C-List Categorical Exclusion

SR-6

(Gallatin Pike), From Liberty Lane to north of Northside Drive

Davidson County

PIN 132524.00

Submitted Pursuant to the National Environmental Policy Act of 1969, 42 U.S.C. 4332(2)

Project Information

General Information

Route: SR-6

Termini: (Gallatin Pike), From Liberty Lane to north of Northside Drive

Municipality:

County: Davidson

PIN: 132524.00

Plans: Pedestrian Road Safety Initiative

Date of Plans: 03/20/2023

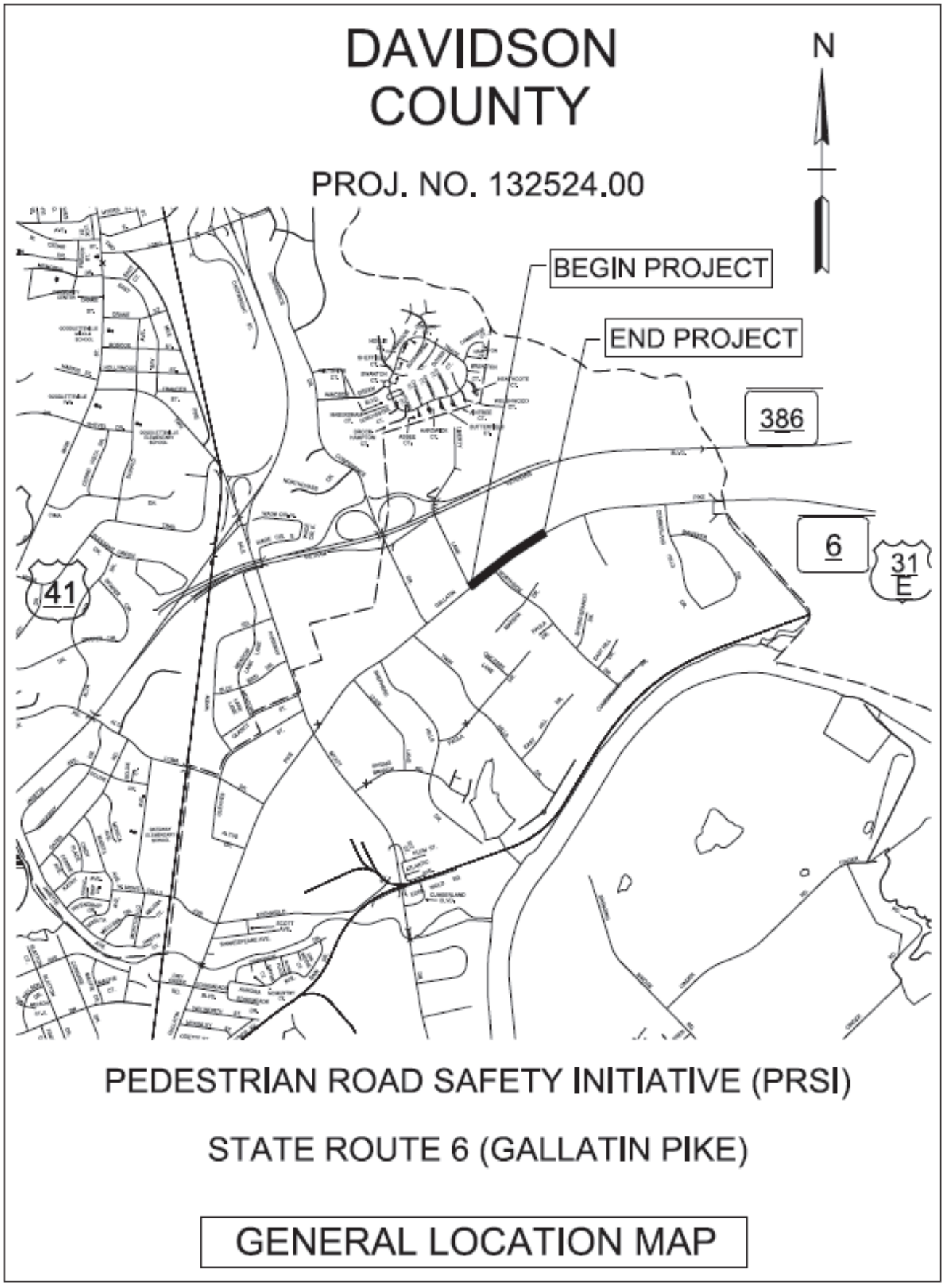
Project Funding

Planning Area: Nashville MPO

STIP/TIP: 2023-89-118 - Highway Safety Improvement Program (HSIP) Grouping

Funding Source	Preliminary Engineering	Right-of-Way	Construction
Federal	PE-D: HSIP-6(155) PE-N: HSIP-6(155)	HSIP-6(155)	HSIP-6(155)
State	PE-D: 19S006-F1-006 PE-N: 19S006-F0-006	19S006-F2-006	19S006-F3-006

Project Location



Project Overview

Introduction

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), is proposing to implement pedestrian safety improvements to SR-6 (Gallatin Pike) from LM 21.83 to LM 22.13 through the Pedestrian Road Safety Initiative (PRSI) program established by the TDOT Multimodal Transportation Resources Division. PRSI projects are selected based on TDOT's Pedestrian Safety Prioritization Tool, which scores and ranks potential projects based on their impact on safety, infrastructure, equity, and pedestrian demand for high-risk intersections and corridors.

The objective of PRSI projects, as part of the 2020-2024 Tennessee Strategic Highway Safety Plan, is to create safer roadway environments for pedestrians and reduce the number of fatal and severe crashes involving pedestrians by identifying safety concerns and implementing countermeasures. Countermeasures should be consistent with the FHWA's Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE) and Safe Transportation for Every Pedestrian (STEP) Program.

This federal-aid highway project has been determined to be a “C-List” CE pursuant to 23 CFR 771.117(c)(3), “Construction of bicycle and pedestrian lanes, paths, and facilities.”

Background

In 2020, the TDOT Pedestrian Safety Prioritization Tool was updated to include additional factors that contribute to pedestrian crashes. Using this newer methodology, SR-6 (Gallatin Pike) was listed in the top 5% of unsafe urban principal arterials for pedestrians statewide. From 01/01/2017 to 07/26/2022, the identified section of SR-6 (Gallatin Pike) between Liberty Lane and Northside Drive had five (5) pedestrian crashes, two (2) of which resulted in incapacitating injuries.

According to the 2023 PRSI report, there were significant motor vehicle volumes with some vehicles speeding. New and planned development adjacent to the study corridor, roadway ditches for stormwater drainage, and WeGo public transit stops were observed in the proposed project limits. In addition, there were multiple observations recorded that indicated a safety concern for pedestrians. These observations include a lack of sidewalks or other pedestrian infrastructure within the study corridor, older street lighting, multiple commercial access points, and a lack of safe pedestrian crossing elements, such as crosswalks or pedestrian actuating signals, at both intersections.

Project Development

Need

According to the TDOT Pedestrian Safety Prioritization Tool updated in 2020, SR-6 (Gallatin Pike) is in the top 5% of unsafe urban principal arterials for pedestrians. Between 01/01/2017 and 07/26/2022, five (5) pedestrian crashes occurred, two (2) of which resulted in incapacitating injuries.

Purpose

The purpose of the proposed project is to improve pedestrian safety along SR-6 (Gallatin Pike) from Liberty Lane to north of Northside Drive through the implementation of pedestrian safety countermeasures, such as improved sidewalks and crosswalks.

Range of Alternatives

Other than the selected design, were any alternative build designs developed for this project? **No**

No-Build

In the development of design solutions that address the needs outlined above and achieve the purpose of the project, TDOT evaluated the potential consequences should the project not be implemented. This option, known as the No-Build alternative, assumed the continuation of current conditions and set the baseline from which the impacts of the selected design were compared.

The No-Build Alternative was not selected because it does not meet the purpose and need of the project.

Public Involvement

Has there been any public involvement for the project? **No**

Project Design

Existing Conditions and Layout

According to the Enhanced Tennessee Roadway Information System (E-TRIMS) and the 2023 PRSI, SR-6 from LM 21.83 to LM 22.13 is an urban principal arterial with four to six 12-foot lanes. SR-6 (Gallatin Pike) consists of four travel lanes (two lanes in each direction), one two-way center turn lane, and from LM 20.070 to LM 22.13, two right-turn lanes. Outside shoulders range from 2 to 12 feet.

Proposed Typical Section

The proposed pedestrian safety improvement project would not alter the existing typical section of SR-6 (Gallatin Pike). According to the 2023 PRSI and E-TRIMS, the existing typical section of SR-6 (Gallatin Pike) consists of four to six 12-foot lanes. SR-6 (Gallatin Pike) has four travel lanes (two lanes in each direction), one two-way center turn lane, and from LM 20.070 to LM 22.13, two right-turn lanes. Outside shoulders range from 2 to 12 feet.

Scope of Work

The proposed project would implement pedestrian safety infrastructure, including physical separation in the shoulders, delineators, signage, and traffic signal improvements. Improved sidewalks, a multi-use path, crosswalks, turning radii reduction, commercial access consolidation, and channelization markings would also be implemented in the project limits. All improvements would comply with state and local accessibility guidelines as well as the requirements set forth in the Americans with Disabilities Act (ADA) and the Public Rights-of-Way Accessibility guidelines (PROWAG).

SR-6 at Liberty Lane
The proposed scope of work for SR-6 (Gallatin Pike) at Liberty Lane is as follows:
Painted channelization markings would be added in all four (4) corners within the existing shoulder area. Pedestrian crossings with ADA-compliant curb ramps, pedestrian signals, pushbuttons, and high-visibility crosswalk pavement markings would be installed on the north, south, east, and west legs of the intersection. The curb radii in all four corners would be reduced to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles. The northbound SR-6 right-turn lane would be removed, and curb extensions would be installed to reduce the crossing distance for pedestrians. Higher-intensity LED lighting would be considered to replace the older sodium fixtures to improve the visibility of pedestrian activity. The sidewalk gap would be completed by installing a new sidewalk or multi-use path

SR-6 at Northside Drive
The proposed scope of work for SR-6 (Gallatin Pike) at Northside Drive is as follows:
Channelization markings would be installed to delineate the right-of-way near the car dealership to prevent motor vehicles from obstructing sight distance and any future pedestrian walkway. Painted channelization markings in all four corners within the existing shoulder area would be installed to shorten pedestrian crossing distances and reduce exposure to motor vehicles. No Turn on Red signs would be installed on both side street approaches to SR-6. Backplates on the existing signal heads would be installed to improve visibility and compliance. Curb radii in the northeast and southeast corners would be reduced to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for a new pedestal pole. ADA-compliant curb ramps could be constructed in the northeast and southeast corners oriented for bi-directional crossings.

SR-6 at South Walmart Access
The proposed scope of work for SR-6 (Gallatin Pike) at South Walmart Access is as follows:
Painted channelization markings would be installed in all four (4) corners within the existing shoulder area to shorten pedestrian crossing distances and reduce exposure to motor vehicles. The crosswalk would be restriped with high-visibility crosswalk pavement markings and W11-2 pedestrian crosswalk pavement markings. The ADA-compliant curb ramps would be realigned to be oriented along the pedestrian path of travel and grade breaks would be leveled on the existing sidewalk near the southwest corner landing.

SR-6 at North Walmart Access
The proposed scope of work for SR-6 (Gallatin Pike) at North Walmart Access is as follows:
The crosswalk would be restriped with high-visibility crosswalk pavement markings. Painted channelization markings would be installed in the southeast, northeast, and southwest corners within the existing shoulder area to shorten pedestrian crossing distances and reduce exposure to motor vehicles. Backplates would be installed on the existing signal heads in an effort to improve visibility and compliance. Turning Vehicles Yield to Pedestrians signs would be installed on the northbound and southbound right-turn movements to improve motorist yielding behavior for pedestrians. A detectable warning surface would be installed on the curb ramp on the southeast corner. The existing traffic signal would be modified to include new pedestrian crossings with high-visibility pavement markings, pedestrian signal heads, pedestrian pushbuttons, and ADA-compliant curb ramps for the east and north legs of the intersection. The curb radii on the northwest and southwest corners would be reduced to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles.

SR-6 at South Walmart Access
The proposed scope of work for SR-6 (Gallatin Pike) at South Walmart Access is as follows:
Painted channelization markings would be installed in all four (4) corners within the existing shoulder area to shorten pedestrian crossing distances and reduce exposure to motor vehicles. The crosswalk would be restriped with high-visibility crosswalk pavement markings and W11-2 pedestrian crosswalk pavement markings. The ADA-compliant curb ramps would be realigned to be oriented along the pedestrian path of travel and grade breaks would be leveled on the existing sidewalk near the southwest corner landing

SR-6 at North Walmart Access
The proposed scope of work for SR-6 (Gallatin Pike) at North Walmart Access is as follows:
The crosswalk would be restriped with high-visibility crosswalk pavement markings. Painted channelization markings would be installed in the southeast, northeast, and southwest corners within the existing shoulder area to shorten pedestrian crossing distances and reduce exposure to motor vehicles. Backplates would be installed on the existing signal heads in an effort to improve visibility and compliance. Turning Vehicles Yield to Pedestrians signs would be installed on the northbound and southbound right-turn movements to improve motorist yielding behavior for pedestrians. A detectable warning surface would be installed on the curb ramp on the southeast corner. The existing traffic signal would be modified to include new pedestrian crossings with high-visibility pavement markings, pedestrian signal heads, pedestrian pushbuttons, and ADA-compliant curb ramps for the east and north legs of the intersection. The curb radii on the northwest and southwest corners would be reduced to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles.

Right-of-Way

Does this project require the acquisition of right-of-way or easements? **Yes**

Right-of-Way Acquisition Table					
Permanent Acquisition				**Temporary Acquisition**	
R.O.W Acquisition	Drainage Easements	Slope Easements	**Total**	Construction Easements	**Total**
0	0	0	**0**	0.75	**0.75**

*Measured in acres

Relocations

Will this project result in residential, business or non-profit relocations? **No**

Changes in Access Control

Will changes in access control impact the functional utility of any adjacent parcels? **No**

Traffic and Access Disruption

At this time, are traffic control measures and temporary access information available? **No**

Environmental Studies

Water Resources

Are there any water resources, wetlands or natural habitat located within the project area? **No**

Protected Species

Are the GPNEA between TDOT and USFWS (2022), the TDEC MOA (2023), and the TWRA MOA (2022) applicable to this project? **Yes**

Floodplain Management

Flood Zone: Zone X (White) - Area Determined to be Outside the 500-year Floodplain.

The project is not in a FEMA floodway, floodplain, or study area.

The project is not in a FEMA floodway, floodplain, or study area, and is located on Flood Insurance Rate Map (FIRM) in Davidson County, Panel 137 of 478, Map #47037C0137J and Panel 141 of 478, Map #47037C0141J. A portion of the FEMA FIRMs are included in the Technical Appendices.

Air Quality

Transportation Conformity:

According to the ESR response, dated 03/23/2023, from the TDOT Air Quality and Noise technical section, "This project is in Davidson County which is in attainment for all regulated criteria pollutants. Therefore, conformity does not apply to this project."

Mobile Source Air Toxics (MSAT):

This project qualifies as a categorical exclusion under 23 CFR 771.117 and, therefore, does not require an evaluation of MSATs per FHWA's "Interim Guidance Update on Air Toxic Analysis in NEPA Documents" dated January 2023.

A copy of the TDOT Air Quality and Noise technical section's ESR response is located in the Technical Appendices.

Noise

In accordance with FHWA requirements and TDOT's Noise Policy this project is determined to be **Type III**

No significant noise impacts are anticipated for this project and a noise study is not needed.

Farmland

Is this project exempt from the provisions of the Farmland Protection Policy Act (FPPA)? **Yes**

FPPA Exemption: Small Acreage (10 acres or less per linear mile)

Section 4(f)

Does this project involve the use of property protected by Section 4(f) (49 USC 303)? **No**

Section 6(f)

Does this project involve the use of property assisted by the L&WCF? **No**

Cultural Resources

Is the Section 106 Programmatic Agreement (2021) applicable to this project? **No**

Are NRHP listed or eligible cultural resources within the project Area of Potential Effect (APE)? **No**

Archaeology Concurrence:

Concurrence from the TN State Historic Preservation Office (TN-SHPO) was received on 03/30/2023.

On 03/30/2023, TN-SHPO stated, "Considering the information provided, we find that no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking."

A copy of the TN-SHPO letter is located in the Technical Appendices.

Historic/Architectural:

Concurrence from the TN State Historic Preservation Office (TN-SHPO) was received on 04/20/2023.
On 04/20/2023, the TN-SHPO stated, "Considering the information provided, we find that no architectural resources eligible for listing in the National Register of Historic Places will be affected by this undertaking."

A copy of the TN-SHPO letter is located in the Technical Appendices.

Native American Consultation

Does this project require Native American consultation? **Yes**

Native American Consultation was requested on 04/04/2023.

Native American Consultation					
Sent	Response		Sent	Response	
☒	☐	Absentee Shawnee Tribe of Oklahoma	☒	☐	Muscogee (Creek) Nation
☒	☒	Cherokee Nation	☐	☐	Poarch Band of Creek Indians
☒	☒	Chickasaw Nation	☐	☐	Quapaw Nation
☐	☐	Choctaw Nation of Oklahoma	☒	☐	Shawnee Tribe
☒	☐	Eastern Band of Cherokee Indians	☒	☐	Thlopthlocco Tribal Town
☒	☐	Eastern Shawnee Tribe of Oklahoma	☒	☐	United Keetoowah Band of Cherokee Indians
☒	☐	Kialegee Tribal Town	☐	☐	Other

Cherokee Nation:

The response was received on 04/27/2023.

On 04/27/2023, the Cherokee Nation stated, "The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office (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."

Chickasaw Nation:

The response was received on 04/10/2023

On 04/10/2023, the Chickasaw Nation stated, "We have reviewed the brief descriptions, maps and project site coordinates. The Chickasaw Nation does desire to consult on these projects under Section 106 of the National Historic Preservation Act."

Environmental Justice

Are there any disproportionately high or adverse effects on low-income or minority populations? **No**

The proposed project does not have the potential to cause disproportionately high or adverse effects to low-income or minority populations.

Hazardous Materials

Does the project involve any hazardous material sites? **No**

On 03/22/2023, the TDOT Hazardous Materials technical section stated,"Based on the Pedestrian Safety Initiative Report dated 20 March 2023, no known hazardous materials sites affect this project as it is currently planned, and no hazardous material studies are recommended at this time. Three fuel facilities are adjacent to the project corridor, but none appear to impact the project as shown.

1. Bob Fresley Chrysler Plymouth - 5190087, 2210 North Gallatin Road, Madison, TN 37115. This is a closed facility.
2. Regal Auto Wash - 5191232, 2239 Gallatin Road North, Madison, TN 37115. This is an active facility.
3. Walmart Super Center No 0695 - 5191784, 2240 Gallatin Pike North, Madison, TN 37115. This is an active facility."

Bicycle and Pedestrian

Does this project include accommodations for bicycles and pedestrians? **Yes**

On 03/30/2023, the TDOT Multimodal Transportation Resources Division stated, "This pedestrian safety project includes crosswalk improvements, curb ramps and other pedestrian facilities."

Environmental Commitments

Does this project involve any environmental commitments? **No**

Additional Environmental Issues

Are there any additional environmental concerns involved with this project? **No**

Conclusion

Review Determination

Determination: C-List Categorical Exclusion

This federal-aid highway project qualifies for a Categorical Exclusion under 23 C.F.R 771.117(c) and does not exceed the thresholds listed in Section IV(A)(1)(b) of the 2018 Programmatic Agreement between the Federal Highway Administration, Tennessee Division and the Tennessee Department of Transportation. The terms of the 2018 Programmatic Agreement have been extended through 07/14/2023 per FHWA's 06/16/2023 letter, which is included in the Technical Appendices. The Department has determined that the specific conditions and criteria for these CEs are satisfied and that significant environmental impacts will not result from this action. This project is therefore designated as a C-List Categorical Exclusion and does not require Administration approval.

