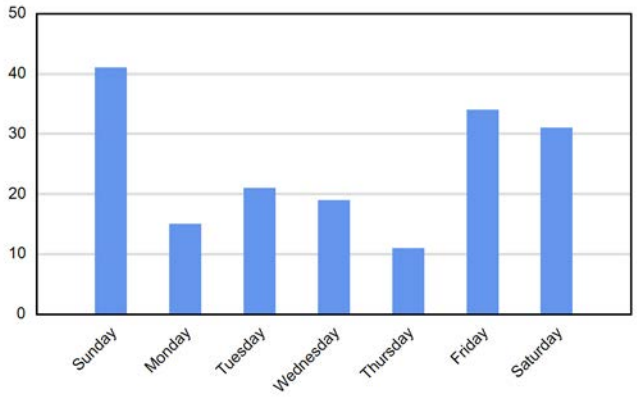
01/01/2014 - 09/30/2019 (5.7 years)

Length = 2.250 miles AADT = 47,777

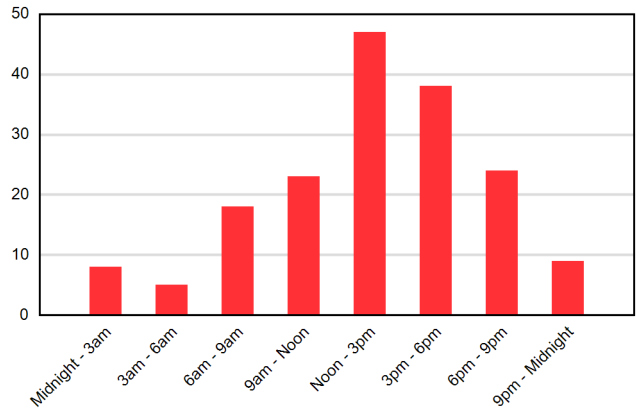
Functional Class = Rural -- Principal Arterial - Interstate

Year	2014	2015	2016	2017	2018	2019	Total
Rear End	6	11	15	13	13	12	70
Angle	2	4	3	2	2	3	16
Sideswipe	2	6	6	1	4	7	26
Head On	0	0	0	2	0	0	2
Run Off Road	10	10	8	11	6	4	49
Animal	2	0	0	1	0	0	3
Bicycle	0	0	0	0	0	0	0
Pedestrian	1	0	1	0	0	0	2
Other	1	1	1	0	0	1	4
	24	32	34	30	25	27	172

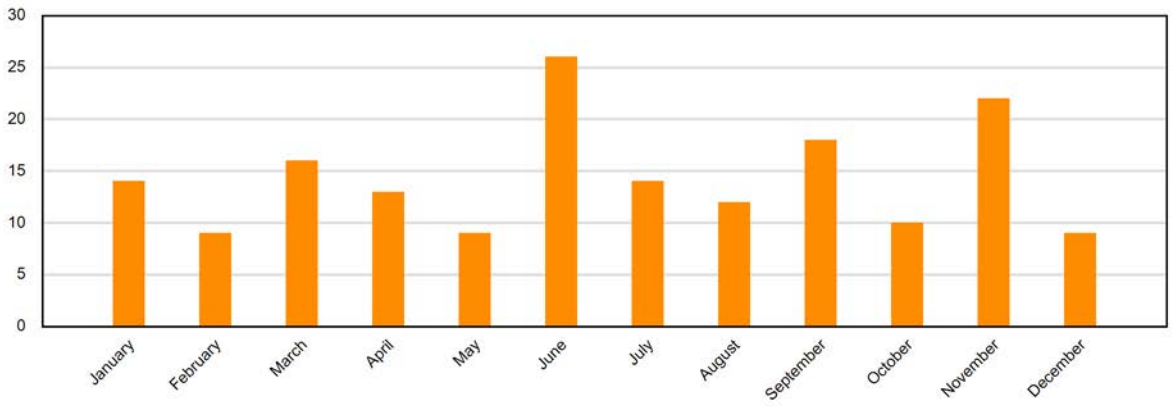
Day of the Week



Time of Day



Month of the Year



Section Crashes

MPT 89.750 to 89.950 (Stack #1)

Total Crashes: 13 Light: 9 Dark: 4 Dry: 9 Wet: 4 Fatalities: 0 Injuries: 2 PDO: 11

1	14615960	89.925	INJ0	DAY	DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV
2	15507071	89.778	INJ0	DARK	WET	MEDIAN BARRIER	NO COLLISION W/MV
3	15573346	89.775	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	15573562	89.937	INJ0	DAY	DRY	OTHER MOVABLE OBJECT	NO COLLISION W/MV
5	16669110	89.825	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
6	17524900	89.860	INJ0	DAY	WET	MEDIAN BARRIER	NO COLLISION W/MV
7	17678431	89.875	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
8	18667426	89.777	INJ1	DUSK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
9	19536179	89.847	INJ1	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
10	19536588	89.849	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
11	19595200	89.874	INJ0	DAY	DRY	OVERTURN/ROLLOVER	NO COLLISION W/MV
12	19610631	89.776	INJ0	DARK	WET	MOTOR VEHICLE (PARKED)	REAR END
13	19610632	89.774	INJ0	DARK	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 89.950 to 90.150 (Stack #2)

Total Crashes: 9 Light: 7 Dark: 2 Dry: 8 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 8

1	14624477	90.046	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
2	14624891	89.956	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
3	15509006	89.955	INJ2	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
4	15535161	89.982	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
5	15573434	90.014	INJ0	DAY	DRY	OVERTURN/ROLLOVER	NO COLLISION W/MV
6	15597957	89.968	INJ0	DUSK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
7	16509459	89.978	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE OPP
8	16511067	90.075	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
9	19610959	90.025	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 90.150 to 90.350 (Stack #3)

Total Crashes: 11 Light: 11 Dark: 0 Dry: 7 Wet: 4 Fatalities: 0 Injuries: 4 PDO: 7

1	14621544	90.171	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
2	14621545	90.169	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
3	15579201	90.220	INJ0	DAY	DRY	MEDIAN BARRIER	ANGLE
4	16569512	90.295	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	BACKED INTO
5	16574636	90.290	INJ2	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	16581333	90.309	INJ1	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
7	16615941	90.256	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END

Section Crashes

8	17545685	90.230	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
9	17549854	90.220	INJ0	DAY	DRY	TREE	NO COLLISION W/MV
10	17569459	90.220	INJ1	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
11	18590377	90.159	INJ1	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV

MPT 90.350 to 90.550 (Stack #4)

Total Crashes: 13 Light: 7 Dark: 6 Dry: 10 Wet: 3 Fatalities: 0 Injuries: 2 PDO: 11