Reference Material

All source material used in support of the information and conclusions presented in this document are included in the Technical Appendices. The Technical Appendices are compiled as a separate document and include information on funding, agency concurrence, applicable agency agreements, special commitment support, project plans, technical reviews, reports, and any other additional information.

Preparer Certification

By signing below, you certify that this document has been prepared in compliance with all applicable environmental laws, regulations and procedures. You can attest to the document's quality, accuracy, and completeness, and that all source material has been compiled and included in the Technical Appendices.

Kate Landers
Digitally signed by Kate Landers
Date: 2023.06.27 10:41:39 -05'00'

Document Preparer

Document Approval

By signing below, you officially concur that this document is in compliance with all applicable environmental laws, regulations and procedures. You have reviewed and verified the document's quality, accuracy, and completeness and that all source material has been compiled and included in the Technical Appendices.

Sam Patterson
Digitally signed by Sam Patterson
Date: 2023.07.13 09:41:15 -05'00'

Tennessee Department of Transportation

Attachments

Acronyms

AADT	Annual Average Daily Traffic
ADA	Americans with Disabilities Act
APE	Area of Potential Effect
BMP	Best Management Practice
CAA	Clean Air Act
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality
DEIS	Draft Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
EPH	Ephemeral Stream
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
GIS	Geographic Information System
IAC	Interagency Consultation
LWCF	Land and Water Conservation Fund
LOS	Level of Service
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PCE	Programmatic Categorical Exclusion
PIN	Project Identification Number
PM	Particulate Matter
PND	Pond
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
ROD	Record of Decision
RPO	Rural Planning Organization
SIP	State Implementation Plan
SNK	Sinkhole
SR	State Route
STIP	State Transportation Improvement Program
STR	Stream
TDEC	TN Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Program
SHPO	State Historic Preservation Office
TPO	Transportation Planning Organization
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USDOT	U.S. Department of Transportation
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VMT	Vehicle Miles Traveled
VPD	Vehicles Per Day
WWC	Wet Weather Conveyance

Technical Appendices

C-List Categorical Exclusion

SR-6

(Gallatin Pike), From Liberty Lane to north of Northside Drive

Davidson County

PIN 132524.00

Transportation Improvement Program

Transportation Improvement Program for FYs 2023-2026

Project Name	**Highway Safety Improvement Program (HSIP) Grouping**			**TIP #**	2023-89-118
Improvement Type	Safety			**Lead Agency**	TDOT
County	Multi-County	**Length**	0.00	**Regional Plan ID**	Safety
Air Quality Status	Exempt	**TDOT PIN**	126759.00	**Project Cost**	$11,950,000.00
Route	Highway Safety Improvement Program (HSIP) Grouping				
Location	Regionwide - Nashville Area MPO				
Project Description	Any strategy, activity or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem, including workforce development, training and education activities. Eligibility of specific projects, strategies, and activities is generally based on: Consistency with SHSP; Crash experience, crash potential, or other data- supported means; Compliance with the requirements of Title 23 of the USC; State's strategic or performance-based safety goals to reduce fatalities and serious injuries on all public roads. Please refer to Appendix G of the TIP document for more information about and work allowable from this grouping.				

Fiscal Year	Type of Work	Funding Type	Total Funds	Federal Funds	State Funds	Local funds
2023	PE-N, PE-D, ROW, CONSTRUCTION	HSIP	$5,280,000.00	$4,752,000.00	$528,000.00	$0.00
2023	PE-N, PE-D, ROW, CONSTRUCTION	HSIP-R	$1,844,500.00	$1,660,050.00	$184,450.00	$0.00
2023	PLANNING	PHSIP	$80,000.00	$80,000.00	$0.00	$0.00
2024	PE-N, PE-D, ROW, CONSTRUCTION	HSIP	$660,000.00	$594,000.00	$66,000.00	$0.00
2024	PE-N, PE-D, ROW, CONSTRUCTION	HSIP-R	$1,844,500.00	$1,660,050.00	$184,450.00	$0.00
2024	PLANNING	PHSIP	$0.00	$0.00	$0.00	$0.00
2025	PE-N, PE-D, ROW, CONSTRUCTION	HSIP	$330,000.00	$297,000.00	$33,000.00	$0.00
2025	PE-N, PE-D, ROW, CONSTRUCTION	HSIP-R	$1,054,000.00	$948,600.00	$105,400.00	$0.00
2025	PLANNING	PHSIP	$0.00	$0.00	$0.00	$0.00
2026	PE-N, PE-D, ROW, CONSTRUCTION	HSIP	$330,000.00	$297,000.00	$33,000.00	$0.00
2026	PE-N, PE-D, ROW, CONSTRUCTION	HSIP-R	$527,000.00	$474,300.00	$52,700.00	$0.00
2026	PLANNING	PHSIP	$0.00	$0.00	$0.00	$0.00
TOTAL			$11,950,000.00	$10,763,000.00	$1,187,000.00	$0.00

REVISION HISTORY

Project Development

U.S. Department of Transportation
Federal Highway Administration

Tennessee Division

404 BNA Drive, Suite 508
Nashville, Tennessee 37217
Phone (615) 781-5770

June 16, 2023

In Reply Refer To:
HDA-TN

Mr. Butch Eley
Deputy Governor and Commissioner of Transportation
Tennessee Department of Transportation
James K. Polk Building, Suite 700
Nashville, TN 37243

Subject: PCE Agreement Terms Extension

Dear Commissioner Eley,

This letter is in regards to the *"Programmatic Agreement Between the Federal Highway Administration, Tennessee Division and The Tennessee Department of Transportation Regarding the Processing of Actions Classified as Categorical Exclusions for Federal-aid Highway Projects."* This programmatic agreement expires on June 18th, 2023. The FHWA TN Division and TDOT staff are currently in the process of renewing this agreement.

While this renewal is in process and to allow for TDOT to continue making approvals of categorical exclusions on behalf of the FHWA TN Division, the FHWA TN Division is extending the terms of this agreement until July 14th, 2023. Should you have any questions, please contact Sean Santalla, Program Development Team Leader at (615) 781 – 5772.

Sincerely,

PAMELA M KORDENBROCK
Digitally signed by PAMELA M KORDENBROCK
Date: 2023.06.16 13:49:35 -05'00'

Pamela M. Kordenbrock
Division Administrator

cc: Mr. Gilberto De León, Deputy Division Administrator, FHWA TN Division
Mr. Sean Santalla, Program Development Team Leader, FHWA TN Division
Mr. Gary Fottrell, Environmental Engineer, FHWA TN Division
Mr. Frank DuBose, Environmental Protection Specialist, FHWA TN Division
Mr. Preston Elliott, Deputy Commissioner/Chief of Environment and Planning, TDOT
Ms. Susannah Kniazewycz, Director of Environmental Division, TDOT
Ms. Tammy Sellers, Assistant Director of Environmental Division, TDOT

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
MULTIMODAL TRANSPORATION RESOURCES DIVISION
SUITE 1200, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-0334

Butch Eley
COMMISSIONER

Bill Lee
GOVERNOR

MEMORANDUM

To: Mr. Preston Elliott
Deputy Commissioner/Chief of Environment & Planning

From: Dan Pallme *Daniel E. Pallme*
Multimodal Transportation Resources Division Interim Director

Date: February 28, 2023

Subject: Pedestrian Road Safety Initiative (PRSI)
State Route 6 (Gallatin Pike), From Liberty Lane (L.M. 21.83) to North Walmart Access (L.M. 22.13)
Davidson County, PIN 132524.00

This project was requested by the TDOT Multimodal Transportation Resources Division as a candidate project to reduce pedestrian crashes along corridors and intersections throughout the State of Tennessee. This section of State Route 6 (Gallatin Pike) from log mile 21.83 to log mile 22.13 is a four (4) to six (6) lane undivided urban principal arterial. Lane widths are eleven (11) feet and twelve (12) feet with shoulder widths of two (2) feet to twelve (12) feet. After a complete review of the project, State Route 6 (Gallatin Pike) was added to the Highway Safety Improvement Program (HSIP) list.

The total estimated cost of the identified improvements listed in this PRSI report is $4,581,900. A detailed cost breakdown by location and measure is provided in the appendix. Right-of-way acquisition is anticipated to modify driveways and for construction easements. General maintenance and signal maintenance agreements with the Metropolitan Government of Nashville and Davidson County are required. A local match is not required. These improvements will be part of a design project and will be let to contract.

If you should need any further information, please contact me at (615) 741-4031 or email me at daniel.pallme@tn.gov.

Attachment

CC: Mr. Will Reid
Mr. Ben Price
Ms. Susannah Kniazewycz
Mr. Matt Meservy
Mr. Ronnie Porter
Mr. Steve Allen
Mr. Lee J. Smith
Mr. Stacy Morrison
Mr. Jonathan Russell
Mr. Brian Hurst
Mr. Jim Waters
Mr. Mike Gilbert
Mr. Shaun Armstrong
Mr. Brandon Darks
Mr. Terry Gladden
Mr. Greg Hamilton
Mr. Nathan Vatter
Mr. Steve Bryan
Ms. Michelle Nickerson
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Mr. Jason Oldam (NDOT)
Mr. Marty Sewell (NDOT)
Mr. Jon Boghozian (NDOT)
Ms. Anna Dearman (NDOT)
Mr. Trey Walker (WeGo)
Mr. Justin Cole (WeGo)
Sean Pfalzer, Greater Nashville Regional Council
Ms. Kim Van Ata, TN Highway Safety Office
File

TENNESSEE
DEPARTMENT OF TRANSPORTATION

PEDESTRIAN ROAD SAFETY INITIATIVE

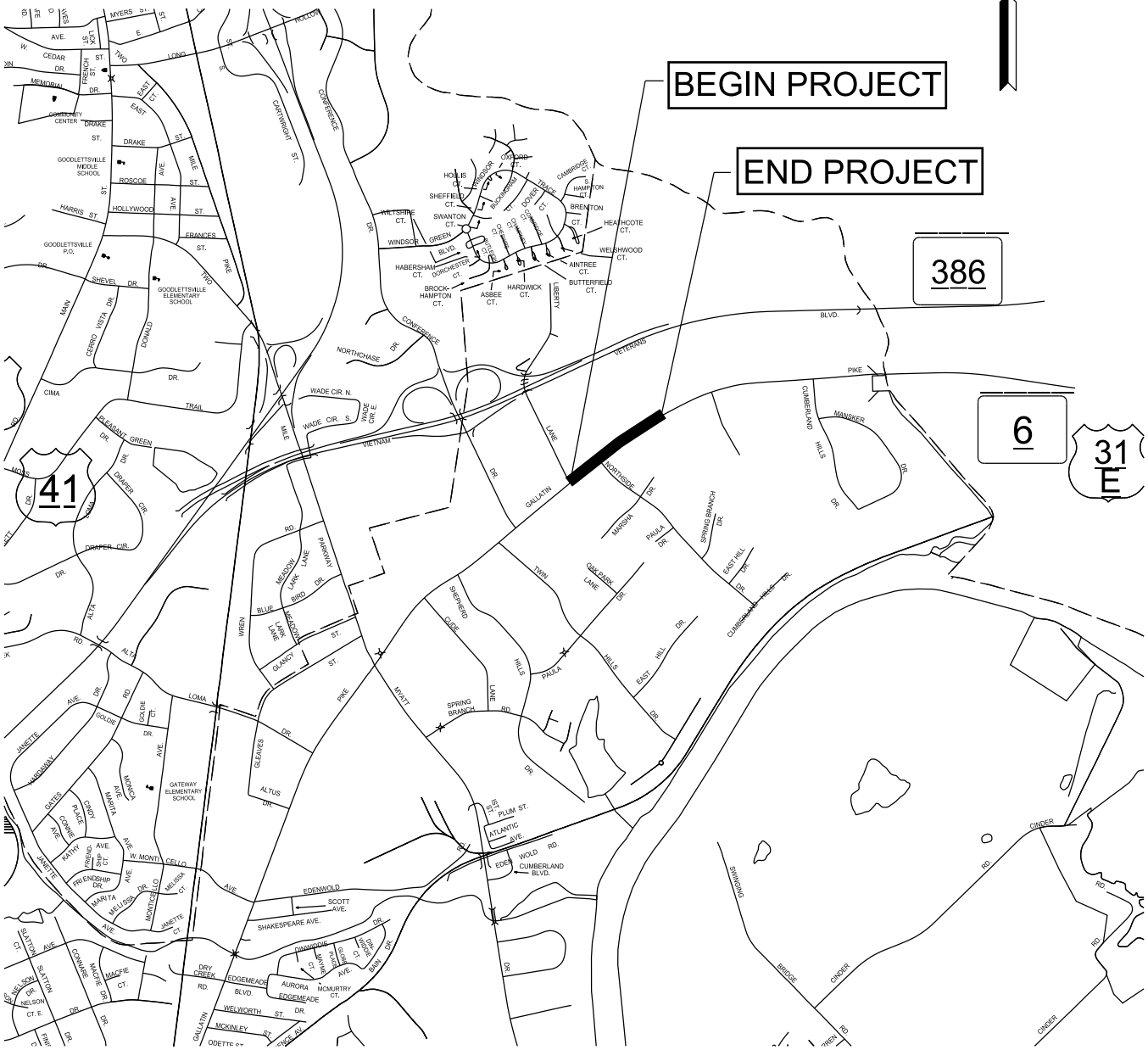
***STATE ROUTE 6* (GALLATIN PIKE)**
From Liberty Lane to North Walmart Access
LM 21.83 to LM 22.13
DAVIDSON COUNTY
PIN 132524.00

PREPARED BY
KCI Technologies Inc.
for the
Multimodal Transportation Resources Division

Approved by:	Signature	DATE
Director **Multimodal Transportation** **Resources Division**	*Daniel E. Pallme*	3/20/23

DAVIDSON COUNTY

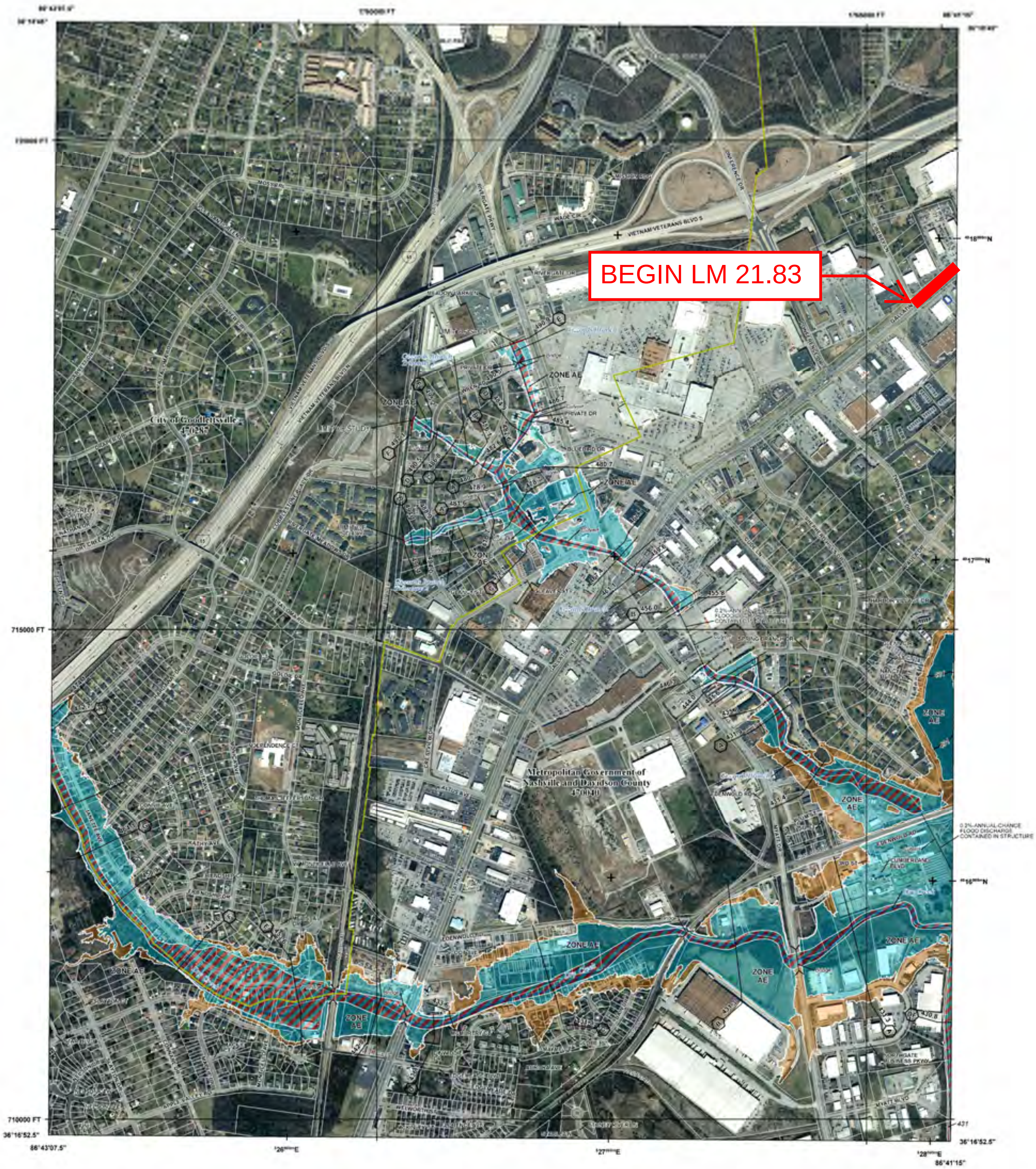
PROJ. NO. 132524.00



PEDESTRIAN ROAD SAFETY INITIATIVE (PRSI)

STATE ROUTE 6 (GALLATIN PIKE)

GENERAL LOCATION MAP



SHEET 1 OF 2

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE)
	With BFE or Depth
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
	Future Conditions 1% Annual Chance Flood Hazard
	Area with Reduced Flood Risk due to Levee See Notes.
	Area with Flood Risk due to Levee
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard
	Area of Undetermined Flood Hazard
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

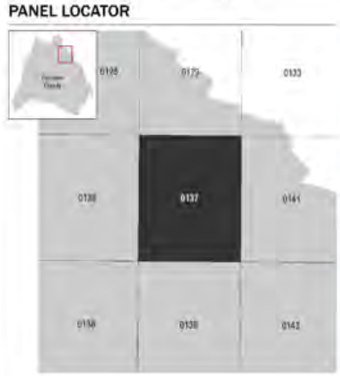
SCALE

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE

PANEL 137 OF 478

COMMUNITY	NUMBER	PANEL	SUFFIX
GOODLETTSVILLE, CITY OF	470287	0137	J
METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY	470040	0137	J

VERSION NUMBER
2.5.3.0

MAP NUMBER
47037C0137J

MAP REVISED
FEBRUARY 25, 2022

SHEET 2 OF 2

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) With BFE or Depth
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Flood Risk due to Levee See Notes.

OTHER AREAS OF FLOOD HAZARD
- Area with Flood Risk due to Levee

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard
- Area of Undetermined Flood Hazard

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities participating in the NFIP may adopt a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided by the State of Tennessee, Department of Finance & Administration, Office of Information Resources, Strategic Technologies Solutions, GIS Services from http://tnmap.tn.gov. Data was also obtained from the Metro Davidson County Planning Department, and Nashville Planning Department. Ortho Imagery was originally produced by the Tennessee Department of Transportation in 2013 and has a 1.0 foot ground-sample distance.

SCALE

N

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE and Incorporated Areas

PANEL 141 of 478

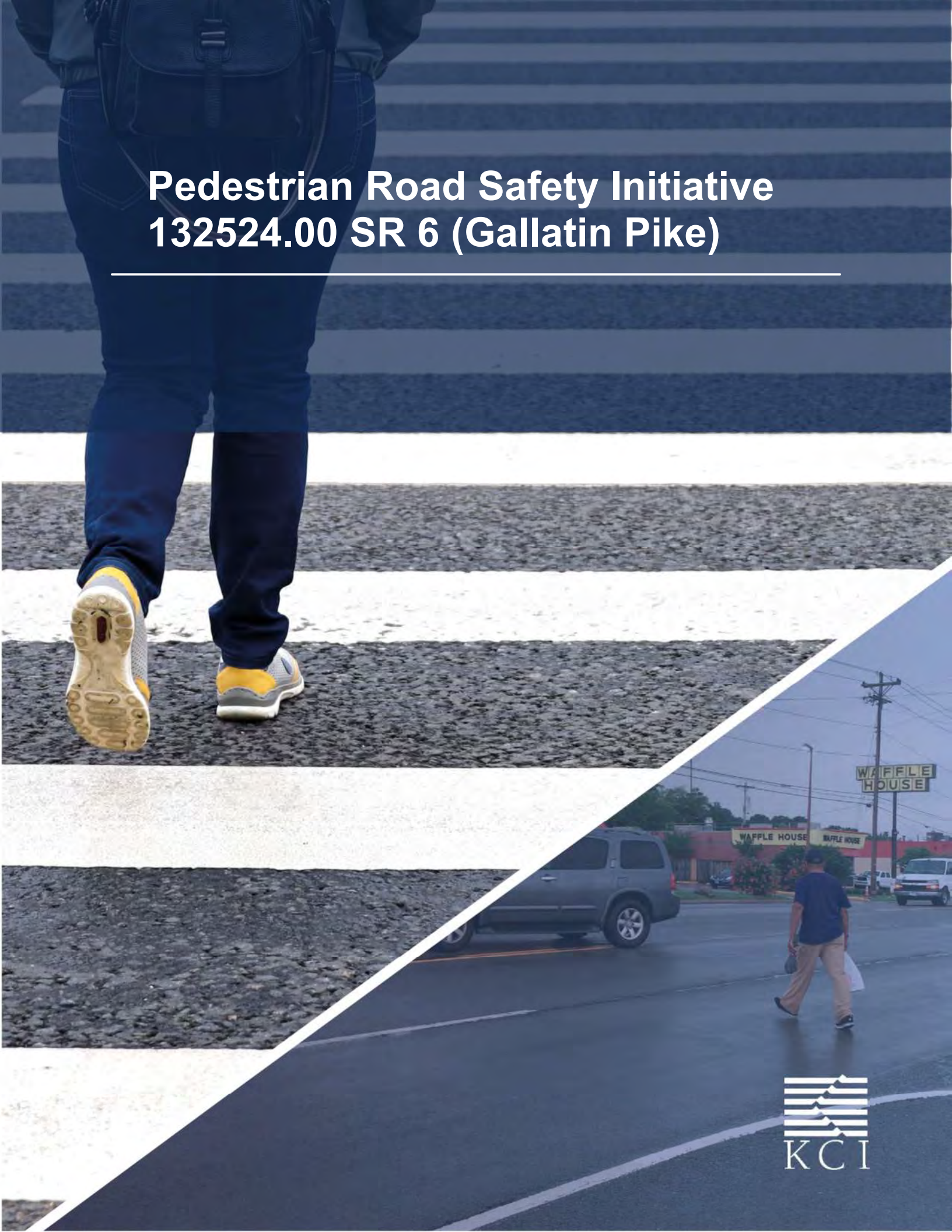
COMMUNITY	NUMBER	PANEL	SUFFIX
METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY	470040	0141	J

VERSION NUMBER 2.5.3.0

MAP NUMBER 47037C0141J

MAP REVISED FEBRUARY 25, 2022

Pedestrian Road Safety Initiative
132524.00 SR 6 (Gallatin Pike)



KCI

Prepared by

This report was prepared for the Tennessee Department of Transportation's Multimodal Transportation Resources Division.

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3.0 Stakeholder Engagement 3
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1.0 Program Overview

This project is funded through the Pedestrian Road Safety Initiative (PRSI) program. This program was established by the Tennessee Department of Transportation (TDOT) Multimodal Transportation Resources Division with the purpose of reducing pedestrian crashes along corridors and intersections throughout the state. Objectives of this program include the identification of safety concerns and implementation of counter measures consistent with the Federal Highway Administration's (FHWA) Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE) and FHWA's Safe Transportation for Every Pedestrian (STEP) Initiative. Project selection for the PRSI program utilizes TDOT's Pedestrian Safety Prioritization Tool, which scores and ranks projects based on their impact on safety, infrastructure, equity, and pedestrian demand on high-risk intersections and corridors.

Figure 1-1. Project Area Extent

2.0 Project Selection

This project was requested by the TDOT Multimodal Transportation Resources Division as a priority project to reduce pedestrian crashes along corridors and intersections throughout the State of Tennessee. This section of State Route 6 (Gallatin Pike), from log mile 21.83 (Liberty Lane) to log mile 22.13 (North Walmart Access) is an urban principal arterial with lane widths of twelve (12) feet and shoulder widths of eight (8) feet. This section includes two (2) through traveling lanes in each direction with a center two-way left turn lane. An aerial view of the roadway, accompanied by pedestrian crash data, is shown in Appendix B.

2.1 Selection Criteria

In 2020, the TDOT Pedestrian Safety Prioritization Tool was updated to include additional factors that contribute to pedestrian crashes. Using this newer methodology, Gallatin Pike was listed in the top 5% of unsafe urban principal arterials for pedestrians statewide. The identified corridor section of Gallatin Pike between Liberty Lane and Northside Drive had five (5) pedestrian crashes, two (2) which resulted in incapacitating injuries, between January 1, 2017, and July 26, 2022. A diagram of pedestrian and bicycle related crashes within the project limits is included in Appendix B.

3.0 Stakeholder Engagement

Primary stakeholders for this project were identified by the TDOT Multimodal Transportation Resources Division and invited to an onsite field review held on July 8, 2022. Stakeholders present included representatives of TDOT, Nashville Department of Transportation (NDOT), and FHWA. Details from the field review, such as participants, location observations, site photos, and input from the attendees are included in the appendices. Based on the original preliminary field review, it was determined by TDOT and the project team that the project limits shall be extended further north from Northside Drive to the north Walmart driveway access (LM 22.14). To supplement the original field notes, the KCI project team conducted an additional field review on Thursday, August 18, 2022, identifying various safety needs of pedestrians between Northside Drive and the north Walmart driveway access.

General observations within the project limits include significant motor vehicle volumes with some vehicles speeding. New and planned development adjacent to the study corridor, roadway ditches for stormwater drainage, and WeGo public transit stops were observed. In addition, there were multiple observations recorded that indicated a safety concern for pedestrians. These observations include: a lack of sidewalks or other pedestrian infrastructure within the study corridor, older street lighting, multiple commercial access points, and a lack of safe pedestrian crossing elements, such as crosswalks or pedestrian actuated signals, at both intersections.

At this field review, attendees walked the length of the project limits to identify pedestrian safety deficiencies and potential improvements. Members of the KCI consultant team collected and compiled notes which were then shared with the entire team for additions and/or revisions. Once the notes were finalized, they served as the basis for a detailed list of improvements to be considered as part of this project. Information used in the review included:

- County Highway Map
- United States Geological Survey (USGS) Maps
- FEMA FIRM Map
- Aerial Photographs
- Annual Average Daily Traffic (AADT) collected by TDOT
- On-Site Visit on July 8th, 2022 and August 18, 2022
- Enhanced Tennessee Roadway Information Management System (ETRIMS) Historic Crash Data, Route Feature Description Listings and Geometric Reports

3.1 Stakeholder Overview

Table 1. PRSI Team Members

NAME	ORGANIZATION	EMAIL
TDOT Office of Multimodal Planning Team Members		
Veda Nguyen	TDOT	veda.nguyen@tn.gov
William Rogers	TDOT	William.Rogers@tn.gov
July 8, 2022 Field Review Team Members		
Cam Morris	TDOT	cam.morris@tn.gov
Jessica Rich	FHWA	jessica.rich@dot.gov
Jon Boghozian	NDOT	Jon.Boghozian@nashville.gov
Anna Dearman	NDOT	Anna.dearman@nashville.gov
Stanley Trice	TDOT	Stanley.Trice@tn.gov
Jesse Hoover	TDOT	Jesse.Hoover@tn.gov
Jonathan Cleghon	KCI Technologies	Jonathan.cleghon@kci.com
Liesel Goethert	KCI Technologies	Liesel.Goethert@kci.com
Hannah Plummer	KCI Technologies	Hannah.plummer@kci.com
August 18, 2022 Field Review Team Members		
Matthew Theriot	KCI Technologies	Matthew.theriot@kci.com
Emily Widder	KCI Technologies	Emily.Widder@kci.com
Additional Stakeholders		
Greg Hamilton	TDOT	Greg.Hamilton@tn.gov
Steve Bryan	TDOT	steve.bryan@tn.gov
Stanley Sumner	TDOT	stanley.sumner@tn.gov
Jordan Burress	TDOT	jordan.burress@tn.gov
Amy Fiscor	TDOT	Amy.Fiscor@tn.gov
Shane Hester	TDOT	shane.hester@tn.gov
Brad Abel	TDOT	brad.abel@tn.gov
Bradley Martin	TDOT	bradley.martin@tn.gov
Aso Hawrami	TDOT	aso.hawrami@tn.gov
Jonathan Russell	TDOT	Jonathan.Russell@tn.gov

Daniel Capparella	GNRC	dcapparella@gnrc.org
Kim Van Atta	TN HSO	kim.vanatta@tn.gov
Chip Knauf	NDOT	Chip.Knauf@nashville.gov
Meredith Montgomery	Walk Bike Nashville	meredith@walkbikenashville.org
Frank Rainear	TDOT	Frank.Rainear@tn.gov
Justin Cole	WeGo	justin.cole@nashville.gov

4.0 Scope of Work

The list of improvements identified include pedestrian infrastructure, such as sidewalks, a multiuse path and crosswalks, turning radii reduction, commercial access consolidation, channelization markings and physical separation in the shoulders such as delineators, signage, and traffic signal improvements. All improvements comply with state and local accessibility guidelines as well as the requirements set forth in the Americans with Disabilities Act (ADA) and the Public Rights-of-Way Accessibility Guidelines (PROWAG).

5.0 Concept Figures

5.1 Concept Figures Overview

TDOT, KCI, and the project team field evaluated all signalized and unsignalized minor street intersections along State Route 6 (Gallatin Pike) between Liberty Lane and the North Walmart Access (LM 22.13). Connecting roadway segments of State Route 6 (Gallatin Pike) were also assessed. The table below lists each location considered for improvements.

Table 2. SR-6 (Gallatin Pike) Study Locations

ID	Log Mile	Location	Control Type
1	21.84	SR 6 at Liberty Lane	Signalized
2	21.95	SR 6 at Northside Drive	Signalized
3	22.03	SR 6 at South Walmart Access	Un-signalized
4	22.13	SR 6 at North Walmart Access	Signalized

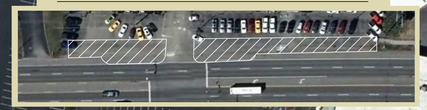
The following figures detail the location and suggested safety improvements within the project limits. Additional information, including estimated improvement costs, are provided in the appendices.

Figure 5-1. Concept Figures

TYPE	YEAR	COUNTY	FIGURE NO.
PRSI	2023	DAVIDSON	5-1A

ABBREVIATION
R# = RECOMMENDATION #

INSET A
SEE R7 - INSTALL AS INTERIM SOLUTION
UNTIL MULTI-USE PATH IS CONSTRUCTED



W11-2
W16-7PL

W11-2
W16-9P
AHEAD

R10-15L(MOD)
TURNING VEHICLES
YIELD TO

R10-11
NO TURN ON RED

R18
R18
R9
R15
R12 (TYP.)
R7 (TYP.)
R13
R3 (TYP.)
R1 (TYP.)
R2 (TYP.)
R5 (TYP.)
R6
R19
R17
R16 (TYP.)
R20 (TYP.)
R23 (TYP.)
R26
R21 (TYP.)
MT13
LIBERTY LANE
SOUTH WALMART ACCESS
NORTH WALMART ACCESS
S.R. 6
S.R. 6
S.R. 6
R24
R4
R8 (TYP.)
R6
R11
NORTHSIDE DRIVE
R19
R28
R25 (TYP.)
R13
R14 (TYP.)
R22
R9
R10 (TYP.)
R27 (TYP.)
L.M. 21.84
L.M. 21.95
L.M. 22.03
L.M. 22.13
NO TURN ON RED
R10-11
TURNING VEHICLES
YIELD TO
R10-15R(MOD)

LEGEND

- MULTI-USE PATH
- GRASS BUFFER
- GREEN BIKE LANE STRIPING
- SIGNAL POLE WITH MAST ARM
- LUMINAIRE WITH HIGHINTESITY LED LIGHTING
- CURB RAMPS
- HIGH VISIBILITY CROSSWALK
- CONCRETE (NEW)

0 200' 400' 600'

N

PEDESTRIAN ROAD SAFETY INITIATIVE

STATE ROUTE 6
LOG MILE 21.84 TO LOG MILE 22.13
DAVIDSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 5-1A
STATE ROUTE 6
LOG MILE 21.84
TO
LOG MILE 22.13

2/15/2023 4:20:36 PM
M:\2021\21108573.01 (TDOT - PRSI - SR 6 from Liberty Lane to Northside Dr)\Design\Submittals_2_Preliminary Field Review\Design\First Draft\Sheet1.sht

TYPE	YEAR	COUNTY	FIGURE NO.
PRSI	2023	DAVIDSON	5-1B

ABBREVIATION
R# = RECOMMENDATION #

GUIDANCE

SR-6 (GALLATIN PIKE) AT LIBERTY LANE

R1. ADD PAINTED CHANNELIZATION MARKINGS IN ALL FOUR (4) CORNERS WITHIN THE EXISTING SHOULDER AREA. CONSIDER INSTALLATION OF PHYSICAL SEPARATION SUCH AS FLEXIBLE DELINEATORS.

R2. ADD PEDESTRIAN CROSSINGS WITH ADA COMPLIANT CURB RAMPS, PEDESTRIAN SIGNALS, PUSHBUTTONS, AND HIGH-VISIBILITY CROSSWALK PAVEMENT MARKINGS FOR THE NORTH,SOUTH, EAST, AND WEST LEGS OF THE INTERSECTION. A FULL TRAFFIC SIGNAL REBUILD SHOULD BE CONSIDERED DUE TO THE AGE AND CONFIGURATION OF THE EXISTING TRAFFIC SIGNAL. FULL REBUILD SHOULD FEATURE SIGNAL TIMING ADJUSTMENTS WITH LEADING PEDESTRIAN INTERVALS. CONSIDER CENTERLINE HARDENING ON SR-6 (GALLATIN PIKE) ALONG THE LEFT TURN LANES AT LIBERTY LANE.

R3. REDUCE CURB RADII IN ALL FOUR (4) CORNERS TO SLOW TURNING TRAFFIC MOVEMENTS, REDUCE PEDESTRIAN CROSSING DISTANCE, AND PROVIDE SPACE FOR NEW PEDESTAL POLES.

R4. REMOVE THE NORTHBOUND SR-6 (GALLATIN PIKE) RIGHT-TURN LANE AND INSTALL A CURB EXTENSION TO REDUCE CROSSING DISTANCE FOR PEDESTRIANS. BASED ON KCI'S TRAFFIC ANALYSIS IN APPENDIX G, THIS IMPROVEMENT IS EXPECTED TO HAVE MINIMAL IMPACT ON OPERATIONS AT THE TRAFFIC SIGNAL.

R5. CONSIDER HIGHER INTENSITY LED LIGHTING TO REPLACE OLDER HIGH-PRESSURE SODIUM FIXTURES TO IMPROVE VISIBILITY OF PEDESTRIAN ACTIVITY. THIS MAY REQUIRE ADDITIONAL POLES AND FIXTURES, WHICH WILL BE DETERMINED DURING THE DESIGN PHASE.

R6. COMPLETE THE SIDEWALK GAP ALONG BOTH SIDES OF SR 6 FROM LIBERTY LANE TO NORTHSIDE DRIVE BY INSTALLING NEW SIDEWALK OR MULTI-USE PATH. AN INSTALLATION ON THE WEST SIDE WOULD SERVE AS AN EXTENSION OF TIP PROJECT #2014-111-026: COMPLETE STREETS IMPLEMENTATION ON BRT LITE CORRIDORS - GALLATIN PIKE, UNDER WHICH A MULTI-USE PATH WOULD BE INSTALLED BETWEEN ALTA LOMA ROAD AND LIBERTY LANE AND INCLUDES IMPROVED SIGNALIZED INTERSECTIONS WITH CROSSWALKS AND PEDESTRIAN COUNTDOWN SIGNALS, RECONFIGURED OR REPOSITIONED TRANSIT STATIONS, AND ENHANCED TRANSIT STATION AMENITIES. CONSOLIDATE COMMERCIAL DRIVEWAYS ACCESSING SR 6 (GALLATIN PIKE) AND DEFINE THE ENTRANCE TO THE CAR DEALERSHIP AT THE EXISTING TRAFFIC SIGNAL. THIS IMPROVEMENT WILL REQUIRE INSTALLATION OF CURB AND GUTTER. BASED ON EXISTING UTILITY PLACEMENT, PERMANENT ROW ACQUISITION MAY NOT BE NECESSARY AT THIS LOCATION. IN DESIGN, CONSIDER THE USE OF COLORED CONCRETE OR PAVEMENT MARKINGS TO BETTER DISTINGUISH BETWEEN BIKE AND PEDESTRIAN PATHS. DESIGN ENGINEER TO COORDINATE WITH NDOT.

SR-6 AT NORTHSIDE DRIVE

R7. INSTALL CHANNELIZATION MARKINGS TO DELINEATE THE RIGHT-OF-WAY NEAR THE CAR DEALERSHIP TO PREVENT MOTOR VEHICLES FROM OBSTRUCTING SIGHT DISTANCE AND ANY FUTURE PEDESTRIAN WALKWAY.

R8. INSTALL PAINTED CHANNELIZATION MARKINGS IN ALL FOUR (4) CORNERS WITHIN THE EXISTING SHOULDER AREA TO SHORTEN PEDESTRIAN CROSSING DISTANCES AND REDUCE EXPOSURE TO MOTOR VEHICLES. CONSIDER INSTALLATION OF PHYSICAL SEPARATION SUCH AS FLEXIBLE DELINEATORS.

R9. INSTALL “NO TURN ON RED”(R10-11) SIGNS FOR BOTH SIDE STREET APPROACHES TO SR-6 (GALLATIN PIKE). BASED ON KCI'S TRAFFIC ANALYSIS IN APPENDIX G, THIS IMPROVEMENT IS EXPECTED TO HAVE MINIMAL IMPACT ON OPERATIONS AT THE TRAFFIC SIGNAL.

R10. INSTALL BACKPLATES ON THE EXISTING SIGNAL HEADS IN AN EFFORT TO IMPROVE VISIBILITY AND COMPLIANCE.

R11. REDUCE CURB RADII IN THE NORTHEAST AND SOUTHEAST CORNERS TO SLOW TURNING TRAFFIC MOVEMENTS, REDUCE PEDESTRIAN CROSSING DISTANCE, AND PROVIDE SPACE FOR A NEW PEDESTAL POLE. ADA COMPLIANT CURB RAMPS CAN BE CONSTRUCTED ON THE NE AND SE CORNERS AS PART OF THIS IMPROVEMENT. THEY SHALL BE ORIENTED FOR BI-DIRECTIONAL CROSSINGS TO ALLOW FOR FUTURE CROSSINGS ON THE NORTH AND SOUTH LEGS OF SR-6 (GALLATIN PIKE).