1	14546548	90.437	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
2	15505312	90.440	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
3	15522158	90.474	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
4	15524478	90.547	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
5	15595169	90.412	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	15612496	90.419	INJ3	DAY	DRY	TREE	NO COLLISION W/MV
7	15615929	90.543	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
8	15615930	90.545	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
9	15639762	90.538	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
10	18589994	90.371	INJ2	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
11	18614502	90.539	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
12	18626845	90.374	INJ0	DARK	WET	EMBANKMENT	NO COLLISION W/MV
13	19563723	90.508	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME

MPT 90.550 to 90.750 (Stack #5)

Total Crashes: 14 Light: 11 Dark: 3 Dry: 10 Wet: 4 Fatalities: 0 Injuries: 4 PDO: 10

1	14563965	90.556	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	14606230	90.726	INJ0	DARK	DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV
3	14623574	90.712	INJ0	DAY	WET	MEDIAN BARRIER	NO COLLISION W/MV
4	15621075	90.566	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
5	16567706	90.615	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	16616007	90.674	INJ1	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
7	16619568	90.632	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
8	16648024	90.643	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
9	16677834	90.651	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
10	18592947	90.676	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
11	19510221	90.729	INJ1	DARK	WET	MEDIAN BARRIER	NO COLLISION W/MV
12	19624398	90.630	INJ1	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
13	19624399	90.636	INJ2	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
14	19626830	90.655	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

Section Crashes

MPT 90.750 to 90.950 (Stack #6)

Total Crashes: 24 Light: 21 Dark: 3 Dry: 17 Wet: 7 Fatalities: 0 Injuries: 1 PDO: 23

1	14505005	90.923	INJ0	DAY	DRY	OTHER MOVABLE OBJECT	NO COLLISION W/MV
2	14506828	90.876	INJ0	DARK	SNOW	TREE	NO COLLISION W/MV
3	14508930	90.773	INJ0	DARK	WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
4	14592689	90.917	INJ0	DAY	DRY	EMBANKMENT	NO COLLISION W/MV
5	14592718	90.877	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
6	15573433	90.884	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
7	16518141	90.783	INJ1	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
8	16551088	90.852	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
9	16577998	90.894	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
10	16596303	90.815	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
11	16596305	90.815	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
12	17621643	90.820	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
13	18543814	90.832	INJ0	DARK	DRY	MOTOR VEHICLE (PARKED)	ANGLE
14	18550204	90.872	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
15	18554197	90.924	INJ0	DAY	WET	HIGHWAY TRAFFIC SIGN POST	NO COLLISION W/MV
16	18670085	90.911	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
17	19530138	90.897	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
18	19545040	90.843	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
19	19577098	90.910	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
20	19590159	90.835	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
21	19590169	90.795	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
22	19593578	90.835	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
23	19596618	90.753	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
24	19610662	90.800	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME

MPT 90.950 to 91.150 (Stack #7)

Total Crashes: 19 Light: 16 Dark: 3 Dry: 15 Wet: 4 Fatalities: 0 Injuries: 3 PDO: 16

1	14560207	91.134	INJ1	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
2	14580416	91.107	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
3	14620354	91.126	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	15527428	90.994	INJ0	DAY	WET	TREE	NO COLLISION W/MV
5	15545968	91.138	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	15589851	91.081	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
7	15651710	90.950	INJ2	DAY	DRY	HIGHWAY TRAFFIC SIGN POST	NO COLLISION W/MV
8	16506265	90.972	INJ0	DAY	WET	MEDIAN BARRIER	NO COLLISION W/MV

Section Crashes

9	16539798	90.958	INJ0	DAY	DRY	TREE	NO COLLISION W/MV
10	16569396	90.974	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
11	16581308	91.083	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
12	16623501	90.956	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
13	17562611	90.970	INJ0	DARK	DRY	DITCH	NO COLLISION W/MV
14	17569402	90.970	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
15	17617762	91.120	INJ1	DARK	DRY	MEDIAN BARRIER	NO COLLISION W/MV
16	17665999	91.130	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
17	18642384	91.042	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
18	18662388	91.134	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
19	19534560	91.070	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE

MPT 91.150 to 91.350 (Stack #8)

Total Crashes: 31 Light: 23 Dark: 8 Dry: 24 Wet: 7 Fatalities: 0 Injuries: 5 PDO: 26

1	14004663	91.220	INJ0	DARK	SNOW	MEDIAN BARRIER	NO COLLISION W/MV
2	14512428	91.169	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
3	14576684	91.196	INJ0	DAY	WET	OVERHEAD SIGN SUPPORT	NO COLLISION W/MV
4	15560792	91.320	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
5	15573343	91.327	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
6	15635045	91.320	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
7	15653088	91.169	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
8	16578002	91.311	INJ0	DAY	DRY	SPILL (TWO-WHEELED VEH)	NO COLLISION W/MV
9	16607105	91.246	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
10	16610946	91.272	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
11	16635161	91.300	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
12	17502738	91.310	INJ0	DAY	WET	GUARDRAIL FACE	NO COLLISION W/MV
13	17503248	91.220	INJ2	DARK	DRY	EQUIPMENT FAILURE	NO COLLISION W/MV
14	17544920	91.290	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
15	17548573	91.220	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
16	17548907	91.220	INJ0	DAY	DRY	MEDIAN BARRIER	NO COLLISION W/MV
17	17581832	91.220	INJ2	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
18	17586584	91.220	INJ1	DAY	DRY	TREE	NO COLLISION W/MV
19	17590349	91.220	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
20	17590363	91.220	INJ1	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
21	17613692	91.220	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
22	17613694	91.220	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
23	17617770	91.220	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	HEAD ON
24	17651029	91.220	INJ0	DARK	DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV

Section Crashes

25	17662263	91.150	INJ0	DARK	DRY	MEDIAN BARRIER	NO COLLISION W/MV
26	17676095	91.220	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
27	18537318	91.199	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
28	18591995	91.158	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
29	18641336	91.192	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
30	18683970	91.302	INJ0	DARK	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
31	19621375	91.345	INJ1	DAY	DRY	TREE	NO COLLISION W/MV

MPT 91.350 to 91.550 (Stack #9)

Total Crashes: 15 Light: 10 Dark: 5 Dry: 12 Wet: 3 Fatalities: 1 Injuries: 3 PDO: 11

1	14519195	91.380	INJ1	DAWN	DRY	OVERTURN/ROLLOVER	NO COLLISION W/MV
2	15628035	91.471	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
3	15628037	91.471	INJ0	DAY	WET	MEDIAN BARRIER	NO COLLISION W/MV
4	16630847	91.360	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
5	16649470	91.513	INJ4	DARK	DRY	PEDESTRIAN	NO COLLISION W/MV
6	16653217	91.443	INJ0	DAY	WET	EMBANKMENT	NO COLLISION W/MV
7	16674408	91.532	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
8	16674567	91.443	INJ0	DARK	DRY	TREE	NO COLLISION W/MV
9	16680037	91.450	INJ2	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
10	18536691	91.425	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
11	18591725	91.515	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
12	19507259	91.483	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
13	19548722	91.393	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
14	19592958	91.503	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
15	19609498	91.403	INJ1	DAY	DRY	TREE	ANGLE