R12. ADD PEDESTRIAN CROSSINGS WITH ADA COMPLIANT CURB RAMPS, PEDESTRIAN SIGNALS, PUSHBUTTONS, AND HIGH-VISIBILITY CROSSWALK PAVEMENT MARKINGS FOR THE NORTH, SOUTH, EAST, AND WEST LEGS OF THE INTERSECTION. A FULL TRAFFIC SIGNAL REBUILD SHOULD BE CONSIDERED DUE TO THE AGE AND CONFIGURATION OF THE EXISTING TRAFFIC SIGNAL. FULL REBUILD SHOULD FEATURE SIGNAL TIMING ADJUSTMENTS WITH LEADING PEDESTRIAN INTERVALS. CONSIDER CENTERLINE HARDENING ON SR-6 (GALLATIN PIKE) ALONG THE LEFT TURN LANES AT NORTHSIDE DRIVE.

R13. COMPLETE THE REMAINING SIDEWALK GAP ALONG BOTH SIDES OF SR 6 FROM NORTHSIDE DRIVE TO THE WALMART SOUTH ACCESS BY INSTALLING NEW SIDEWALK OR MULTI-USE PATH. AN INSTALLATION ON THE WEST SIDE WOULD SERVE AS AN EXTENSION OF TIP PROJECT #2014-111-026: COMPLETE STREETS IMPLEMENTATION ON BRT LITE CORRIDORS - GALLATIN PIKE, UNDER WHICH A MULTI-USE PATH WOULD BE INSTALLED BETWEEN ALTA LOMA ROAD AND LIBERTY LANE AND INCLUDES IMPROVED SIGNALIZED INTERSECTIONS WITH CROSSWALKS AND PEDESTRIAN COUNTDOWN SIGNALS, RECONFIGURED OR REPOSITIONED TRANSIT STATIONS, AND ENHANCED TRANSIT STATION AMENITIES. CONSOLIDATE COMMERCIAL DRIVEWAYS ACCESSING SR 6 (GALLATIN PIKE) AND DEFINE THE ENTRANCE TO THE CAR DEALERSHIP AT THE EXISTING TRAFFIC SIGNAL. THIS IMPROVEMENT WILL REQUIRE INSTALLATION OF CURB AND GUTTER. SIDEWALK ALONG THE DEVELOPMENT FRONTAGE SHOULD TIE INTO THE EXISTING SIDEWALK NORTH OF THE DEVELOPMENT. BASED ON EXISTING UTILITY PLACEMENT, PERMANENT ROW ACQUISITION MAY NOT BE NECESSARY AT THIS LOCATION. IN DESIGN, CONSIDER THE USE OF COLORED CONCRETE OR PAVEMENT MARKINGS TO BETTER DISTINGUISH BETWEEN BIKE AND PEDESTRIAN PATHS. DESIGN ENGINEER TO COORDINATE WITH NDOT.

R14. CONSIDER HIGHER INTENSITY LED LIGHTING TO REPLACE OLDER HIGH-PRESSURE SODIUM FIXTURES ALONG SR-6 (GALLATIN PIKE) FROM NORTHSIDE DRIVE TO WALMART SOUTH ACCESS AS PART OF A CORRIDOR WIDE ENHANCEMENT TO IMPROVE VISIBILITY OF PEDESTRIAN ACTIVITY. THIS MAY REQUIRE ADDITIONAL POLES AND FIXTURES, WHICH WILL BE DETERMINED DURING THE DESIGN PHASE.

R15. INSTALL DYNAMIC LEFT-TURN BLANK OUT WARNING SIGNS FOR THE NORTHBOUND AND SOUTHBOUND LEFT-TURN MOVEMENTS TO IMPROVE MOTORIST YIELDING BEHAVIOR FOR PEDESTRIANS.

SR-6 (GALLATIN PIKE) AT SOUTH WALMART ACCESS

R16. INSTALL PAINTED CHANNELIZATION MARKINGS IN ALL FOUR (4) CORNERS WITHIN THE EXISTING SHOULDER AREA TO SHORTEN PEDESTRIAN CROSSING DISTANCES AND REDUCE EXPOSURE TO MOTOR VEHICLES. CONSIDER INSTALLATION OF PHYSICAL SEPARATION SUCH AS FLEXIBLE DELINEATORS.

R17. RESTRIPE CROSSWALK WITH HIGH-VISIBILITY CROSSWALK PAVEMENT MARKINGS.

R18. INSTALL W11-2 PEDESTRIAN SIGNAGE ON THE EASTBOUND APPROACH OF THE WALMART SOUTH ACCESS WITH SUPPLEMENTAL ADVANCED WARNING SIGNAGE. COORDINATION WITH PRIVATE DEVELOPMENT MAY BE REQUIRED FOR SIGN INSTALLATION.

R19. REALIGN ADA COMPLIANT CURB RAMPS TO BE ORIENTED ALONG THE PEDESTRIAN PATH OF TRAVEL. LEVEL OUT GRADE BREAKS ON THE EXISTING SIDEWALK NEAR THE LEVEL LANDING ON THE SOUTHWEST CORNER.

PEDESTRIAN ROAD SAFETY INITIATIVE

STATE ROUTE 6
LOG MILE 21.84 TO LOG MILE 22.13
DAVIDSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 5-1B
STATE ROUTE 6
LOG MILE 21.84
TO
LOG MILE 22.13

TYPE	YEAR	COUNTY	FIGURE NO.
PRSI	2023	DAVIDSON	5-1C

ABBREVIATION
R# = RECOMMENDATION #

GUIDANCE

SR-6 (GALLATIN PIKE) AT NORTH WALMART ACCESS

R20. INSTALL PAINTED CHANNELIZATION MARKINGS IN THE SOUTHEAST, NORTHEAST, AND SOUTHWEST CORNERS WITHIN THE EXISTING SHOULDER AREA TO SHORTEN PEDESTRIAN CROSSING DISTANCES AND REDUCE EXPOSURE TO MOTOR VEHICLES. CONSIDER INSTALLATION OF PHYSICAL SEPARATION SUCH AS FLEXIBLE DELINEATORS. A SIGNALIZED MIDBLOCK PEDESTRIAN CROSSING WAS CONSIDERED AT THIS LOCATION ON SR-6 (GALLATIN PIKE) BUT DEEMED TO NOT BE FEASIBLE DUE TO THE CLOSE PROXIMITY TO THE EXISTING TRAFFIC SIGNALS AT NORTHSIDE DRIVE AND THE NORTH WALMART ACCESS.

R21. INSTALL BACKPLATES ON THE EXISTING SIGNAL HEADS IN AN EFFORT TO IMPROVE VISIBILITY AND COMPLIANCE.

R22. INSTALL R10-15 “TURNING VEHICLES YIELD TO PEDESTRIANS” SIGNS FOR THE NORTHBOUND AND SOUTHBOUND RIGHT-TURN MOVEMENTS TO IMPROVE MOTORIST YIELDING BEHAVIOR FOR PEDESTRIANS.

R23. RESTRIPE CROSSWALK WITH HIGH-VISIBILITY CROSSWALK PAVEMENT MARKINGS.

R24. INSTALL A DETECTABLE WARNING SURFACE ON THE CURB RAMP ON THE SOUTHEAST CORNER.

R25. THE EXISTING TRAFFIC SIGNAL SHOULD BE MODIFIED TO INCLUDE NEW PEDESTRIAN CROSSINGS WITH HIGH VISIBILITY PAVEMENT MARKINGS, PEDESTRIAN SIGNAL HEADS, PEDESTRIAN PUSHBUTTONS, AND ADA COMPLIANT CURB RAMPS FOR THE EAST AND NORTH LEGS OF THE INTERSECTION. THESE IMPROVEMENTS SHOULD FEATURE SIGNAL TIMING ADJUSTMENTS WITH LEADING PEDESTRIAN INTERVALS. CONSIDER CENTERLINE HARDENING ON SR-6 (GALLATIN PIKE) ALONG THE LEFT TURN LANES AT THE NORTH WALMART ACCESS.

R26. REDUCE CURB RADII ON THE NORTHWEST AND SOUTHWEST CORNERS TO SLOW TURNING TRAFFIC MOVEMENTS, REDUCE PEDESTRIAN CROSSING DISTANCE, AND PROVIDE SPACE FOR NEW PEDESTAL POLES. AS PART OF THIS IMPROVEMENT, CONSIDER A CURB EXTENSION ON THE SOUTHWEST CORNER INTO THE EXISTING SHOULDER TO PREVENT USE OF THE SHOULDER AS A TRAVEL LANE AND PROVIDE ADDITIONAL SPACE FOR A LANDSCAPED BUFFER WITHOUT RELOCATING EXISTING UTILITIES.

R27. CONSIDER HIGHER INTENSITY LED LIGHTING TO REPLACE OLDER HIGH-PRESSURE SODIUM FIXTURES TO IMPROVE VISIBILITY OF PEDESTRIAN ACTIVITY. THIS MAY REQUIRE ADDITIONAL POLES AND FIXTURES, WHICH WILL BE DETERMINED DURING THE DESIGN PHASE.

R28. CONSIDER INSTALLATION OF NEW SIDEWALK OR MULTI-USE PATH ALONG THE EAST SIDE OF SR 6 ABOVE THE GRADE OF THE ROADWAY FROM THE SOUTH WALMART ACCESS TO THE NORTH WALMART ACCESS. SEVERAL DESIGN LIMITATIONS EXIST ALONG THE EAST SIDE OF THE ROADWAY INCLUDING EXISTING OPEN DITCH STORMWATER DRAINAGE. HOWEVER, A SIDEWALK ABOVE GRADE OF THE ROADWAY ALONG THE DEVELOPMENT FRONTAGE MAY BE FEASIBLE. UTILITIES WERE OBSERVED BEYOND THE DESIRED SIDEWALK PATH; THEREFORE, EXISTING RIGHT-OF-WAY OR UTILITY EASEMENTS MAY EXIST. TO INSTALL SIDEWALK, UTILITY RELOCATION SUCH AS EXISTING WATER LINES AND CONDUIT MAY BE NECESSARY. NORTH OF THE CAR WASH, THE GRADE BEGINS TO LEVEL OUT. SIGNIFICANT EARTHWORK MAY BE REQUIRED TO MAINTAIN ADA COMPLIANCE. IN DESIGN, CONSIDER THE USE OF COLORED CONCRETE OR PAVEMENT MARKINGS TO BETTER DISTINGUISH BETWEEN BIKE AND PEDESTRIAN PATHS. DESIGN ENGINEER TO COORDINATE WITH NDOT.

PEDESTRIAN ROAD SAFETY INITIATIVE

STATE ROUTE 6
LOG MILE 21.84 TO LOG MILE 22.13
DAVIDSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 5-1B
STATE ROUTE 6
LOG MILE 21.84
TO
LOG MILE 22.13

6.0 Conclusion

The total estimated cost of identified improvements is provided in the table below. A detailed cost breakdown by location and improvement is provided in Appendix D. Right-of-way acquisition is not anticipated, but surveying may be required for some improvements. General maintenance and signal maintenance agreements with the Metropolitan Government of Nashville and Davidson County are required. These improvements will be part of a design project and will be let to construction.

Table 3. SR-6 (Gallatin Pike) PRSI Improvements Cost Estimate Summary

DESCRIPTION CONSTRUCTION ITEMS (NOT TO INCLUDE ENGINEERING DESIGN)		FIELD REVIEW IMPROVEMENTS	TOTAL
Full Traffic Signal Rebuild		$800,000	$800,000
Curb Ramp Installation		$50,500	$50,500
Pedestrian Signal Improvements		$28,000	$28,000
PHB/HAWK Improvements		$0	$0
Crosswalk Pavement Markings		$13,000	$13,000
Curb Extensions		$174,400	$174,400
Sidewalk		$1,710,000	$1,710,000
Other Improvements (Signage, Signal Timing, Street Lighting, Refuge Islands, Etc.)		$308,000	$308,000
Maintenance of Traffic	10%	$309,000	$309,000
SUBTOTAL		**$3,392,900**	**$3,392,900**
Mobilization	5%		$170,000
Const. Contingency	20%		$679,000
Const. Eng. & Inspec.	10%		$340,000
TOTAL CONSTRUCTION ESTIMATE			**$4,581,900**

Appendix A. Field Review

PEDESTRIAN ROAD SAFETY INITIATIVE (PRSI)
PRELIMINARY FIELD REVIEW SUMMARY
July 8, 2022

Project No.: HSIP-6(155), 19S006-F0-006
PIN: 132524.00
Route: SR-6 (Gallatin Pike)
Description: SR-6 (Gallatin Pike), From Liberty Lane to Northside Drive
County: Davidson County

Existing site conditions were inspected during a preliminary field review meeting on Friday, July 8, 2022, along the SR-6 (Gallatin Pike) corridor between Liberty Lane and Northside Drive. All team members identified various safety needs of pedestrians along the roadway and identified potential pedestrian safety countermeasures to be considered throughout the project planning and design process. The following summary details all items discussed with team members during the preliminary field review.

GENERAL ITEMS

- Significant motor vehicle volumes were apparent throughout the entire project limits.
- The posted speed limit on SR-6 (Gallatin Pike) within the project limits is 45 mph. Higher speeds were seemingly observed for some motor vehicles.
- Street lighting was present throughout the entire project limits, however, higher intensity LED lighting to replace older high-pressure sodium fixtures could improve visibility of pedestrian activity. This may require additional poles and fixtures, which will be determined during the design phase.
- No sidewalks exist along SR-6 (Gallatin Pike), Liberty Lane, or Northside Drive within the project limits.
- Recommend installing new sidewalk or multi-use path on both sides of SR-6 (Gallatin Pike) throughout the project limits. An installation on the west side would serve as an extension of *TIP Project #2014-111-026: Complete Streets Implementation on BRT Lite Corridors - Gallatin Pike*, under which a multi-use path would be installed between Alta Loma Road and Liberty Lane and includes improved signalized intersections with crosswalks and pedestrian countdown signals, reconfigured or repositioned transit stations, and enhanced transit station amenities.
- Consider consolidating commercial driveways accessing SR-6 (Gallatin Pike) in conjunction with the installation of new sidewalk or multi-use path to reduce the number of motor vehicle and pedestrian conflict points.
- Based on the location of existing utilities, there appears to be ample right of way available on both the east and west sides of SR-6 (Gallatin Pike) for new pedestrian improvements, such as a sidewalk or multi-use path. Existing right of way availability will ultimately be determined with field run survey during the design phase.
- The existing stormwater drainage is accommodated with roadway ditches.
- There are two (2) signalized intersections within the project limits spaced approximately 580’ apart. Neither intersection provides a protected pedestrian

crossing with pedestrian signalization, pushbuttons, or crosswalks on any intersection leg. Existing signal timings for side street approaches do not provide adequate crossing time and are not conducive for those crossing SR-6 (Gallatin Pike) on foot.

- New development is being constructed west of SR-6 (Gallatin Pike) on Liberty Lane. There is also a planned development currently in the rezoning phase of the development process along Liberty Lane, which may increase pedestrian activity in the area.
- Consider extending the project limits north along SR-6 (Gallatin Pike) approximately 450' to the unsignalized Walmart shopping center driveway. This would provide connection to an existing sidewalk on the west side SR-6 (Gallatin Pike) approximately 220' north and access to a signalized pedestrian crossing at the primary Walmart shopping center driveway. It is likely that the shopping center generates pedestrian activity that traverses the current project limits and continues through the proposed extension.
- SR-6 (Gallatin Pike) is designated as T5-M-AB5 in Metro Nashville's Major and Collector Street Plan (MCSP), meaning it has been identified as a mixed-use arterial-boulevard supporting a 'Center' place type. The MCSP proposed cross-section for SR-6 (Gallatin Pike) within the project limits includes a 2' Bikeway Buffer, 6' Protected Bikeway, 4' Planting Strip, 10' Sidewalk, and 4' Frontage Zone.
- According to route information published by WeGo, Bus Route #56 provides service along SR-6 (Gallatin Pike) with stops provided at Walmart and in the vicinity of Conference Drive, both of which are just outside of the study area. The route is classified as 'frequent' meaning the service operates every 15 minutes or less.

1. SR-6 (GALLATIN PIKE) AND LIBERTY LANE

a. Add pedestrian crossings with ADA-compliant curb ramps, pedestrian signals, pushbuttons, and high-visibility crosswalk pavement markings for the north, south, east, and west legs of the intersection. New pedestrian crossings could be retrofitted to the existing traffic signal with the installation of new pedestal poles. All existing wood traffic signal poles are owned by the Nashville Department of Transportation (NDOT).

b. Due to the age and condition of the existing wood pole traffic signal, a new traffic signal installation with fully compliant pedestrian crossings should be considered.

c. Reduce curb radii in all four (4) corners to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles. Existing concrete curb radii are only present for the NE and SE corners of the intersection.

d. Evaluate the need for the northbound SR-6 (Gallatin Pike) right-turn lane. Removal would reduce pedestrian conflicts and crossing distance with little impact anticipated to motor vehicle traffic. A traffic analysis should be performed.

e. Consider adding painted channelization markings in all four (4) corners within the existing shoulder area. This would discourage drivers from using the shoulder space near the intersection as a travel way and effectively shorten pedestrian crossing distances and exposure to motor vehicles.

2. SR-6 (GALLATIN PIKE) AND NORTHSIDE DRIVE

a. Add pedestrian crossings with ADA-compliant curb ramps, pedestrian signals, pushbuttons, and high-visibility crosswalk pavement markings for the north, south, east, and west legs of the intersection. New pedestrian crossings could be retrofitted

to the existing traffic signal with the installation of new pedestal poles. Three (3) of the existing wood traffic signal poles are owned by the Nashville Department of Transportation (NDOT). The traffic signal span is attached to a wood pole in the SW corner owned by Nashville Electric Service (NES).

b. Due to the age and condition of the existing wood pole traffic signal, a new traffic signal installation with fully compliant pedestrian crossings should be considered.
c. There is a continuous open-frontage driveway serving the automobile dealership on the west side of SR-6 (Gallatin Pike). In order to install pedestrian crossings and sidewalk or multi-use path, the open frontage would need to be closed and the existing entrance defined at the existing traffic signal. An existing sidewalk on the west side of SR-6 (Gallatin Pike) terminates just north of the intersection, in part, due to the continuous open-frontage driveway of the automobile dealership.
d. Currently, motor vehicles at the automobile dealership appear to be parked in the existing right of way. Until a sidewalk or multi-use path is constructed, this could be discouraged with the installation of channelization markings as well as discussing the matter with the dealership. At a minimum, motor vehicles should be prevented from blocking sight distance at any access along SR-6 (Gallatin Pike), particularly at the existing traffic signal. Additionally, the existing sidewalk on the west side of SR-6 (Gallatin Pike) terminates into the parked motor vehicles within the existing right of way.
e. Reduce curb radii in the NE and SE corners at Northside Drive to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for a new pedestal poles. Existing concrete curb radii are not present.
f. Consider adding painted channelization markings in all four (4) corners within the existing shoulder area. This would discourage drivers from using the shoulder space near the intersection as a travel way and effectively shorten pedestrian crossing distances and exposure to motor vehicles.
g. Consider adding “No Turn on Red” (R10-11) signs for both side street approaches to SR-6 (Gallatin Pike). Both pedestrian crashes identified appear to have occurred during turns on red.

ACTION ITEMS

- NDOT to provide information on development occurring west of SR-6 (Gallatin Pike) on Liberty Lane.
- NDOT to provide status and up-to-date project scope of TIP Project #2014-111-026.
- TDOT to provide additional information on the process required to close open-frontage driveways and whether or not a right-of-way acquisition phase would be required.
- TDOT to consider extending project limits north along SR-6 (Gallatin Pike) approximately 450’ to the Walmart shopping center.
- KCI to follow-up with WeGo (not in attendance) regarding future plans for the area.
- KCI to discuss collecting traffic volume, speed, and turning movement count data (including pedestrians and bicyclists) with TDOT.