MPT 91.550 to 91.750 (Stack #10)

Total Crashes: 15 Light: 9 Dark: 6 Dry: 11 Wet: 4 Fatalities: 2 Injuries: 1 PDO: 12

1	14541624	91.642	INJ0	DAY	DRY	EMBANKMENT	NO COLLISION W/MV
2	14605635	91.574	INJ4	DARK	DRY	PEDESTRIAN	NO COLLISION W/MV
3	15534530	91.694	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
4	15536314	91.704	INJ0	DAY	WET	HIGHWAY TRAFFIC SIGN POST	NO COLLISION W/MV
5	15536619	91.575	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
6	17569529	91.720	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
7	17615899	91.720	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
8	17630721	91.720	INJ1	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
9	17647817	91.720	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	HEAD ON
10	17678432	91.570	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

Section Crashes

11	18514001	91.624	INJ0	DARK	DRY	MOTOR VEHICLE (STOPPED)	REAR END
12	18545699	91.692	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
13	18553209	91.671	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
14	18557792	91.603	INJ4	DARK	DRY	OVERTURN/ROLLOVER	NO COLLISION W/MV
15	18688378	91.735	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END

MPT 91.750 to 91.950 (Stack #11)

Total Crashes: 8 Light: 5 Dark: 3 Dry: 6 Wet: 2 Fatalities: 1 Injuries: 2 PDO: 5

1	14565957	91.902	INJ1	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
2	15521378	91.798	INJ4	DARK	DRY	GUARDRAIL FACE	NO COLLISION W/MV
3	16566822	91.795	INJ0	DAWN	DRY	TREE	NO COLLISION W/MV
4	16654551	91.805	INJ0	DARK	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
5	18520229	91.769	INJ1	DAY	DRY	GUARDRAIL END	NO COLLISION W/MV
6	18623879	91.925	INJ0	DAY	DRY	GUARDRAIL END	NO COLLISION W/MV
7	19552385	91.803	INJ0	DAY	OTHER	GUARDRAIL END	NO COLLISION W/MV
8	19614835	91.884	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME

Crash Summary

S- 48 (COLUMBIA AVE) from MPT 1.835 (EAGLE CHASE CT) to MPT 2.858 (DAN COMALANDER DR)

LEXINGTON COUNTY

01/01/2014 - 09/30/2019 (5.7 years)

Length = 1.023 miles

AADT = 11,686

Functional Class = Rural -- Minor Arterial

Crashes by Injury Class

Fatality Crashes	0
Injury Crashes	14
PDO Crashes	53
Total Crashes	**67**

Crashes by Manner Of Collision

Rear End	51
Angle	9
Sideswipe	2
Head On	0
Run Off Road	4
Animal	1
Bicycle	0
Pedestrian	0
Other	0
Total Crashes	**67**

Special Contributing Factors

Night	8
Day	59
Wet	16
Dry	51

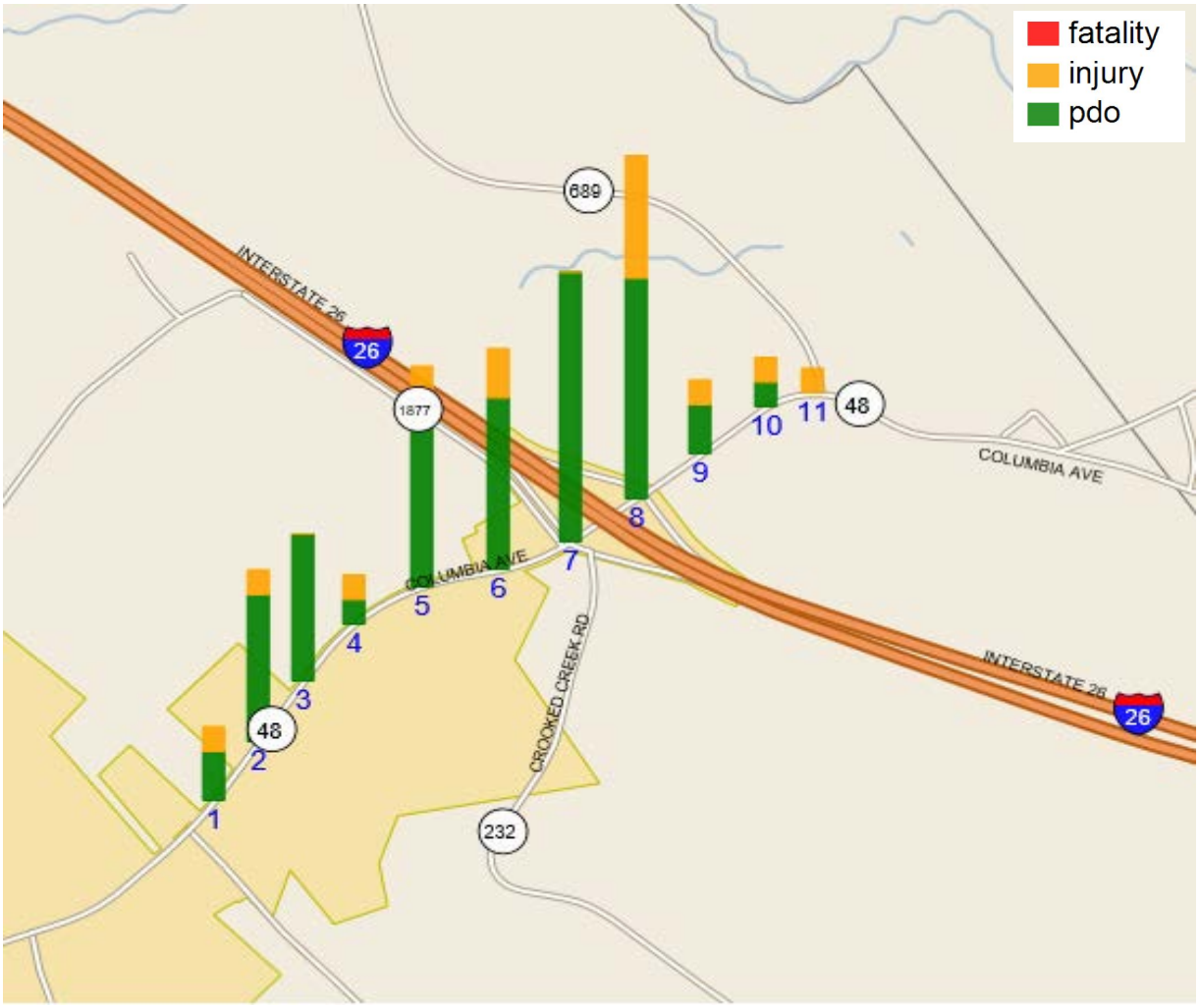
S- 48 (COLUMBIA AVE) from MPT 1.835 (EAGLE CHASE CT) to MPT 2.858 (DAN COMALANDER DR)

LEXINGTON COUNTY

01/01/2014 - 09/30/2019 (5.7 years)

Length = 1.023 miles AADT = 11,686

Functional Class = Rural -- Minor Arterial



S- 48 (COLUMBIA AVE) from MPT 1.835 (EAGLE CHASE CT) to MPT 2.858 (DAN COMALANDER DR)

LEXINGTON COUNTY

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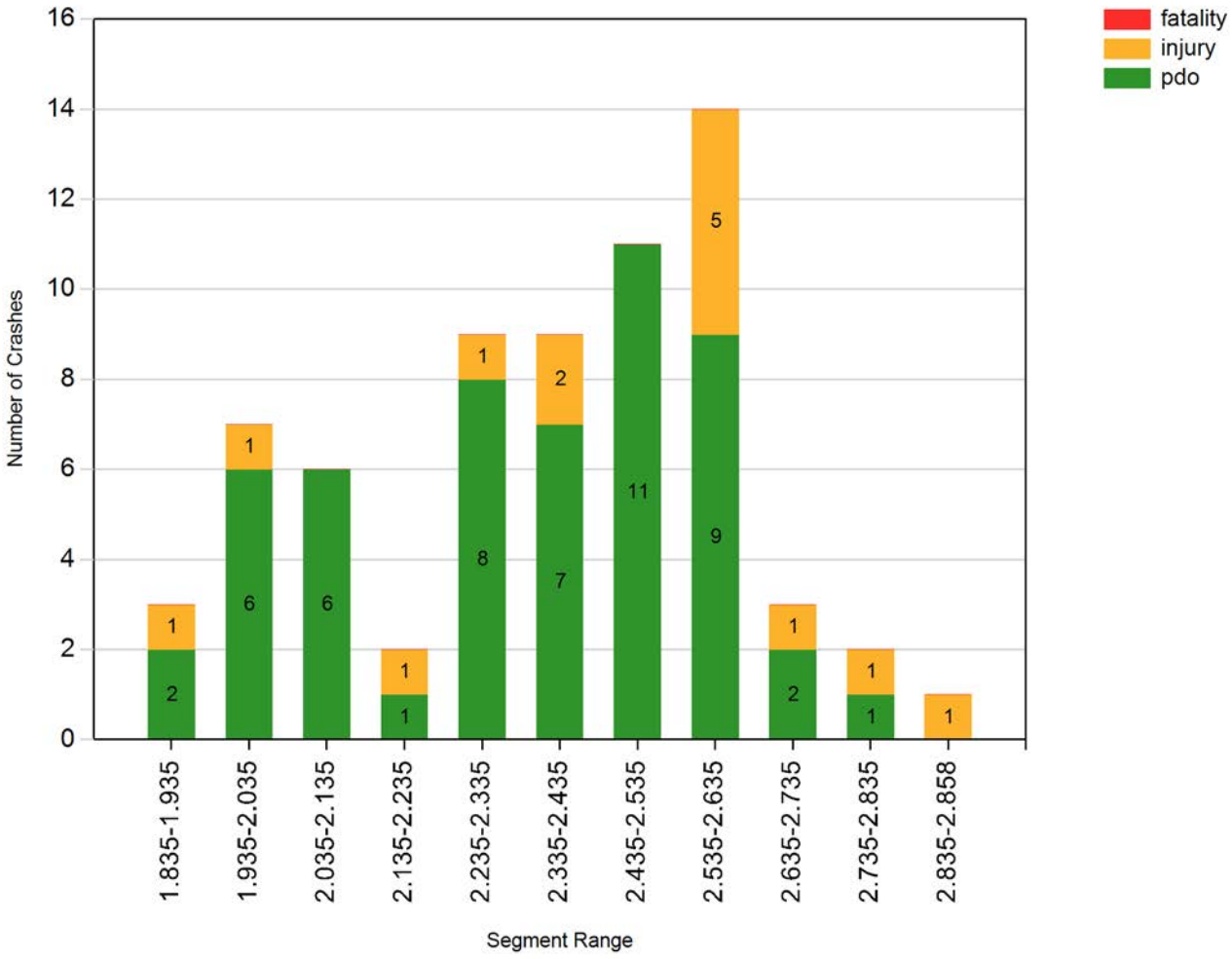


S- 48 (COLUMBIA AVE) from MPT 1.835 (EAGLE CHASE CT) to MPT 2.858 (DAN COMALANDER DR)

LEXINGTON COUNTY

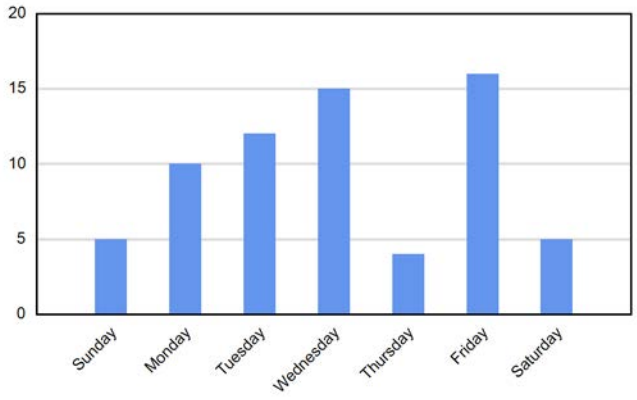
01/01/2014 - 09/30/2019 (5.7 years)

Length = 1.023 miles AADT = 11,686

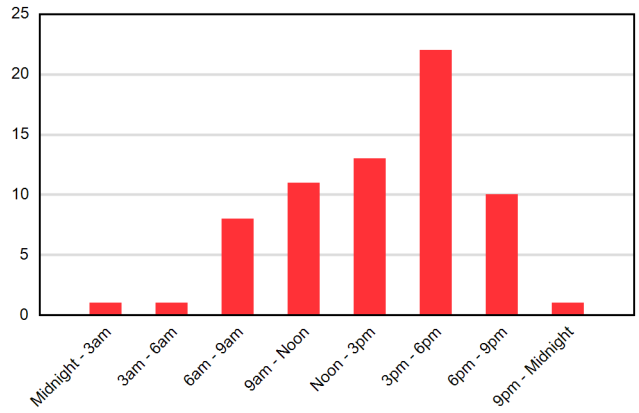
Functional Class = Rural -- Minor Arterial

Year	2014	2015	2016	2017	2018	2019	Total
Rear End	10	5	13	10	7	6	51
Angle	1	2	1	3	1	1	9
Sideswipe	0	0	1	1	0	0	2
Head On	0	0	0	0	0	0	0
Run Off Road	0	1	0	1	2	0	4
Animal	1	0	0	0	0	0	1
Bicycle	0	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
	12	8	15	15	10	7	67