Sign-In Sheet

PIN 132524.00 - TDOT PRSI SR-6 (GALLATIN PIKE)
PRELIMINARY FIELD REVIEW MEETING
SIGN-IN
JULY 8, 2022

NAME	ORGANIZATION	PHONE	EMAIL
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PEDESTRIAN ROAD SAFETY INITIATIVE (PRSI)
PRELIMINARY FIELD REVIEW SUMMARY
August 18, 2022

Project No.: HSIP-6(155), 19S006-F0-006
PIN: 132524.00
Route: SR-6 (Gallatin Pike)
Description: SR-6 (Gallatin Pike), From Liberty Lane (LM 21.83) to North Walmart Driveway Access (LM 22.14)
County: Davidson County

Existing site conditions were inspected during a preliminary field review meeting on Friday, July 8, 2022, along the SR-6 (Gallatin Pike) corridor between Liberty Lane and Northside Drive. All team members identified various safety needs of pedestrians along the roadway and identified potential pedestrian safety countermeasures to be considered throughout the project planning and design process. Based on the original preliminary field review, it was determined by TDOT and the project team that the project limits shall be extended further north from Northside Drive to the north Walmart driveway access (LM 22.14). To supplement the original field notes, the KCI project team conducted an additional field review on Thursday, August 18, 2022, identifying various safety needs of pedestrians between Northside Drive and the north Walmart driveway access.

GENERAL ITEMS

- The existing shoulder along the east and west sides of SR-6 (Gallatin Pike) remains unpaved and sits approximately 0-2 inches lower than the full depth asphalt pavement. One vehicle was observed using the shoulder as an additional travel lane. Channelized striping, shoulder width reduction or repurposing of the existing shoulder should be considered.
- No sidewalk exists along the east side of SR-6 (Gallatin Pike). Several design limitations exist along this side of the roadway including existing open ditch stormwater drainage. However, a sidewalk above grade of the roadway along the development frontage may be feasible. Utilities were observed beyond the desired sidewalk path; therefore, existing right-of-way or utility easements may exist. To install sidewalk, utility relocation such as existing water lines and conduit may be necessary. North of the car wash, the grade begins to level out. Significant earthwork may be required to maintain ADA compliance.
- Existing lighting is spaced at a reasonable distance along this section of SR-6 (Gallatin Pike). Observations occurred during daytime, however, and the effectiveness of this lighting is unknown to the project team.
- A potential mid-block crossing can be considered at the south Walmart driveway access. However, given its proximity to two signalized intersections, queueing into the potential crossing location is a concern, specifically from the north Walmart driveway access traffic signal. Design obstacles related to grading and drainage exist for installation of a curb ramp on the east side of the intersection. Sight distance at this location was adequate.
- On the west side of SR-6 (Gallatin Pike), generally a 4-5’ landscaped buffer is present between the curb and the sidewalk. There is a 45’ segment near the north Walmart

driveway access, where no landscaped buffer is present. The existing sidewalk utilizes this space to avoid existing utilities.

- Near the south Walmart driveway access, a 12’ sidewalk is provided near a new retail development, currently under construction.
- The curb ramps for the south Walmart driveway access are not angled in the direction of travel. Realignment of the ramps should be considered.
- The south driveway access features a steep vertical grade into the development. However, the existing crossing is mostly level. Crosswalk striping is partially worn. Restriping of the crosswalk and stop line should be considered.
- The curb ramp on the southwest corner of the south Walmart driveway access includes significant grade breaks near the level landing. These should be leveled out to meet ADA compliance.
- As noted in the July 8 field notes, the property frontage near Northside Drive does not provide a pedestrian path of travel. Vehicles are parked for the car dealership within the assumed existing right-of-way.
- At the intersection of Northside Drive and SR-6 (Gallatin Pike) vehicles from the minor street and driveway access were observed not complying with the traffic signal. More specifically, vehicles from Northside Drive were observed performing left-turns while the traffic signal was red for that approach.

3. SR-6 (GALLATIN PIKE) AND NORTH WALMART DRIVEWAY ACCESS

f. A traffic signal with mast arms, pedestrian signal heads, and pedestrian pushbuttons is installed at the intersection. Pedestrian signals are only provided on the southeast, northwest, and northeast corners for crossings on the west and south legs.

g. The pedestrian signal head on the southwest corner (Gallatin running north/south) facing the southeast corner did not display a countdown indicator. All other pedestrian signal heads included a pedestrian countdown. No APS infrastructure was observed.

h. Signal heads did not include backplates on all mast arms. No yield to pedestrian signage was observed.

i. Crosswalk striping is worn on the south and west legs of the intersection and should be replaced. No pedestrian crossing exists on the east and north legs. The existing traffic signal should be modified to include new pedestrian crossings with high visibility pavement markings, pedestrian signal heads, pedestrian pushbuttons, and ADA compliant curb ramps for the east and north legs of the intersection.

j. No curb ramp or pedestrian infrastructure exists on the northeast corner. The curb ramp on the southeast corner is missing a detectable warning surface. No sidewalk exists on this side of the roadway.

k. Existing curb ramps on the southwest and northwest corners of the intersection are not angled at the path of travel. Realignment of the ramps should be considered. Sidewalk on this side of the roadway extends into the Walmart development.

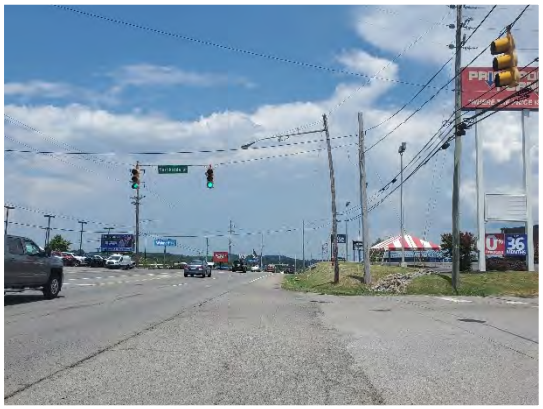
Field Review Photos

These photos were taken during the preliminary field review on July 8, 2022 and the follow up site visit from August 18,2022, to illustrate the existing conditions and call-out features mentioned in the above summary.

1. GENERAL ITEMS

Motor Vehicle Volume

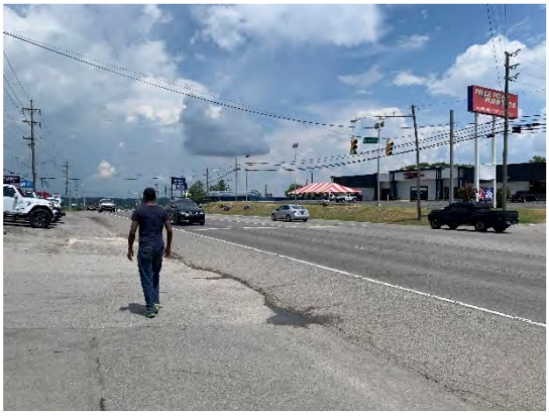
Street Lighting

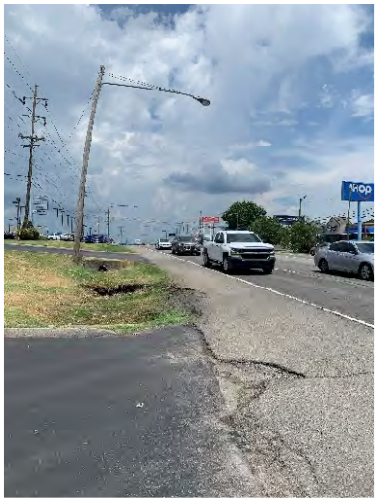

Pedestrian Access

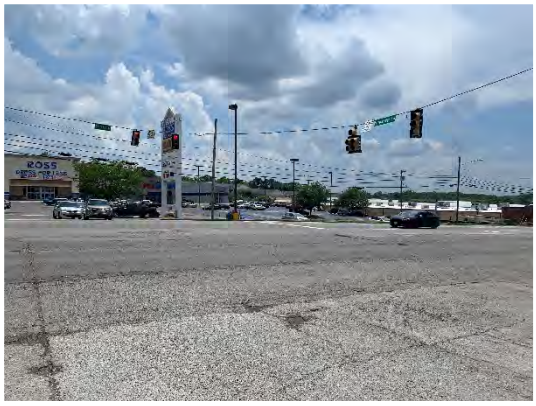




Commercial Driveways



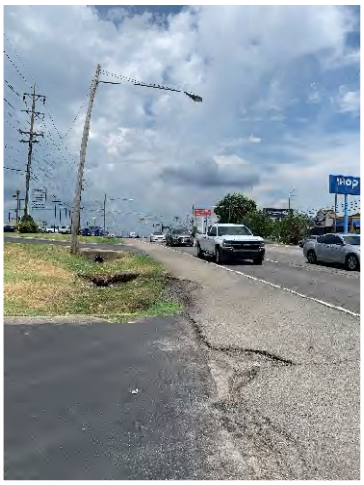


Existing Utility Location

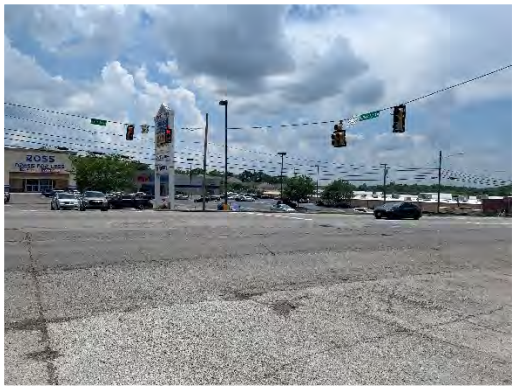


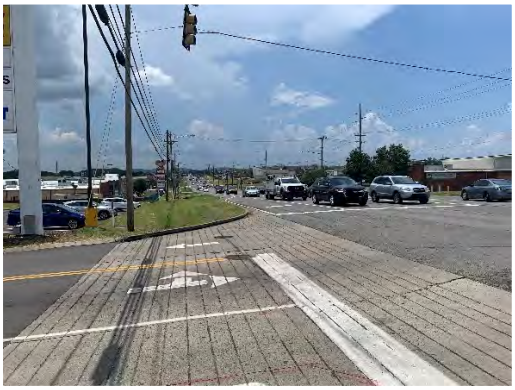

Stormwater Drainage



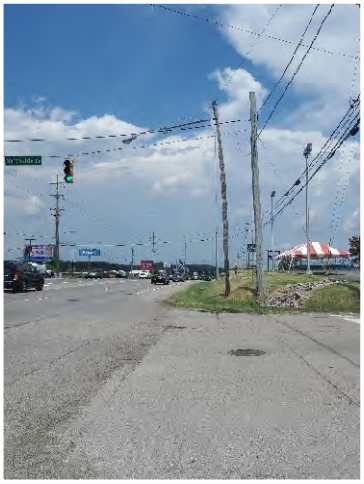



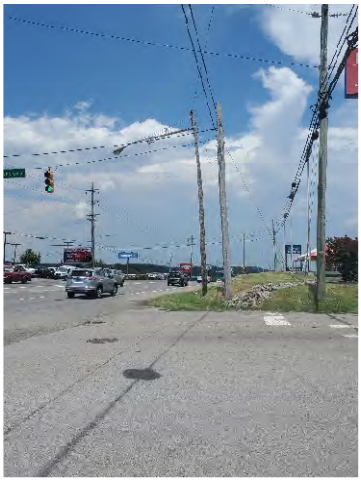
2. SR-6 (GALLATIN PIKE) AND LIBERTY LANE

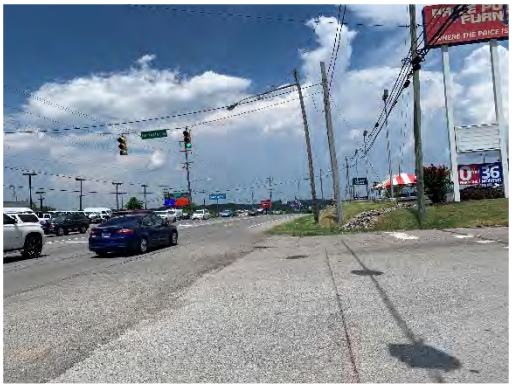




3. SR-6 (GALLATIN PIKE) AND NORTHSIDE DRIVE

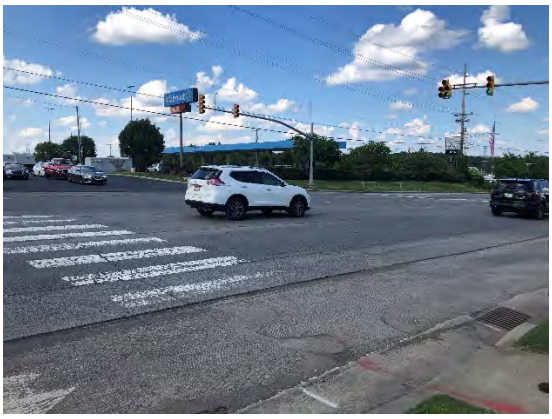






4. SR-6 (GALLATIN PIKE) FROM NORTHSIDE DRIVE TO NORTH WALMART ACCESS

5. SR-6 (GALLATIN PIKE) AT NORTH WALMART ACCESS



Appendix B. Crash Diagrams

TYPE	YEAR	COUNTY	FIGURE NO.
PRSI	2022	DAVIDSON	1

CRASH LEGEND

- Vehicle Path (Direction of Travel)
- Backing Vehicle
- Rear End
- Head On
- Side Swipe (Same Direction)
- Side Swipe (Opposite Direction)
- Right Angle
- Left Turn
- Overturn
- Out of Control
- Pedestrian/Bicycle Pedestrian/Motorcycle (Specify Road User)
- Heavy Truck / Bus

CONDITION CODES LEGEND

X - X - X - # — NUMBER OF VEHICLES

WEATHER	ROAD SURFACE	LIGHTING
C=Clear	D=Dry	D=Daylight
R=Rain	W=Wet	DKN=Dark Not Lighted
CLD=Cloudy	I=Icy	DKL=Dark Lighted
F=Fog	O=Other	DN=Dawn
S=Snow	U=Unknown	DS=Dusk
U=Unknown		U=Unknown

TYPE OF CRASH

NUMBER OF FATALITIES OR INJURIES

- # FATAL CRASH
- # INCAPACITATING/SUSPECT SERIOUS INJURY CRASH
- # NON-INCAPACITATING/SUSPECTED MINOR INJURY CRASH
- # PROPERTY DAMAGE CRASH

Time: A=AM P=PM

☒ Parked Vehicle

☒ Object (Specify)

LIBERTY LANE

NORTHSIDE DRIVE

SR 6 (GALLATIN PIKE)

LM 21.83

BEGIN PROJECT

LM 22.13

END PROJECT

1 11/19/20 17:40P C - D -DKN- 1 (PEDESTRIAN)

1 07/21/22 13:05P C - D - U - 1 (BICYCLE)

1 05/13/17 15:30P C - D - D - 1 (PEDESTRIAN)

1 09/18/20 20:18P U - D -DKL- 1 (PEDESTRIAN)

1 12/01/19 17:08P C - D -DKL- 1 (PEDESTRIAN)

0 400' 800' 1200'

N

PEDESTRIAN ROAD SAFETY INITIATIVE

STATE ROUTE 6

LOG MILE 21.83 TO LOG MILE 22.13

DAVIDSON COUNTY

BICYCLE/PEDESTRIAN CRASHES 1/1/2017-7/26/2022

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 1
STATE ROUTE 6
LOG MILE 21.83
TO
LOG MILE 22.13

10/19/2022 2:20:25 PM
M:\2021\2108573.01 (TDOT - PRSI - SR 6 from Liberty Lane to Northside Dr)\Engr\Crashes\Crash Diagrams\Crash Diagrams\132524-00-CrashDiagram.dgn

Appendix C. Project Recommendations

Recommendations Overview

TDOT, KCI, and the project team field evaluated all signalized and unsignalized intersections along State Route 6 (Gallatin Pike) between Liberty Lane and the North Walmart Access (LM 22.13). Connecting roadway segments of State Route 6 (Gallatin Pike) were also assessed. The table below lists each location considered for improvements.

Table C1. Study Intersections

ID	Log Mile	Location	Control Type
1	21.84	SR 6 at Liberty Lane	Signalized
2	21.95	SR 6 at Northside Drive	Signalized
3	22.03	SR 6 at South Walmart Access	Un-signalized
4	22.13	SR 6 at North Walmart Access	Signalized

Recommended Improvements

The following table details the recommended improvements. The numerical ID in the table below can be used to cross-reference each project with the corresponding cost estimate.

Table C2. Recommended Improvements Summary

ID	Control Type	Recommended Improvements	Cost Estimate
SR 6 AT LIBERTY LANE			
1	Signalized	• Add painted channelization markings in all four (4) corners within the existing shoulder area. Consider installation of physical separation such as flexible delineators.	$14,000
		• Add pedestrian crossings with ADA compliant curb ramps, pedestrian signals, pushbuttons, and high-visibility crosswalk pavement markings for the north, south, east, and west legs of the intersection. A full traffic signal rebuild should be considered due to the age and configuration of the existing traffic signal. Full rebuild should feature signal timing adjustments with leading pedestrian intervals. Consider centerline hardening on SR-6 (Gallatin Pike) along the left turn lanes at Liberty Lane.	Full Traffic Signal Rebuild $400,000
		• Reduce curb radii in all four (4) corners to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles.	$87,200

		• Remove the northbound SR-6 (Gallatin Pike) right-turn lane, add painted channelization markings, and install a curb extension to reduce crossing distance for pedestrians. Based on KCI's traffic analysis contained in Appendix G, it was determined that this improvement is expected to have minimal impact on traffic operations at this signal.	$6,000
		• Consider higher intensity LED lighting to replace older high-pressure sodium fixtures along SR-6 (Gallatin Pike) from Liberty Lane to Northside Drive as part of a corridor wide enhancement to improve visibility of pedestrian activity. This may require additional poles and fixtures, which will be determined during the design phase.	$69,000
		• Complete the sidewalk gap along both sides of SR 6 from Liberty Lane to Northside Drive by installing new sidewalk or multi-use path. An installation on the west side would serve as an extension of TIP Project #2014-111-026: Complete Streets Implementation on BRT Lite Corridors - Gallatin Pike, under which a multi-use path would be installed between Alta Loma Road and Liberty Lane and includes improved signalized intersections with crosswalks and pedestrian countdown signals, reconfigured or repositioned transit stations, and enhanced transit station amenities. Consolidate commercial driveways accessing SR 6 (Gallatin Pike) and define the entrance to the car dealership at the existing traffic signal. This improvement will require installation of curb and gutter. Based on existing utility placement, permanent ROW acquisition may not be necessary at this location. In design, consider the use of colored concrete or pavement markings to better distinguish between bike and pedestrian paths. Design engineer to coordinate with NDOT.	$600,000
			SR 6 at Liberty Lane Total Cost: $1,176,200

SR 6 AT NORTHSIDE DRIVE			
2	Signalized	• Install channelization markings to delineate the right-of-way near the car dealership to prevent motor vehicles from obstructing sight distance and any future pedestrian walkway.	$14,500
		• Install painted channelization markings in all four (4) corners within the existing shoulder area to shorten pedestrian crossing distances and reduce exposure to motor vehicles. Consider installation of physical separation such as flexible delineators.	$14,500
		• Install “No Turn on Red” (R10-11) signs for both side street approaches to SR-6 (Gallatin Pike). Based on KCI’s traffic analysis contained in Appendix G, it was determined that this improvement is expected to have minimal impact on traffic operations at this signal.	$3,000
		• Install backplates on the existing signal heads in an effort to improve visibility and compliance.	$1,000
		• Reduce curb radii in the northeast and southeast corners to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for a new pedestal pole. ADA compliant curb ramps can be constructed on the northeast and southeast corners as part of this improvement. They shall be oriented for bi-directional crossings to allow for future crossings on the north and south legs of SR-6 (Gallatin Pike).	$43,600