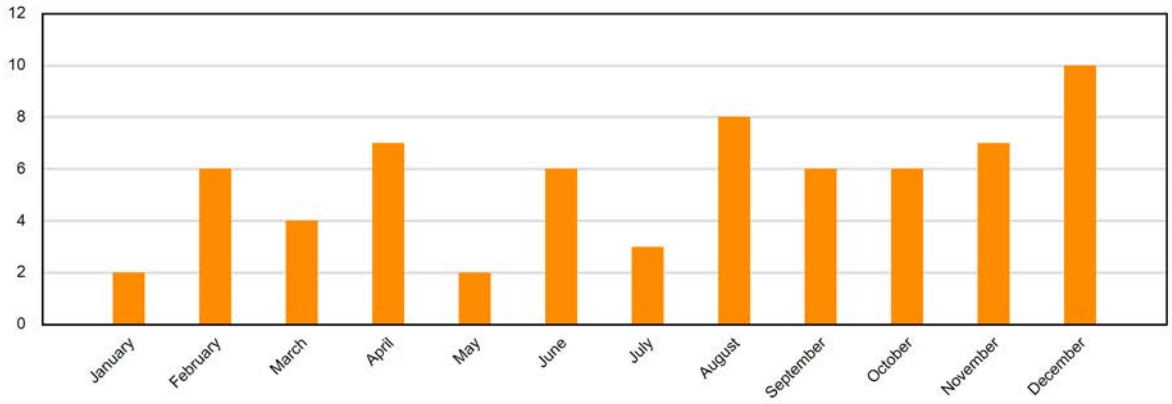
Day of the Week



Time of Day



Month of the Year



Section Crashes

MPT 1.835 to 1.935 (Stack #1)

Total Crashes: 3 Light: 2 Dark: 1 Dry: 2 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 2

1	17008783	1.838	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	18689311	1.839	INJ2	DARK	DRY	DITCH	NO COLLISION W/MV
3	19002799	1.930	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END

MPT 1.935 to 2.035 (Stack #2)

Total Crashes: 7 Light: 5 Dark: 2 Dry: 4 Wet: 3 Fatalities: 0 Injuries: 1 PDO: 6

1	14031186	2.020	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	14034302	1.951	INJ0	DUSK	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
3	14532308	1.992	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	16017692	1.961	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
5	17670109	1.954	INJ1	DUSK	WET	MOTOR VEHICLE (STOPPED)	REAR END
6	18010183	1.952	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
7	19006940	1.997	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 2.035 to 2.135 (Stack #3)

Total Crashes: 6 Light: 5 Dark: 1 Dry: 6 Wet: 0 Fatalities: 0 Injuries: 0 PDO: 6

1	14031007	2.054	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	14621568	2.037	INJ0	DARK	DRY	ANIMAL (DEER ONLY)	NO COLLISION W/MV
3	15036328	2.038	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	16025449	2.044	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
5	17647818	2.039	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	18534513	2.054	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END

MPT 2.135 to 2.235 (Stack #4)

Total Crashes: 2 Light: 2 Dark: 0 Dry: 2 Wet: 0 Fatalities: 0 Injuries: 1 PDO: 1

1	17026161	2.232	INJ1	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
2	19006505	2.188	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END

MPT 2.235 to 2.335 (Stack #5)

Total Crashes: 9 Light: 9 Dark: 0 Dry: 8 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 8

1	14037306	2.254	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	ANGLE
2	14538836	2.318	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
3	14612170	2.247	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	15033761	2.238	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END

Section Crashes

5	15537511	2.254	INJ0	DAY	WET	DITCH	NO COLLISION W/MV
6	16025450	2.238	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
7	16028313	2.238	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
8	18008296	2.253	INJ1	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
9	18009166	2.252	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END

MPT 2.335 to 2.435 (Stack #6)

Total Crashes: 9 Light: 8 Dark: 1 Dry: 5 Wet: 4 Fatalities: 0 Injuries: 2 PDO: 7

1	14582903	2.388	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
2	15004224	2.360	INJ0	DUSK	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
3	15008555	2.424	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
4	16012074	2.415	INJ1	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
5	16015361	2.434	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	16607229	2.425	INJ0	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END
7	17000439	2.421	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
8	17012464	2.426	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
9	17026636	2.347	INJ1	DAY	DRY	DITCH	NO COLLISION W/MV

MPT 2.435 to 2.535 (Stack #7)

Total Crashes: 11 Light: 11 Dark: 0 Dry: 10 Wet: 1 Fatalities: 0 Injuries: 0 PDO: 11

1	14036670	2.472	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	14517648	2.531	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
3	15004955	2.456	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
4	15020021	2.468	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
5	16017690	2.460	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
6	16023770	2.472	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
7	16578026	2.505	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
8	16631047	2.447	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
9	18602884	2.487	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
10	18677572	2.479	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
11	19629537	2.492	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE

MPT 2.535 to 2.635 (Stack #8)

Total Crashes: 14 Light: 12 Dark: 2 Dry: 10 Wet: 4 Fatalities: 0 Injuries: 5 PDO: 9

1	14517644	2.592	INJ1	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
2	15545790	2.595	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
3	16027909	2.577	INJ1	DARK	WET	MOTOR VEHICLE (STOPPED)	REAR END
4	16647983	2.541	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

Section Crashes

5	17010232	2.577	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
6	17022823	2.577	INJ1	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
7	17025964	2.577	INJ0	DAWN	DRY	MOTOR VEHICLE (IN TRANSPORT)	ANGLE
8	17026160	2.577	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
9	17027607	2.577	INJ2	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
10	17525356	2.577	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
11	18509909	2.605	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END
12	18535754	2.592	INJ0	DAY	DRY	GUARDRAIL FACE	NO COLLISION W/MV
13	18587841	2.594	INJ0	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
14	19006504	2.577	INJ1	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 2.635 to 2.735 (Stack #9)

Total Crashes: 3 Light: 2 Dark: 1 Dry: 2 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 2

1	17020429	2.677	INJ1	DUSK	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END
2	17519763	2.677	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME
3	19002560	2.677	INJ0	DAY	WET	MOTOR VEHICLE (STOPPED)	REAR END

MPT 2.735 to 2.835 (Stack #10)

Total Crashes: 2 Light: 2 Dark: 0 Dry: 2 Wet: 0 Fatalities: 0 Injuries: 1 PDO: 1

1	16004239	2.774	INJ2	DAY	DRY	MOTOR VEHICLE (STOPPED)	REAR END
2	19517690	2.786	INJ0	DAY	DRY	MOTOR VEHICLE (IN TRANSPORT)	REAR END

MPT 2.835 to 2.858 (Stack #11)

Total Crashes: 1 Light: 1 Dark: 0 Dry: 0 Wet: 1 Fatalities: 0 Injuries: 1 PDO: 0

1	16012075	2.835	INJ3	DAY	WET	MOTOR VEHICLE (IN TRANSPORT)	SIDESWIPE SAME

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 2248

Change driveway density from X to Y (driveways/mile for segment)

Description:

Prior Condition: ***No Prior Condition(s)***

Category: Access management

Study: ***Potential Driveway Density Accident Modification Factors for Rural Highways Using Texas Data*****, Fitzpatrick et al., 2008**

Star Quality Rating:	★★★☆☆ [View score details]

Crash Modification Factor (CMF)	
Value:	$e^{0.0232(Y-X)}$
Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)	
Value:	$100(1-e^{0.0232(Y-X)})$

Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Principal Arterial Other
Number of Lanes:	2
Road Division Type:	
Speed Limit:	
Area Type:	Rural
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	1999 to 2001
Municipality:	

State:	TX
Country:	
Type of Methodology Used:	Regression cross-section
Sample Size Used:	7062

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Dec-01-2009
Comments:	Driveway density at the study sites ranged from 0 to 20 driveways per mile.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 7569

Convert 2 lane roadway to 4 lane divided roadway

Description: Conversion of urban and rural two-lane roadways to four-lane divided roadways

Prior Condition: 2 lane roadway

Category: Roadway

Study: *Evaluation of the Safety Effectiveness of the Conversion of Two-Lane Roadways to Four-Lane Divided Roadways: Bayesian vs. Empirical Bayes*, Ahmed et al., 2015

Star Quality Rating:	★★★★☆ [View score details]

Crash Modification Factor (CMF)	
Value:	0.712
Adjusted Standard Error:	
Unadjusted Standard Error:	0.076

Crash Reduction Factor (CRF)	
Value:	28.79 *(This value indicates a **decrease** in crashes)*

Adjusted Standard Error:	
Unadjusted Standard Error:	7.65

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	2
Road Division Type:	Undivided
Speed Limit:	
Area Type:	Rural
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	2002 to 2012
Municipality:	

State:	FL
Country:	USA
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Nov-01-2015
Comments:	

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 325

Install a traffic signal

Description:

Prior Condition: Stop controlled

Category: Intersection traffic control

Study: *Accident Modification Factors for Traffic Engineering and ITS Improvements*, Harkey et al., 2008

Star Quality Rating:	★★★★★

Crash Modification Factor (CMF)	
Value:	0.56
Adjusted Standard Error:	0.03
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)	
Value:	44 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	3

Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Rural
Traffic Volume:	
Time of Day:	

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	3-leg,4-leg
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	3261 to 29926 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	101 to 10300 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	
Municipality:	
State:	

Country:	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	Yes. HSM lists this CMF in **bold** font to indicate that it has the highest reliability since it has an adjusted standard error of 0.1 or less.
Date Added to Clearinghouse:	Dec-01-2009
Comments:	Countermeasure name has been slightly modified for consistency across Clearinghouse

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 479

Provide cloverleaf ramp instead of long ramp

Description:

Prior Condition: *No Prior Condition(s)*

Category: Interchange design

Study: *Revision of the Hand Book of Road Safety Measures*, Elvik, R. and Erke, A., 2007

Star Quality Rating:	★★★☆☆

Crash Modification Factor (CMF)	
Value:	0.77
Adjusted Standard Error:	0.2
Unadjusted Standard Error:	0.11

Crash Reduction Factor (CRF)	
Value:	23 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	20

Unadjusted Standard Error:	11

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Not specified
Traffic Volume:	
Time of Day:	

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	
Municipality:	
State:	

Country:	
Type of Methodology Used:	Meta-analysis
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Dec-01-2009
Comments:	

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 477

Provide long ramp instead of shortramp

Description:

Prior Condition: *No Prior Condition(s)*

Category: Interchange design

Study: ***Revision of the Hand Book of Road Safety Measures*, Elvik, R. and Erke, A., 2007**

Star Quality Rating:	★★★★☆

Crash Modification Factor (CMF)	
Value:	0.62
Adjusted Standard Error:	0.1
Unadjusted Standard Error:	0.06

Crash Reduction Factor (CRF)	
Value:	38 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	10

Unadjusted Standard Error:	6

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Not specified
Traffic Volume:	
Time of Day:	

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	
Municipality:	
State:	

Country:	
Type of Methodology Used:	Meta-analysis
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Dec-01-2009
Comments:	

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF Details

CMF ID: 7997

Install left-turn lane

Description:

Prior Condition: Intersections without left turn lanes

Category: Intersection geometry

Study: *Safety Evaluation of Signal Installation With and Without Left Turn Lanes on Two Lane Roads in Rural and Suburban Areas*, Srinivasan et al., 2014

Star Quality Rating:	★★★★☆ [View score details]

Crash Modification Factor (CMF)	
Value:	0.924
Adjusted Standard Error:	
Unadjusted Standard Error:	0.07

Crash Reduction Factor (CRF)	
Value:	7.6 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	

Unadjusted Standard Error:	7

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	2
Road Division Type:	
Speed Limit:	
Area Type:	All
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Not specified
Intersection Geometry:	4-leg
Traffic Control:	Signalized
Major Road Traffic Volume:	1360 to 17566 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	746 to 8884 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	1992 to 2012
Municipality:	
State:	NC

Country:	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Nov-10-2016
Comments:	The CMF was developed for both rural and suburban areas.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

APPENDIX H

Conceptual Signing Plan

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	LEXINGTON	P029208	I-26	SN1

I-26 MAINLINE

1030 1035 1040 1045 1050 1055

D10-2a-12-92.8
BARRIER MOUNT

D10-2a-12-92.6
I-2P-11

D10-2a-12-92.4
I-2P-11

D10-2a-12-92.4
I-2P-11

I-26 EASTBOUND

I-26 WESTBOUND

O-9
STA 1054+50
PEC 27.0

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

ERECT NEW CANTILEVER STRUCTURE
INSTALL NEW SIGN

OH-24-9IAB
STA 1041+00

LEGEND

SCALE
0 200' 400' 600'

DWG: 20045
DATE: June 01, 2020

Conceptual Signing Plan
I-26 / Columbia Avenue Interchange
Chapin, SC

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	LEXINGTON	P029208	I-26	SN2

I-26 MAINLINE

I-26 EASTBOUND

Q-10
STA 1063+08
PEC 26.0
Richland County

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

D10-2a-12-92.2
I-2P-11

R2-4a-48-70/45
STA 1064+50
PEC 16.0

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

SPEED LIMIT 70 MINIMUM 45

1060 1065 1070 1075 1080 1085

D10-2a-12-92.0
I-2P-11

M3-2-36-B
MI-1-36-26
I-3P-16

EAST
INTERSTATE
26

D10-2a-12-91.8
1-2P-11

16 SPACES @ 100'

I-26 WESTBOUND

D10-2a-12-92.2
I-2P-11

Q-11
STA 1063+05
PEC 26.0
Lexington County

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

RETAIN EXISTING SIGN
REMOVE EXISTING I-BEAM POSTS
ERECT NEW BREAKAWAY POSTS
INSTALL EXISTING SIGN
SCDOT SHALL REVISE SIGN FOR EXIT