		• Add pedestrian crossings with ADA compliant curb ramps, pedestrian signals, pushbuttons, and high-visibility crosswalk pavement markings for the north, south, east, and west legs of the intersection. A full traffic signal rebuild should be considered due to the age and configuration of the existing traffic signal. Full rebuild should feature signal timing adjustments with leading pedestrian intervals. Consider centerline hardening on SR-6 (Gallatin Pike) along the left turn lanes at Northside Drive.	Full Traffic Signal Rebuild $400,000
		• Complete the remaining sidewalk gap along both sides of SR 6 from Northside Drive to the Walmart South Access by installing new sidewalk or multi-use path. An installation on the west side would serve as an extension of TIP Project #2014-111-026: Complete Streets Implementation on BRT Lite Corridors - Gallatin Pike, under which a multi-use path would be installed between Alta Loma Road and Liberty Lane and includes improved signalized intersections with crosswalks and pedestrian countdown signals, reconfigured or repositioned transit stations, and enhanced transit station amenities. Consolidate commercial driveways accessing SR 6 (Gallatin Pike) and define the entrance to the car dealership at the existing traffic signal. This improvement will require installation of curb and gutter. Sidewalk along the development frontage should tie into the existing sidewalk north of the development. Based on existing utility placement, permanent ROW acquisition may not be necessary at this location. In design, consider the use of colored concrete or pavement markings to better distinguish between bike and pedestrian paths. Design engineer to coordinate with NDOT.	$420,000

		• Consider higher intensity LED lighting to replace older high-pressure sodium fixtures along SR-6 (Gallatin Pike) from Northside Drive to Walmart south access as part of a corridor wide enhancement to improve visibility of pedestrian activity. This may require additional poles and fixtures, which will be determined during the design phase.	$69,000
		• Install dynamic left-turn blank out warning signs for the northbound and southbound left-turn movements to improve motorist yielding behavior for pedestrians.	$12,000
		SR 6 at Northside Drive Total Cost: $977,600	
SR 6 AT SOUTH WALMART ACCESS			
3	Un-Signalized	• Install painted channelization markings in all four (4) corners within the existing shoulder area to better establish its use as a shoulder, rather than a travel lane. Consider installation of physical separation such as flexible delineators. A signalized midblock pedestrian crossing was considered at this location on SR-6 (Gallatin Pike) but deemed to not be feasible due to the close proximity to the existing traffic signals at Northside Drive and the North Walmart Access.	$14,000
		• Restripe crosswalk with high-visibility crosswalk pavement markings.	$2,000
		• Install W11-2 Pedestrian signage on the eastbound approach of the Walmart South Access with supplemental advanced warning signage. Coordination with private development may be required for sign installation.	$4,000
		• Realign ADA compliant curb ramps to be oriented along the pedestrian path of travel. Level out grade breaks on the existing sidewalk near the level landing on the southwest corner.	$11,000
		SR 6 at South Walmart Access Total Cost: $31,000	

SR 6 AT NORTH WALMART ACCESS			
4	Signalized	• Install painted channelization markings in the southeast, northeast, and southwest corners within the existing shoulder area to shorten pedestrian crossing distances and reduce exposure to motor vehicles. Consider installation of physical separation such as flexible delineators.	$14,000
		• Install backplates on the existing signal heads in an effort to improve visibility and compliance.	$1,000
		• Install R10-15 “Turning vehicles yield to pedestrians” signs for the northbound and southbound right-turn movements to improve motorist yielding behavior for pedestrians.	$3,000
		• Restripe crosswalks with high-visibility crosswalk pavement markings.	$5,500
		• Install a detectable warning surface on the curb ramp on the southeast corner.	$1,000
		• The existing traffic signal should be modified to include new pedestrian crossings with high visibility pavement markings, pedestrian signal heads, pedestrian pushbuttons, and ADA compliant curb ramps for the east and north legs of the intersection. These improvements should feature signal timing adjustments with leading pedestrian intervals. Consider centerline hardening on SR-6 (Gallatin Pike) along the left turn lanes at the North Walmart Access.	$72,000
		• Reduce curb radii on the northwest and southwest corners to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles.	$43,600

• Consider higher intensity LED lighting to replace older high-pressure sodium fixtures along SR-6 (Gallatin Pike) from Walmart south access to Walmart north access as part of a corridor wide enhancement to improve visibility of pedestrian activity. This may require additional poles and fixtures, which will be determined during the design phase.	$69,000
• Consider installation of new sidewalk or multi-use path along the east side of SR 6 above the grade of the roadway from the South Walmart Access to the North Walmart Access. Several design limitations exist along the east side of the roadway including existing open ditch stormwater drainage. However, a sidewalk above grade of the roadway along the development frontage may be feasible. Utilities were observed beyond the desired sidewalk path; therefore, existing right-of-way or utility easements may exist. To install sidewalk, utility relocation such as existing water lines and conduit may be necessary. North of the car wash, the grade begins to level out. Significant earthwork may be required to maintain ADA compliance. In design, consider the use of colored concrete or pavement markings to better distinguish between bike and pedestrian paths. Design engineer to coordinate with NDOT.	Survey required for more accurate estimate. Estimated $690,000
SR 6 at North Walmart Access Total Cost: $899,100	

Cost Estimate Summary

TDOT, KCI, and the project team evaluated all signalized and unsignalized minor street intersections along State Route 6 (Gallatin Pike) between Liberty Lane and the North Walmart Access. The team identified infrastructure improvements that could improve pedestrian safety throughout the corridor.

The total construction estimate for all improvements, including mobilization, construction contingencies, and construction engineering and inspection is approximately **$4,581,900.** Estimated subtotal costs of traffic maintenance, mobilization, construction contingencies, and construction engineering and inspection have been rounded up to the next $1,000. The cost does not include engineering design. It should be noted that estimates were generated in 2022 during a time of high inflation, and therefore may be conservative in nature. Actual costs may differ if economic trends were to change in the future. The following table details the cost estimate of all projects identified within the parameters of the study corridor. Information from this table can be cross-referenced to the recommended improvements detailed above using the ID number.

Table C3. Cost Estimate Summary

ID	Log Mile	Location	Estimated Cost
1	21.84	SR 6 at Liberty Lane	*$1,176,200*
2	21.95	SR 6 at Northside Drive	*$977,600*
3	22.03	SR 6 at South Walmart Access	*$31,000*
4	22.13	SR 6 at North Walmart Access	*$899,100*
SUBTOTAL INCLUDING MAINTENANCE OF TRAFFIC (10%)			**$3,392,900**
TOTAL CONSTRUCTION ESTIMATE* INCLUDING MOBILIZATION (5%), CONTINGENCY (20%) & CEI (10%)			**$4,581,900**

**Does not include engineering design cost.*

Appendix D. Prioritization

The improvements identified by TDOT, KCI, and the project team were prioritized based on their respective expected crash reductions to pedestrian/vehicle-type crashes. Careful consideration was taken by KCI and the project team to select and prioritize improvements that align with the goals of TDOT and the needs of the community along State Route 6 within the study area.

Prioritization Methods

The procedures used to prioritize these improvements are based on methodologies provided in the FHWA manual, *Crash Modification Factors in Practice: Using CMFs to Quantify the Safety in the Value Engineering Process* which includes typical practices from the American Association of State Highway Transportation Officials' (AASHTO) *Highway Safety Manual*. More specifically, KCI implemented the observed crash frequency with crash modification factor (CMF) method. This methodology is particularly effective when sufficient crash data is available for the study location. In addition to considering historical crash data, the methodology utilizes industry standard crash modification factors. The CMF was used as an estimate of each safety countermeasure's ability to reduce both crashes and crash severity and select the countermeasure with the greatest safety benefit for a specific location.

To select CMFs for the study area, a list of countermeasures were identified, relevant CMFs were developed, and CMF applicability was verified for the pedestrian/vehicle-type crashes within the study area. Applicable CMFs were gathered from Appendix B of the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (Figure D1).

Figure D1. FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations Appendix B

Countermeasure	CRF	CMF	Basis	Reference
Crosswalk visibility enhancement[1]	—	—	—	—
Advance STOP/YIELD signs and markings	25%	0.75	Pedestrian crashes[2]	Zegeer, et. al. 2017
Add overhead lighting	23%	0.77	Total injury crashes	Harkey, et. al. 2008
High-visibility marking[3]	48%	0.52	Pedestrian crashes	Chen, et. al., 2012
High-visibility markings (school zone)[3]	37%	0.63	Pedestrian crashes	Feldman, et. al. 2010
Parking restriction on crosswalk approach	30%	0.70	Pedestrian crashes	Gan, et. al., 2005
In-street Pedestrian Crossing sign	UNK	UNK	N/A	N/A
Curb extension	UNK	UNK	N/A	N/A
Raised crosswalk (speed tables)	45%	0.55	Pedestrian crashes	Elvik, et. al., 2004
	30%	0.70	Vehicle crashes	
Pedestrian refuge island	32%	0.68	Pedestrian crashes	Zegeer, et. al., 2017
PHB	55%	0.45	Pedestrian crashes	Zegeer, et. al., 2017
Road Diet – Urban area	19%	0.81	Total crashes	Pawlovich, et. al., 2006
Road Diet – Suburban area	47%	0.53	Total crashes	Persaud, et. al., 2010
RRFB	47%	0.53	Pedestrian crashes	Zegeer, et. al. 2017

[1]This category of countermeasure includes treatments which may improve the visibility between the motorist and the crossing pedestrian.
[2]Refers to pedestrian street crossing crashes, and does not include pedestrians walking along the road crashes or "unusual" crash types.
[3]The effects of high-visibility pavement markings (e.g., ladder, continental crosswalk markings) in the "after" period is compared to pedestrian crashes with parallel line markings in the "before" period.

For countermeasures not considered in the FHWA manual, additional transportation resources were consulted, including the AASHTO Highway Safety Manual, the FHWA Toolbox of Countermeasures and Their Potential Effectiveness, and the CMF Clearinghouse database, which is a database that allows users to search CMFs from carefully vetted transportation research studies. Relevant CMF resources utilized in this study are contained in Appendix E.

To apply CMFs to the observed crashes in the study area, historical non-motorized crash data was obtained from Enhanced Tennessee Roadway Information Management System (ETRIMS) for the time period between January 1, 2017 and July 26, 2022 to account for a 5-year analysis period. In total, five (5) non-motorized crashes were reported in the study area during the 5-year period. The State Route 6 (Gallatin Pike) corridor was divided into the three (3) signalized intersections and one (1) unsignalized intersection listed in the previous section. Observed crashes were assigned to each of these four (4) locations using engineering judgement based on information in the crash reports obtained from the Tennessee Integrated Traffic Analysis Network (TITAN) and crash diagrams produced by KCI.

The selected CMFs were applied as a multiplicative factor to the number of observed crashes at each location to estimate a reduced number of anticipated crashes after the countermeasure has been implemented. The following equation was applied at each location:

$$N_{exp} = N_{obs} * (CMF_1 * CMF_2 * CMF_{3...})$$

Where,

N_{obs} is the number of observed crashes at a given location within a specific period
N_{exp} is the number of expected crashes to occur at a specific location within a specific period
CMF_1, CMF_2, CMF_3… are the applicable crash modification factors at a specific location.

The anticipated 5-year crash total was calculated separately for each location following improvements to develop a method of prioritization for each improvement type. The 5-year crash totals observed and the anticipated 5-year crash totals determined at each location were analyzed as a historic yearly crash rates ($\frac{5-year\ N_{obs}}{5\ years}$ and $\frac{5-year\ N_{exp}}{5\ years}$). To determine the effectiveness of improvements the difference in anticipated and observed yearly crash rates were calculated for each improvement category at each location. Locations (including signalized intersections and un-signalized intersections) were ranked based on the anticipated improvement in yearly crash rates for each improvement category. Table D1 shows location-based prioritization for improvements.

The summary table shown below is compiled to provide TDOT additional assistance in the improvement prioritization process. Included for each location, are the number of non-motorized crashes observed during the five-year period, the yearly observed crash rate, the expected yearly crash rate following improvements, and the difference in observed and expected crash rates. The locations in the table are listed in descending order based on the total anticipated improvement in yearly crash. If budget constraints are identified following submittal of this report, KCI can provide additional prioritization that identifies the most cost-effective solution for each location based on anticipated crash reduction and type of improvement. Location IDs are provided in the summary table that directly correlate to the improvement tables shown previously. These tables may be referenced for specific improvements at each location.

Table D1. Location Based Improvement Prioritization Rankings Along SR-6 (Gallatin Pike)

Rank	ID	LOCATION	Observed Crashes (Obs)	Years Analyzed	Obs/yr	Expected/ year	**(Obs-Exp)/yr**
1	2	STATE ROUTE 6 (GALLATIN PIKE) AT NORTHSIDE DRIVE (L.M. 21.95)	3	5	0.60	0.01	**0.59**
2	4	STATE ROUTE 6 (GALLATIN PIKE) AT NORTH WALMART ACCESS (L.M. 22.13)	1	5	0.20	0.00	**0.20**
3	3	STATE ROUTE 6 (GALLATIN PIKE) AT SOUTH WALMART ACCESS (L.M. 22.03)	1	5	0.20	0.06	**0.14**
4	1	STATE ROUTE 6 (GALLATIN PIKE) AT LIBERTY LANE (L.M. 21.84)	0	5	0.00	0.00	**0.00**

*Observed crashes occurred over a five-year period between January 1, 2017 and July 26, 2022.
**Expected/yr represents the number of expected crashes per year following implementation of improvements.
***(Obs-Exp)/yr represents the reduction in the number of anticipated crashes per year following implementation of improvements.

Appendix E. Crash Modification Factor (CMF) Resources

U.S. Department of Transportation
Federal Highway Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
202-366-4000

Safety

Toolbox of Countermeasures and Their Potential Effectiveness

Downloadable Version
PDF [552 KB]

FHWA-SA-018-41
September 2018

- Introduction
- Crash Reduction Factors
- Using the Tables
- References

Introduction

A CMF is the proportion of crashes that are expected to remain after the countermeasure is implemented. For example, an expected 20 percent reduction in crashes would correspond to a CMF of (1.00 – 0.20) = 0.80. In some cases, the CMF is negative, i.e. the implementation of a countermeasure is expected to lead to a percentage increase in crashes.

One CMF estimate is provided for each countermeasure. Where multiple CMF estimates were available from the literature, selection criteria were used to choose which CMFs to include in the issue brief:

Crash Reduction Factors

A CRF is the percentage crash reduction that might be expected after implementing a given countermeasure. In some cases, the CRF is negative, i.e. the implementation of a countermeasure is expected to lead to a percentage increase in crashes.

One CRF estimate is provided for each countermeasure. Where multiple CRF estimates were available from the literature, selection criteria were used to choose which CRFs to include in the issue brief:

- First, CMFs from studies that took into account regression to the mean and changes in traffic volume were preferred over studies that did not.
- Second, CMFs from studies that provided additional information about the conditions under which the countermeasures was applied (e.g. road type, area type) were preferred over studies that did not.

Where these criteria could not be met, a CMF may still be provided. In these cases, it is recognized that the estimate of the CMF may not be as reliable, but is the best available at this time. The CMFs in this issue brief may be periodically updated as new information becomes available.

The Desktop Reference for Countermeasures includes most of the CMFs included in this issue brief, and adds many other CMFs available in the literature. A few CMFs found in the literature were not included in the Desktop

Reference. Those excluded CMFs were considered to have smaller sample sizes or too large a standard error to be meaningful, or the original research did not provide sufficient detail for the CMF to be useful.

A CMF should be regarded as a generic estimate of the effectiveness of a countermeasure. The estimate is a useful guide, but it remains necessary to apply engineering judgment and to consider site-specific environmental, traffic volume, traffic mix, geometric, and operational conditions which will affect the safety impact of a countermeasure. Actual effectiveness will vary from site to site. The user must ensure that a countermeasure applies to the particular conditions being considered. The reader is also encouraged to obtain and review the original source documents for more detailed information, and to search databases such as the National Transportation Library (ntlsearch.bts.gov) for information that becomes available after the publication of this issue brief.

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Using the Tables

The CRFs for pedestrian crashes are presented in three tables which summarize the available information. The Tables are:

Table 1: Signalization Countermeasures
Table 2: Geometric Countermeasures
Table 3: Signs, Markings, Operational Countermeasures

Each table has the following columns:

- Countermeasure = the countermeasure name.
- Crash Severity = the crash severity used in the analysis. Where available, separate CMFs are provided for different crash severities. The crash severities are: all, fatal/injury, fatal, or injury. The categories depend on the approach taken by the original study. For example, some studies referred to fatal/injury (fatal and injury crashes combined). Some distinguished fatal from injury. "All" is used for CMFs from studies which did not specify
  the severity.
- CMF for Crash Type (SE) = the CMF value selected from the literature, listed under the column(s) for the appropriate crash type (All, Left-Turn, or Pedestrian). CMFs listed under the Pedestrian column refer to the reduction in crashes involving pedestrians crossing the street, unless otherwise specified. Standard error (SE) for the CMF is provided in parenthesis where available. The standard error is the standard deviation of the error in the estimate of the CMF. The true value of the CMF is unknown for a given treatment type. The standard error provides a measure of the precision of the estimate of the true
  value of the CMF. A relatively small standard error indicates that a CMF is more precisely known. A relatively large standard error indicates that a CMF is less precisely known.
- Reference Number = the reference number for the source information, as given in the reference list in this document.
- CMF ID = ID number of the CMF in the CMF Clearinghouse.
- Star Rating – an indicator of the quality or confidence of the CMF and is based on the following factors: study design, sample size, standard error, potential bias, and data source. The ratings range from 1 to 5 where 5 indicates the highest or most reliable rating.

Cells with "—" indicate that no information is reported in the source document. For additional information, visit the FHWA Office of Safety website (safety.fhwa.dot.gov).

Example

COUNTERMEASURE	CRASH SEVERITY	CMF FOR CRASH TYPE (SE)			REFERENCE NUMBER	CMF ID	STAR RATING
		ALL	LEFT	PEDESTRIAN			

			TURN				
Exclusive Pedestrian Phase	All	—	—	0.49 (0.16)	2	4117	2

Using the first countermeasure from Table 1 as an example, the following information can be gained from the table:

1. The countermeasure name is "Exclusive Pedestrian Phase."
2. The crash severity is "All," meaning that the original study calculated the CMF for all crash severities combined or did not specify a crash severity.
3. A CMF of 0.49 is listed under the "Pedestrian" column, meaning that a (1.00 - 0.49) = 51% reduction in pedestrian crashes is expected for this countermeasure.
4. The "—" in the "All" and "Left-Turn" columns indicates that CMFs for these crash types were not provided in the original study.
5. The standard error for this CMF is 0.16.
6. The reference number is 2, which refers to the 2012 study by Chen, Chen, Ewing, McKnight, Srinivasan, and Roe in the references list.
7. The CMF ID is 4117 in the CMF Clearinghouse.
8. This study has a 2 star rating.