STA 1064+00
PEC 16.0
FOOD-EXIT 91A

D10-2a-12-91.9
I-2P-11

RETAIN EXISTING SIGN
REMOVE EXISTING I-BEAM POSTS
ERECT NEW BREAKAWAY POSTS
INSTALL EXISTING SIGN
SCDOT SHALL REVISE SIGN FOR EXIT

STA 1073+00
PEC 16.0
GAS-EXIT 91A

D10-2a-12-91.8
1-2P-11

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

Q-12-91A
STA 1081+00
PEC 16.0
Dreher Is. State Park
SECOND RIGHT
EXIT 91 A

LEGEND

SCALE
0 200' 400' 600'

DWG: 20045
DATE: June 01, 2020

Conceptual Signing Plan
I-26 / Columbia Avenue Interchange
Chapin, SC

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	LEXINGTON	P029208	I-26	SN3

I-26 MAINLINE

1090 1095 1100 1105 1110 1115 1120

I-26 EASTBOUND

I-26 WESTBOUND

D10-2a-12-91.6
1-2P-11

2 SPACES @ 100'

D10-2a-91.4
1-2P-11

10 SPACES @ 100'

D10-2a-12-91.6
1-2P-11

2 SPACES @ 100'

D10-2a-91.4
1-2P-11

W13-6-48
2-3P-15

W13-13R-48
W13-1P-30
2-3P-17

23 SPACES @ 100'

18 SPACES @ 100'

2 - D10-2a-12-91.2
INSTALL BARRIER MOUNT

17 SPACES @ 100'

D10-2-8 #9
2-2P-14
Columbia Ave
Chapin

12 SPACES @ 100'

5 @ 40' 100'

5 SPACES @ 1

ERECT NEW CANTILEVER STRUCTURE
INSTALL NEW SIGN

EXIT 91A
Columbia Ave - WEST
Chapin
1/4 MILE

OH-25A-91A
STA 1093+50

EXIT 91B
Columbia Ave - EAST

OH-25B-91B
STA 1093+50

EXIT 91B

M1025-91B
STA 1101+00
PEC 12.5

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

EXIT 91A
Columbia Ave - WEST
Chapin

OH-26-91A
STA 1119+00

ERECT NEW CANTILEVER STRUCTURE
INSTALL NEW SIGN

LEGEND

SCALE
0 200' 400' 600'

DWG: 20045
DATE: June 01, 2020

Conceptual Signing Plan
I-26 / Columbia Avenue Interchange
Chapin, SC

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	LEXINGTON	P029208	I-26	SN4

I-26 MAINLINE

I-26 EASTBOUND

I-26 WESTBOUND

STA 1124+00
PEC 26.0
GAS

RETAIN EXISTING SIGN
REMOVE EXISTING I-BEAM POSTS
ERECT NEW BREAKAWAY POSTS
INSTALL EXISTING SIGN

D10-2a-12-91.0
I-2P-11

STA 1127+00
PEC 26.0
FOOD

RETAIN EXISTING SIGN
REMOVE EXISTING I-BEAM POSTS
ERECT NEW BREAKAWAY POSTS
INSTALL EXISTING SIGN

M1025-91
STA 1129+80
PEC 12.5
EXIT 91

ERECT BREAKAWAY POSTS
INSTALL NEW SIGN

OH-29-91
STA 1134+40
EXIT 91
Columbia Ave
Chapin

ERECT NEW CANTILEVER STRUCTURE
INSTALL NEW SIGN

1120 1125 1130 1135 1140 1145

2 SPACES @ 100'
8 SPACES @ 100'
2 SPACES @ 100'
12 SPACES @ 100'

2 - D10-2a-12-91.0
INSTALL BARRIER MOUNT

2 - D10-2a-12-90.8
INSTALL BARRIER MOUNT

2 - D10-2a-12-90.6
INSTALL BARRIER MOUNT

0-2a-12-91.2
L BARRIER MOUNT

M1025-91A
STA 1123+14
PEC 15.0
EXIT 91A
30 MPH

D10-2a-12-91.0
I-2P-11

2 SPACES @ 100'
9 SPACES @ 40'
8 SPACES @ 100'
2 SPACES @ 100'
12 SPACES @ 100'
2 SPACES @ 100'
5 @ 40' 100'
5 SPACES @ 100'

INSTALL 6 @ 80' SPACING
WI-8R-36
2-3P-14

I-3P-16
M6-2L-21-B
MI-1-24-26
M3-4-24-B
26
WEST

Chapin
Columbia Ave
D1-2-8 #11
2-3P-14 2-2P BR @ 80"

WATER ELEVATION AT TIME OF SURVEY ELEV = 338.23

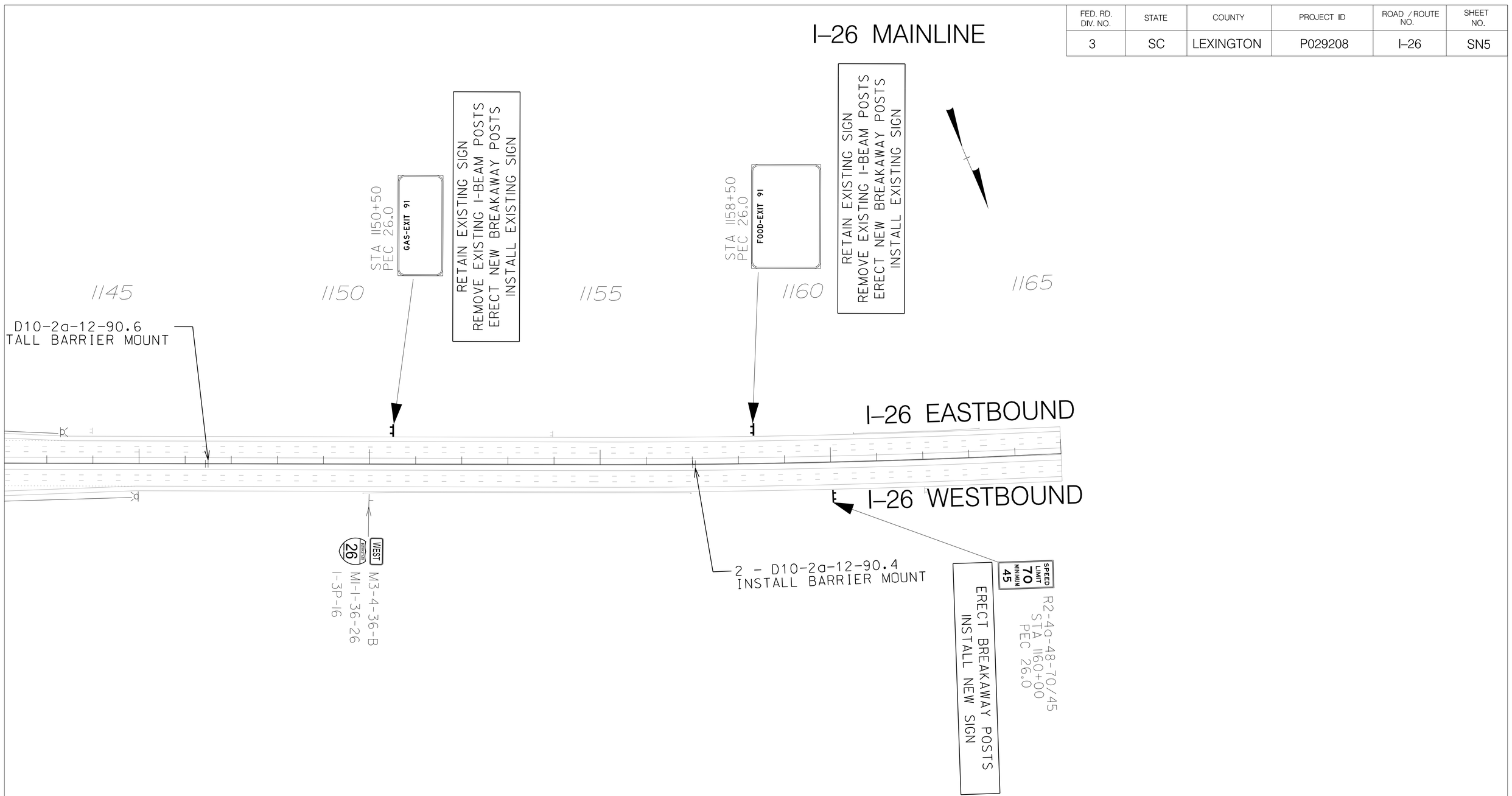
LEGEND

SCALE
0 200' 400' 600'

DWG: 20045
DATE: June 01, 2020

Conceptual Signing Plan
I-26 / Columbia Avenue Interchange
Chapin, SC

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	LEXINGTON	P029208	I-26	SN5



LEGEND

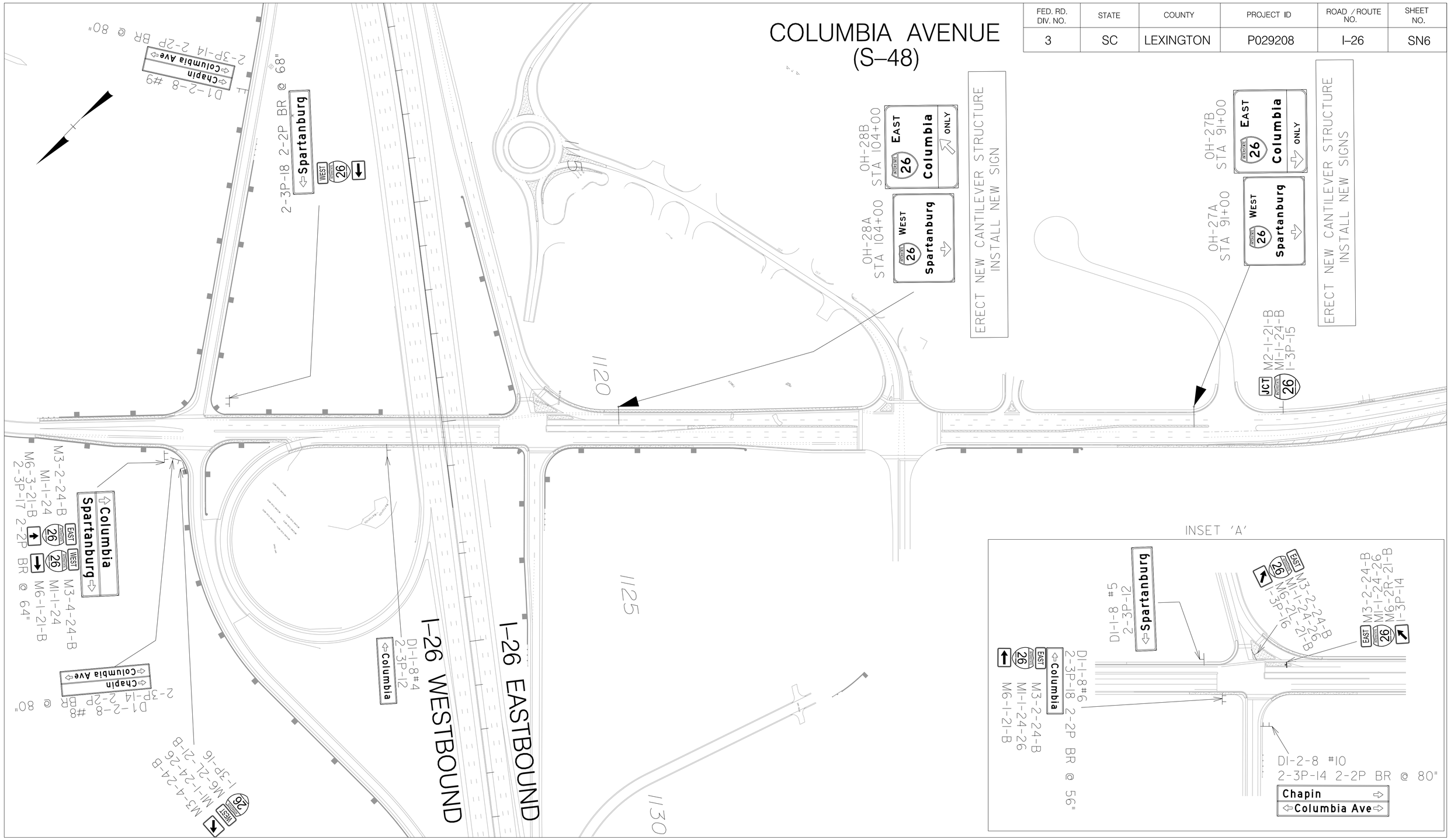
SCALE
0 200' 400' 600'

DWG: 20045
DATE: June 01, 2020

Conceptual Signing Plan
I-26 / Columbia Avenue Interchange
Chapin, SC

COLUMBIA AVENUE (S–48)

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	LEXINGTON	P029208	I–26	SN6



LEGEND

SCALE

0 200' 400' 600'

DWG: 20045
DATE: June 01, 2020

Conceptual Signing Plan
I-26 / Columbia Avenue Interchange
Chapin, SC