Other Useful Resources

- www.cmfclearinghouse.org
- www.walkinginfo.org
- www.walkinginfo.org/pedsafe/
- safety.fhwa.dot.gov/provencountermeasures

TABLE 1. SIGNALIZED COUNTERMEASURES

COUNTERMEASURE	CRASH SEVERITY	CMF FOR CRASH TYPE (SE)			REFERENCE NUMBER	CMF ID	STAR RATING
		ALL	LEFT TURN	PEDESTRIAN			
Exclusive Pedestrian Phase	All	—	—	0.49 (0.16)	2	4117	2
Improved Signal Timing (ITE)	Fatal/Injury	—	—	0.63	14	383	2
Replace Existing "Walk/ Don't Walk" Signals with Pedestrian Countdown Signal Head	All	—	—	0.75	9	—	—
Replace Existing "Walk/ Don't Walk" Signals with Pedestrian Countdown Signal Head	All	—	—	0.3	15	5272	4
Implement Leading Pedestrian Interval (LPI)	All	—	—	0.413 (0.064)	4	1993	3
Remove Unwarranted Signals (One-Way	All	—	—	0.83	12	331	3

Street)							
Pedestrian Hybrid Beacon (PHB)	All	—	—	0.45 (0.167)	17	9020	4
PHB and Advanced Yield/Stop Markings/ Signs	All	—	—	0.43 (0.134)	17	9021	4
Increase Pedestrian Crossing Time	All	—	—	0.49 (0.10)	2	4658	3
Add New Traffc Signals, when Warranted	All	0.75 (0.07)	—	—	2	4658	3

TABLE 2. GEOMETRIC COUNTERMEASURES

COUNTERMEASURE	CRASH SEVERITY	CMF FOR CRASH TYPE (SE)			REFERENCE NUMBER	CMF ID	STAR RATING
		ALL	LEFT TURN	PEDESTRIAN			
Install Pedestrian Overpass/Underpass	Fatal/Injury	—	—	0.1	6	—	—
Install Pedestrian Overpass/Underpass	All	—	—	0.14	6	—	—
Install Pedestrian Overpass/Underpass (Unsignalized Intersection)	All	—	—	0.87	8	—	—
Install Raised Median	All	—	—	0.75	6	—	—
Install Raised Median at Unsignalized Crossing	All	—	—	0.69 (0.183)	17	8799	3
Install Raised Pedestrian Crossing	All	0.7	—	—	1	—	—
Install Raised Pedestrian Crossing	Fatal/Injury	0.64	—	—	1	—	—
Install Sidewalk	All	—	—	0.12	10	—	—
Provide Paved Shoulder	All	—	—	0.29	6	—	—
Narrow Roadway from Four Lanes to Three Lanes (Two Through Lanes with Center Turn Lane)	All	0.71	—	—	7	199	5
Road Diet–Urban Area	All	—	—	0.81	11	5554	4

				(0.005)			
Road Diet–Suburban Area	All	—	—	0.53 (0.02)	12	2841	4

TABLE 3. SIGNS, MARKINGS, AND OPERATIONAL COUNTERMEASURES

COUNTERMEASURE	CRASH SEVERITY	CMF FOR CRASH TYPE (SE)			REFERENCE NUMBER	CMF ID	STAR RATING
		ALL	LEFT TURN	PEDESTRIAN			
Add Overhead Lighting	Injury Crashes	—	—	0.77	7	199	5
Improve Pavement Friction (Skid Treatment with Overlay)	Fatal/Injury	—	—	0.97	6	—	—
Increase Enforcement	All	—	—	0.77	16	—	—
Prohibit Right-Turn-on-Red	All	0.97	—	—	7	199	5
Prohibit Left Turns	All	—	—	0.9	6	—	—
Restrict Parking Near Intersections (to Off-Street)	All	—	—	0.7	6	—	—
High-Visibility Crosswalk	All	—	—	0.52 (0.17)	2	4658	3
Convert Parallel Lane to High-Visibility Crosswalk (School Zone)	All	—	—	0.63	5	2697	3
Advanced Stop/Yield	All	—	—	0.75 (0.230)	17	9017	3
Rectangular Rapid-Flashing Beacon (RRFB)	All	—	—	0.53 (0.377)	17	9024	2

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Page last modified on October 16, 2018

CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF DETAILS

CMF ID: 8481

INSTALL PEDESTRIAN SIGNALS

DESCRIPTION:

PRIOR CONDITION: INTERSECTIONS WITHOUT PEDESTRIAN SIGNALS

CATEGORY: PEDESTRIANS

STUDY: *DEVELOPING CRASH MODIFICATION FUNCTIONS FOR PEDESTRIAN SIGNAL IMPROVEMENT*, SACCHI ET AL., 2015

Star Quality Rating:	★★★★☆ [VIEW SCORE DETAILS]
Rating Points Total:	115

Crash Modification Factor (CMF)

Value:

$$CMF_{FI} = 0.552 \times (V_{M,1}^{*} \times V_{m,1}^{*})^{0.076} \times \exp(0.090 \times Area + 0.189[1 - (0.621)^{S}]/s)$$

Where:

V_M = Major Road AADT (in thousands of vehicles)

V_m = Minor Road AADT (in thousands of vehicles)

Area = Area Type Indicator (Residential = 0, Commercial = 1)

S = Number of years since treatment installation

Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)

Value:	
Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	K (fatal),A (serious injury),B (minor injury),C (possible injury)
Roadway Types:	Not specified
Number of Lanes:	

Road Division Type:	
Speed Limit:	
Area Type:	Urban and suburban
Traffic Volume:	
Average Traffic Volume:	
Time of Day:	Not specified

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	4-leg
Traffic Control:	Signalized
Major Road Traffic Volume:	Minimum of 5120 to Maximum of 44800 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	Minimum of 650 to Maximum of 9530 Annual Average Daily Traffic (AADT)
Average Major Road Volume :	23326 Annual Average Daily Traffic (AADT)
Average Minor Road Volume :	2130 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	2005 to 2013
Municipality:	Metro Vancouver
State:	
Country:	Canada
Type of Methodology Used:	10
Sample Size (crashes):	36 crashes
Sample Size (sites):	13 sites
Sample Size (site-years):	53 site-years

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Mar-13-2017
Comments:	

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CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF / CRF DETAILS

CMF ID: 2089

RESTRICT LEFT OR RIGHT TURN (TRANSIT-SERVICED LOCATIONS)

DESCRIPTION:

PRIOR CONDITION: SIGNALIZED INTERSECTION

CATEGORY: ACCESS MANAGEMENT

STUDY: *ANALYSIS OF TRANSIT SAFETY AT SIGNALIZED INTERSECTIONS IN TORONTO*, SHALAH ET AL., 2009

Star Quality Rating:	[VIEW SCORE DETAILS]
Rating Points Total:	115

Crash Modification Factor (CMF)

Value:	0.87
Adjusted Standard Error:	
Unadjusted Standard Error:	0.02

Crash Reduction Factor (CRF)

Value:	13.4 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	2

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not Specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Urban
Traffic Volume:	
Average Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	
Traffic Control:	Signalized
Major Road Traffic Volume:	Minimum of 3556 to Maximum of 50877 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	
Average Major Road Volume :	
Average Minor Road Volume :	

Development Details

Date Range of Data Used:	1999 to 2003
Municipality:	City of Toronto, Canada
State:	
Country:	
Type of Methodology Used:	7
Sample Size (sites):	1655 sites

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: 9738

PRESENCE OF DRIVEWAY ON AN INTERSECTION APPROACH CORNER

DESCRIPTION:

PRIOR CONDITION: NO DRIVEWAYS WITHIN 50 FEET OF ANY APPROACH CORNER AT A SIGNALIZED INTERSECTION

CATEGORY: ACCESS MANAGEMENT

STUDY: *SAFETY EVALUATION OF CORNER CLEARANCE AT SIGNALIZED INTERSECTIONS*, LE ET AL., 2018

Star Quality Rating:	★★★★★ [VIEW SCORE DETAILS]
Rating Points Total:	150

Crash Modification Factor (CMF)

Value:	0.79
Adjusted Standard Error:	
Unadjusted Standard Error:	0.08

Crash Reduction Factor (CRF)

Value:	21 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	8

Applicability

Crash Type:	All
Crash Severity:	K (fatal),A (serious injury),B (minor injury),C (possible injury)
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Not specified
Traffic Volume:	
Average Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	4-leg
Traffic Control:	Signalized
Major Road Traffic Volume:	Minimum of 10406 to Maximum of 93000 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	Minimum of 500 to Maximum of 48000 Annual Average Daily Traffic (AADT)
Average Major Road Volume :	37945 Annual Average Daily Traffic (AADT)
Average Minor Road Volume :	8598 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	2009 to 2011
Municipality:	
State:	CA, NC
Country:	United States
Type of Methodology Used:	7
Sample Size (crashes):	1568 crashes
Sample Size (sites):	275 sites
Sample Size (site-years):	825 site-years

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Oct-27-2018
Comments:	This CMF is for the presence of a driveway on 1 approach corner within 50 feet of a signalized intersection compare driveways present.

VIEW THE FULL STUDY DETA

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Appendix F. Additional Information

KCI discussed various project details along the corridor with TDOT, NDOT, WeGo, and Walk Bike Nashville staff. Among them were the lack of safe access and overall comfort level for pedestrians and cyclists along the SR-6 (Gallatin Pike) corridor. No bike lanes are present along the study area. Additionally, many significant improvements to the sidewalk network and non-motorized facilities are recommended to create a safe and attractive environment for all non-motorized users.

New multi-use paths should be installed on both the east and west sides of SR-6 (Gallatin Pike) throughout the project limits to eliminate sidewalk gaps and improve infrastructure for cyclists along the corridor. In design, consider the use of colored concrete or pavement markings to better distinguish between bike and pedestrian paths. Coordination with NDOT should be considered.

Three (3) specific sections were identified by the project team during the field review meeting for potential installation with limited impacts. The sections identified will provide needed connections to nearby bus stops, schools, and high-frequency pedestrian destinations and tie into crosswalk locations. In addition, existing right-of-way may be available or if right-of-way acquisition is required it would have a minimal impact on adjacent properties at the selected locations. The specific sidewalk gaps to be addressed are displayed in the aerial figures below and include:

- The west side of SR-6 (Gallatin Pike) between Liberty Lane and existing sidewalk to the north

• The east side of SR-6 (Gallatin Pike) between Liberty Lane and south Walmart access

• The east side of SR-6 (Gallatin Pike) between the south and north Walmart access

The sidewalk gap on the east side of SR-6 (Gallatin Pike) between south and north Walmart access is expected to impact utilities and open drainage and require significant grading. Although right of way impacts are expected to be minimal, survey data would be needed to determine the feasibility of sidewalk installation at this location.

In addition to new sidewalk connections, significant improvements could be made to improve the safety and overall comfort level of existing sidewalks for pedestrians. Low cost, immediate solutions could include the retrofitting of existing pedestrian infrastructure to reach a required level of ADA compliance. Additionally, regulatory and maintenance improvements could be considered, such as more frequent street cleaning and vegetation clearing by the TDOT Highway Beautification Office. High vehicle speeds were observed for some vehicles throughout the entire project limits and roadway debris was observed as an obstruction to pedestrian travel. Higher

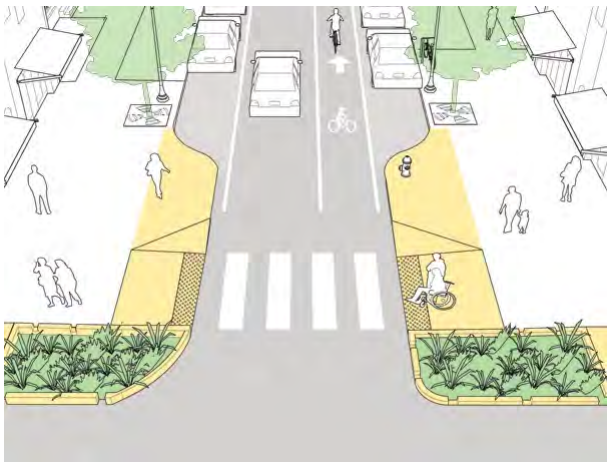
cost, longer-term solutions could include widened sidewalks to improve walkability and provide space for cyclists.

Street lighting should be improved on SR-6 (Gallatin Pike) throughout the entire project limits to improve visibility. Pedestrian and bicycle crash data assembled between January 1, 2017 and July 26, 2022 reveals a total of five (5) crashes with non-motorized roadway users occurred during that time. Of the five (5) total crashes, three (3) or 60% occurred during dark or dusk lighting conditions. A high rate of crashes in dark conditions could correlate to a higher rate of severe crashes. According to the United States Department of Transportation National Highway Safety Administration (NHTSA), 76% of all pedestrian fatalities occurred in dark conditions. The Federal Highway Administration's (FHWA) Safe Transportation for Every Pedestrian (STEP) program identifies street lighting as an effective countermeasure to improving pedestrian safety. Information from FHWA states that:

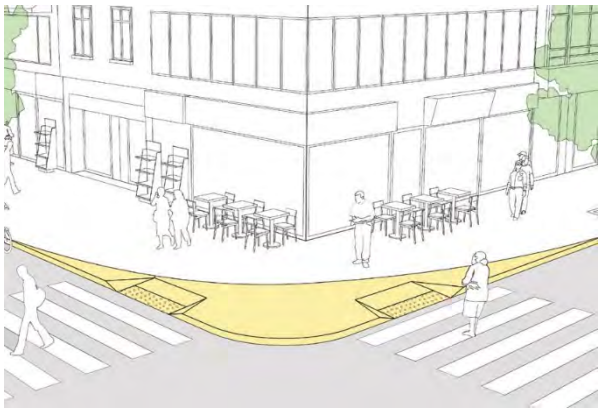
> "Studies have identified a strong relationship between darker conditions and more severe injury pedestrian crashes. Appropriate lighting should increase visibility of pedestrian crosswalks and reduce glare for motorists. Illumination may also encourage more pedestrians to use crosswalks. Generally, overhead lights should be placed in advance of crosswalks and intersections, on both approaches, illuminating pedestrians from the sides and not creating overhead shadows on people crossing the road. At intersections, overhead lighting is estimated to reduce all types of injury crashes by 27%. Outside of intersections, overhead lighting improvements are estimated to reduce all types of injury crashes by 23%."

Corridor-wide improvements to street lighting on SR-6 (Gallatin Pike) should be implemented to improve the safety of non-motorized users. In addition to increases in the coverage of corridor lighting, light-emitting diode (LED) streetlights should be considered. Brighter LED streetlights will not only provide better visibility than the existing conditions, but they are also more environmentally friendly by reducing energy consumption and typically require less maintenance. Supplemental countermeasures, such as reflective signage, LED signs, crosswalk illumination, pedestrian hybrid beacons, and leading pedestrian intervals (LPI) can provide additional improvements to pedestrian safety in dark conditions.

Multiple locations were identified along the SR-6 (Gallatin Pike) corridor, particularly at stop controlled minor side streets, where the installation of curb extensions or pedestrian bulb-outs could improve pedestrian safety by reducing pedestrian crossing distances and exposure time. The curb extension, or pedestrian bulb-out, would utilize roadway width that is not needed for turning or moving vehicles to allow more space for pedestrians. NDOT requires a minimum roadway width of 27 feet, including the gutter pan, between curb extensions on Residential Low-Density Minor and Local Streets. Additional survey may be required in certain areas with drainage or underground utility concerns. In conjunction with or where curb extensions are not feasible, reducing intersection curb radii to slow turning vehicles should be considered. Curb radii between 10 feet and 15 feet could be applied depending on the specific location and design vehicle. Appropriate guidelines from TDOT, the National Association of City Transportation Officials (NACTO), and specific details adopted by NDOT should be adhered to during design. Locations identified for installation of curb extensions or pedestrian bulb-outs include:



Example of Curb Extensions (Source: NACTO)



Example of Reduced Curb Radius (Source:

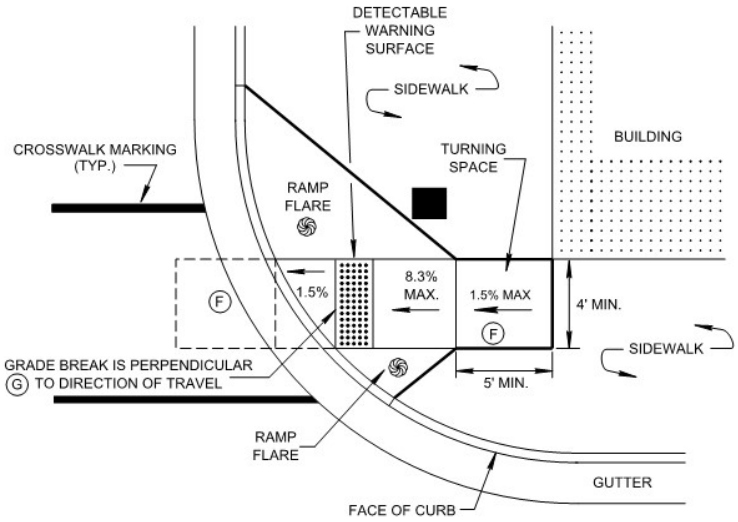
- At all four corners of the intersection of SR-6 / Liberty Lane. This location was identified to slow turning traffic movements, reduce pedestrian crossing distance, and provide space for new pedestal poles.
- At the northeast and southeast corners of the SR-6 / Northside Drive intersection. This location was identified to reduce pedestrian crossing distance and provide space for a new pedestal pole.
- At the northwest and southwest corners of the North Walmart Access intersection. This location was identified to reduce pedestrian crossing distance and provide space for new pedestal poles.

Crosswalk pavement markings shall be longitudinal bar style, which are used on all TDOT routes. Pavement markings at intersections surface at SR-6 (Gallatin Pike) / North Walmart Access and SR-6 (Gallatin Pike) / South Walmart Access were observed to be worn and should be restriped with high-visibility crosswalk pavement markings for increased pedestrian safety.

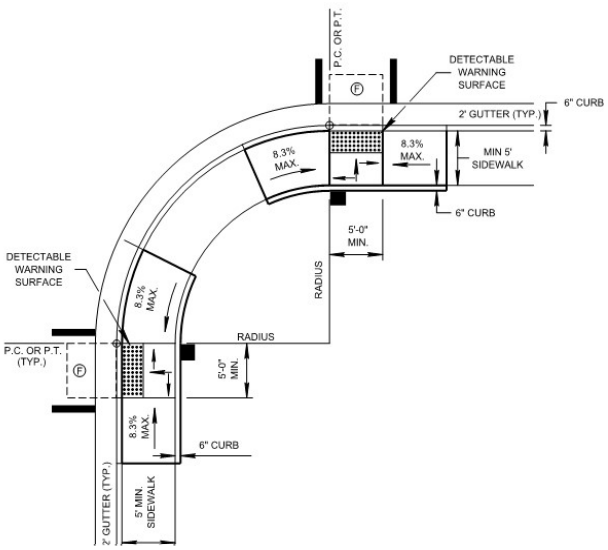
Pedestrian signal accommodations are generally not provided along this portion of the SR-6 (Gallatin Pike) corridor due to lack of existing sidewalk and pedestrian infrastructure. Multiple locations were identified for improvements during the field review meeting that would improve

accessibility. In many locations accessible pedestrian signals (APS) are required to ensure ADA compliance, including the installation of pedestal poles and/or pedestrian pushbutton posts. Specific pedestrian signal improvements for each intersection are detailed in Appendix D.

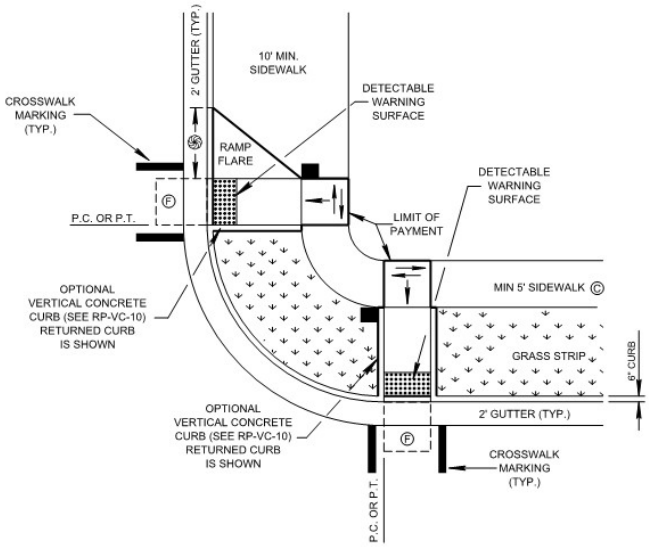
Various curb ramp design elements within the limits of the SR-6 (Gallatin Pike) project are generally non-compliant or do not meet current preferred standards, particularly at minor street crossings, including the orientation of curb ramps for dual crossings and single crossings. The orientation of the curb ramps should direct pedestrian travel into the crosswalk compared to the travel lanes within the intersection. Multiple locations were deemed to have a non-standard orientation based on TDOT's multimodal standard drawings (MM-CR-1 through MM-CR-9). TDOT and NDOT require truncated dome surfaces to be yellow in color.



Example of Preferred Curb Ramp Orientation for Single Crossing (Source: TDOT Standard Drawing MM-CR-5)



Example of Parallel Curb Ramp Outside Radius (Source: TDOT Standard Drawing MM-CR-6)



Example of Perpendicular Curb Ramp Outside Radius (Source: TDOT Standard Drawing MM-CR-

Heavy pedestrian traffic at signalized intersections and aggressive motorist behavior were observed at multiple locations during the field review meeting. The project team would like to consider providing the following traffic signal associated countermeasures to improve pedestrian safety throughout the SR-6 (Gallatin Pike) corridor project limits.

- Leading Pedestrian Intervals (LPIs) for pedestrian crossings at all signalized intersections to help improve pedestrian safety. In addition, it is recommended that each intersection be examined for walk/flashing don't walk pedestrian signal timing adjustments, as needed, for compliance with the MUTCD and ADA.
- Flashing yellow arrow (FYA) traffic signal operations to replace all protected/permissive left turn signal operations. At this time, KCI is not recommending the installation of FYA due to the lack of available research correlating FYA to improvements in pedestrian safety. NDOT does not typically install FYA signal operations in Davidson County.
- Dynamic left- and right- turn blank out warning signage for select intersection approaches to improve motorist yielding behavior for pedestrians. These signs illuminate when activated and blanks out (disappears) when de-activated and are designed to MUTCD LED layout guidelines. Dynamic signs are more visible during nighttime hours than static signs and can draw additional attention by only being activated during conflicting movements. The selected signalized intersection was chosen based on thresholds for the following measures: historic crash frequency, high vehicle turning volumes, and the presence of frequently utilized pedestrian destinations such as transit stops, schools, libraries, or popular commercial developments. By applying engineering judgement to the available data, the following locations were recommended for installation of dynamic left- and right- turn blank out warning signage:

    - State Route 6 (Gallatin Pike) at Northside Drive (L.M. 21.95) (Left-Turn)
    - State Route 6 (Gallatin Pike) at North Walmart Access (L.M. 21.95) (Right-Turn)

Appendix G. Traffic Operations

The purpose of this memo is to present the projected results of recommended improvements along State Route 6 (Gallatin Pike) from log mile 21.83 to log mile 22.13. KCI Technologies recommends improvements along this corridor for the purpose of reducing pedestrian crashes. Recommended improvements that would alter the geometry or traffic operation along the corridor were analyzed to determine the associated impact to the corridor's levels of service. Within these project limits, the following recommended improvements were analyzed:

- SR-6 (Gallatin Pike) and Liberty Lane
    - Removing the northbound right-turn lane on SR-6 (Gallatin Pike) and installing a curb extension. The exterior northbound through lane will become a shared through/right-turn lane.
- SR-6 (Gallatin Pike) and Northside Drive
    - Installing "No Turn on Red" signs for both side street approaches to SR-6 (Gallatin Pike).
        - This recommendation was analyzed using Synchro's automatic calculation for saturation flow rate for right-turns on red (RTOR). The RTOR calculations are based on an internally developed model based on the HCM gap acceptance formula for right turns. The RTOR saturation flow rates calculated by Synchro provide similar results to the HCM method of reducing right-turn volumes to account for right turns on red.
- It should be noted for both signalized intersections, splits were optimized, and cycle lengths were maintained.

Overview

In this memo, the current operating characteristics of the intersections along the SR-6 (Gallatin Pike) corridor are evaluated. Recommended improvements that would alter the geometry or traffic operation along the corridor are then added to the network. The intersections along the corridor are then reevaluated to determine the associated traffic impacts of the recommended improvements.

To determine the operation of the intersections along the SR-6 (Gallatin Pike) corridor for existing and projected scenarios, capacity analyses were performed for the AM and PM peak hours with existing counts and projected counts.

Marr Traffic conducted the existing counts from 7:00 – 9:00 AM and 4:00 – 6:00 PM on a typical weekday in October 2022 while local schools were in session. From the counts, it was determined that the peak hours of traffic flow for the majority of the intersections along the corridor occurred from 7:00 – 8:00 AM and 4:30 – 5:30 PM.

In order to account for the traffic growth prior to the completion of the recommended improvements, projected traffic volumes were established. For the purpose of this analysis, the recommended improvements were analyzed based on projected traffic volumes in the year 2032, which is a 10-year horizon, per TDOT Multimodal Division's request. Historical daily traffic volumes were obtained from the two TDOT count stations located in the vicinity of the project site.

From 2009-2019, the combined traffic at these two TDOT count stations has increased by an average exponential rate of 0.7% per year. The TDOT count station data is included in Appendix G-4.

A growth factor was applied to the existing peak hour traffic volumes to account for projected growth for the future conditions. The existing peak hour traffic volumes at the intersection of SR-6 (Gallatin Pike) and Liberty Lane was conservatively increased by 1.0% per year for ten years to account for projected traffic growth along the corridor.

The results of the capacity analyses for the existing and projected conditions of the SR-6 (Gallatin Pike) corridor are presented in Table G-1 and Table G-2. The capacity calculations were performed according to the methods outlined in the *Highway Capacity Manual (HCM)*, 6th Edition. For the intersection of SR 6 (Gallatin Pike) and Liberty Lane, HCM 2000 methodologies were applied due to limitations of the software. Capacity analyses worksheets are included in Appendix G-5.

Capacity Analysis

TABLE G-1. AM PEAK HOUR LEVELS OF SERVICE

INTERSECTION	SCENARIO LANEAGE	TURNING MOVEMENT	LEVEL OF SERVICE (Average Delay in sec/veh)	
			EXISTING 2022 VOLUMES	PROJECTED 2032 VOLUMES
SR-6 (Gallatin Pike) and Liberty Lane	Northbound Right-Turn Lane	Overall Intersection	A (5.0)	A (5.3)
	Shared Northbound Through/Right-Turn Lane	Overall Intersection	A (5.0)	A (5.3)
SR-6 (Gallatin Pike) and Northside Drive	EB and WB Right-Turn on Red Allowed	Overall Intersection	A (2.8)	A (3.0)
	EB and WB No Right-Turn on Red	Overall Intersection	A (2.8)	A (3.0)

TABLE G-2. PM PEAK HOUR LEVELS OF SERVICE

INTERSECTION	SCENARIO LANEAGE	TURNING MOVEMENT	LEVEL OF SERVICE (Average Delay in sec/veh)	
			EXISTING 2022 VOLUMES	PROJECTED 2032 VOLUMES
SR-6 (Gallatin Pike) and Liberty Lane	Northbound Right-Turn Lane	Overall Intersection	B (12.7)	B (13.8)
	Shared Northbound Through/Right-Turn Lane	Overall Intersection	B (13.4)	B (14.9)
SR-6 (Gallatin Pike) and Northside Drive	EB and WB Right-Turn on Red Allowed	Overall Intersection	A (3.8)	A (4.1)
	EB and WB No Right-Turn on Red	Overall Intersection	A (3.8)	A (4.0)

Summary

The capacity analyses results for the existing and projected conditions along the SR-6 (Gallatin Pike) corridor were analyzed to determine the associated traffic impacts of the recommended improvements.

The capacity analyses indicate that the levels of service will remain similar or slightly deteriorate from existing conditions to the proposed scenario. Projected level of service is expected to continue to operate at LOS B or better during the morning and afternoon peak periods.

From these results, KCI determined the following:

- The removal of the northbound right-turn lane at SR-6 (Gallatin Pike) at Liberty Lane is feasible as a 10-year plan based on estimated traffic volumes and growth in the area.
- The installation of “No Turn on Red” signs for both side street approaches of Northside Drive at SR-6 (Gallatin Pike) is feasible as a 10-year plan based on estimated traffic volumes and growth in the area.

TABLE G-3. TDOT AADT DATA

Station	24	242
Route	SR-6 (Gallatin Pike)	SR-6 (Gallatin Pike)
Location	Between Rivergate Parkway and Conference Drive	Between Cumberland Hills Drive and Center Point Road
County	Davidson	Davidson
2019	35,655	26,434
2018	35,512	25,852
2017	38,905	28,555
2016	35,892	26,020
2015	37,829	24,228
2014	31,045	22,306
2013	31,803	22,740
2012	34,113	25,096
2011	39,471	27,815
2010	34,187	24,089
2009	32,575	22,673
2008	34,187	24,089
2007	32,575	22,673

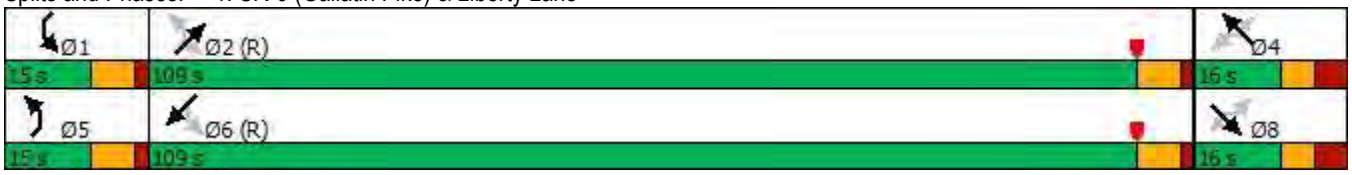
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Future Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		50	100		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.955		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1779	1583	1770	3539	1583	1770	3539	0
Flt Permitted		0.851			0.827		0.149			0.403		
Satd. Flow (perm)	0	1585	1583	0	1540	1583	278	3539	1583	751	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			70			78			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			305			925			561	
Travel Time (s)		22.2			6.9			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	24	17	1	9	25	655	32	5	1491	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	24	0	18	9	25	655	32	5	1493	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			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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0	24.0	10.0	24.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	15.0	109.0	109.0	15.0	109.0	
Total Split (%)	11.4%	11.4%	11.4%	11.4%	11.4%	11.4%	10.7%	77.9%	77.9%	10.7%	77.9%	
Maximum Green (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	103.0	103.0	9.0	103.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		7.5	7.5		7.5	7.5	124.0	125.4	125.4	121.3	121.0	
Actuated g/C Ratio		0.05	0.05		0.05	0.05	0.89	0.90	0.90	0.87	0.86	
v/c Ratio		0.08	0.16		0.22	0.06	0.08	0.21	0.02	0.01	0.49	
Control Delay		64.7	2.3		69.6	0.8	2.1	2.2	0.0	0.6	3.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		64.7	2.3		69.6	0.8	2.1	2.2	0.0	0.6	3.5	
LOS		E	A		E	A	A	A	A	A	A	
Approach Delay		16.4			46.6			2.1			3.5	
Approach LOS		B			D			A			A	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 87 (62%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 3.8 Intersection LOS: A
Intersection Capacity Utilization 66.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Future Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1770	1583		1779	1583	1770	3539	1583	1770	3539	
Flt Permitted		0.85	1.00		0.83	1.00	0.15	1.00	1.00	0.40	1.00	
Satd. Flow (perm)		1585	1583		1541	1583	278	3539	1583	750	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	24	17	1	9	25	655	32	5	1491	2
RTOR Reduction (vph)	0	0	23	0	0	9	0	0	6	0	0	0
Lane Group Flow (vph)	0	7	1	0	18	0	25	655	26	5	1493	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Actuated Green, G (s)		4.7	4.7		4.7	4.7	118.4	115.4	115.4	114.2	113.3	
Effective Green, g (s)		4.7	4.7		4.7	4.7	118.4	115.4	115.4	114.2	113.3	
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.85	0.82	0.82	0.82	0.81	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		53	53		51	53	267	2917	1304	618	2864	
v/s Ratio Prot							c0.00	0.19		0.00	c0.42	
v/s Ratio Perm		0.00	0.00		c0.01	0.00	0.08		0.02	0.01		
v/c Ratio		0.13	0.02		0.35	0.01	0.09	0.22	0.02	0.01	0.52	
Uniform Delay, d1		65.7	65.4		66.2	65.4	2.8	2.7	2.2	2.4	4.4	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.32	0.69	
Incremental Delay, d2		0.4	0.0		1.5	0.0	0.1	0.2	0.0	0.0	0.6	
Delay (s)		66.1	65.5		67.7	65.4	2.8	2.8	2.2	0.8	3.7	
Level of Service		E	E		E	E	A	A	A	A	A	
Approach Delay (s)		65.6			66.9			2.8			3.6	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

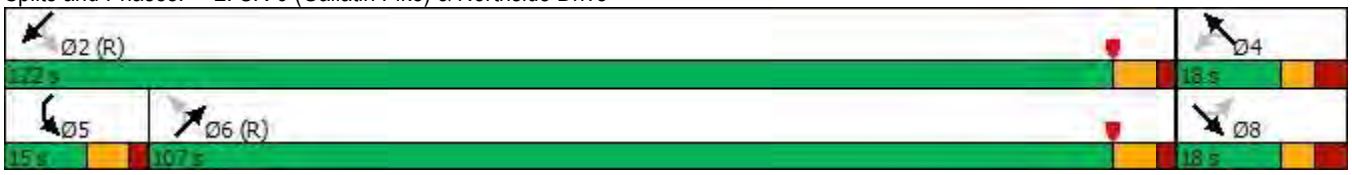
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	2	0	4	12	0	3	22	597	6	7	1386	14
Future Volume (vph)	2	0	4	12	0	3	22	597	6	7	1386	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.910			0.850			0.998			0.999	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1668	0	1770	1583	0	1770	3532	0	1770	3536	0
Flt Permitted		0.889					0.170			0.381		
Satd. Flow (perm)	0	1507	0	1863	1583	0	317	3532	0	710	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		78			397			2			3	
Link Speed (mph)		25			30			45			45	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		5.3			18.1			8.5			11.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	4	13	0	3	24	649	7	8	1507	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	13	3	0	24	656	0	8	1522	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	18.0	18.0		18.0	18.0		107.0	107.0		15.0	122.0	
Total Split (%)	12.9%	12.9%		12.9%	12.9%		76.4%	76.4%		10.7%	87.1%	
Maximum Green (s)	11.0	11.0		11.0	11.0		100.5	100.5		8.5	115.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		7.2		7.2	7.2		129.3	129.3		127.7	131.6	
Actuated g/C Ratio		0.05		0.05	0.05		0.92	0.92		0.91	0.94	
v/c Ratio		0.04		0.14	0.01		0.08	0.20		0.01	0.46	
Control Delay		0.5		66.6	0.0		2.5	1.3		1.4	1.8	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		0.5		66.6	0.0		2.5	1.3		1.4	1.8	
LOS		A		E	A		A	A		A	A	
Approach Delay		0.5			54.1			1.4			1.8	
Approach LOS		A			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 79 (56%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 2.0		Intersection LOS: A	
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	12	0	3	22	597	6	7	1386	14
Future Volume (veh/h)	2	0	4	12	0	3	22	597	6	7	1386	14
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	2	0	4	13	0	3	24	649	7	8	1507	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	6	30	93	0	46	320	2956	32	703	3154	31
Arrive On Green	0.03	0.00	0.03	0.03	0.00	0.03	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	333	192	1049	1412	0	1585	343	3601	39	1781	3605	36
Grp Volume(v), veh/h	6	0	0	13	0	3	24	320	336	8	742	780
Grp Sat Flow(s),veh/h/ln	1574	0	0	1412	0	1585	343	1777	1863	1781	1777	1864
Q Serve(g_s), s	0.0	0.0	0.0	0.6	0.0	0.3	0.5	0.0	0.0	0.1	12.6	12.6
Cycle Q Clear(g_c), s	0.5	0.0	0.0	1.1	0.0	0.3	5.5	0.0	0.0	0.1	12.6	12.6
Prop In Lane	0.33		0.67	1.00		1.00	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	80	0	0	93	0	46	320	1458	1529	703	1554	1631
V/C Ratio(X)	0.08	0.00	0.00	0.14	0.00	0.07	0.07	0.22	0.22	0.01	0.48	0.48
Avail Cap(c_a), veh/h	155	0	0	164	0	125	320	1458	1529	798	1554	1631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	0.0	66.6	0.0	66.2	0.1	0.0	0.0	1.8	1.9	1.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.2	0.5	0.3	0.3	0.0	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.5	0.0	0.1	0.0	0.1	0.1	0.0	2.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.4	0.0	0.0	66.8	0.0	66.4	0.6	0.3	0.3	1.8	2.9	2.9
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		6			16			680			1530	
Approach Delay, s/veh		66.4			66.7			0.3			2.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		129.0		11.0	7.6	121.4		11.0				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		115.5		11.0	8.5	100.5		11.0				
Max Q Clear Time (g_c+I1), s		14.6		3.1	2.1	7.5		2.5				
Green Ext Time (p_c), s		7.6		0.0	0.0	2.7		0.0				

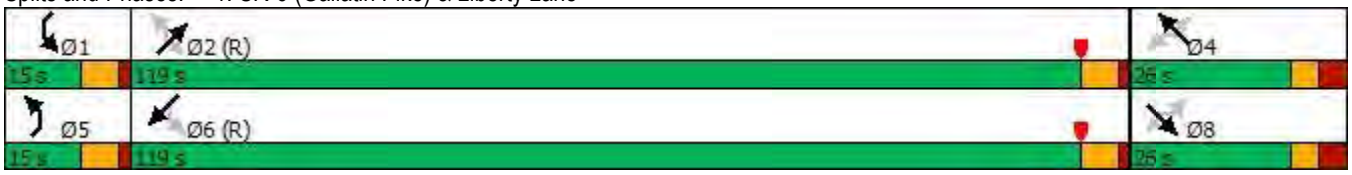
Intersection Summary												
HCM 6th Ctrl Delay			2.8									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Future Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		50	100		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1770	3539	1583	1770	3536	0
Flt Permitted		0.720			0.721		0.194			0.111		
Satd. Flow (perm)	0	1341	1583	0	1343	1583	361	3539	1583	207	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			61			68		1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			305			925			561	
Travel Time (s)		22.2			6.9			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	1	86	97	1	36	53	1674	107	24	1230	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	86	0	98	36	53	1674	107	24	1237	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			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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0	24.0	10.0	24.0	
Total Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	15.0	119.0	119.0	15.0	119.0	
Total Split (%)	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%	9.4%	74.4%	74.4%	9.4%	74.4%	
Maximum Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	9.0	113.0	113.0	9.0	113.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		15.2	15.2		15.2	15.2	128.6	125.1	125.1	126.5	122.5	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.80	0.78	0.78	0.79	0.77	
v/c Ratio		0.09	0.38		0.77	0.18	0.16	0.60	0.09	0.11	0.46	
Control Delay		65.3	16.5		106.0	5.7	4.1	9.4	2.5	4.0	6.6	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	
Total Delay		65.3	16.5		106.0	5.7	4.1	9.4	2.5	4.0	6.7	
LOS		E	B		F	A	A	A	A	A	A	
Approach Delay		22.1			79.0			8.9			6.7	
Approach LOS		C			E			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 39 (24%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Future Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1782	1583		1775	1583	1770	3539	1583	1770	3536	
Flt Permitted		0.72	1.00		0.72	1.00	0.19	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		1342	1583		1343	1583	362	3539	1583	207	3536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	1	86	97	1	36	53	1674	107	24	1230	7
RTOR Reduction (vph)	0	0	78	0	0	33	0	0	16	0	0	0
Lane Group Flow (vph)	0	11	8	0	98	3	53	1674	91	24	1237	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Actuated Green, G (s)		15.2	15.2		15.2	15.2	127.2	122.7	122.7	124.4	121.3	
Effective Green, g (s)		15.2	15.2		15.2	15.2	127.2	122.7	122.7	124.4	121.3	
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.80	0.77	0.77	0.78	0.76	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		127	150		127	150	327	2713	1213	191	2680	
v/s Ratio Prot							c0.00	c0.47		0.00	0.35	
v/s Ratio Perm		0.01	0.01		c0.07	0.00	0.12		0.06	0.10		
v/c Ratio		0.09	0.05		0.77	0.02	0.16	0.62	0.08	0.13	0.46	
Uniform Delay, d1		66.1	65.9		70.7	65.7	4.5	8.3	4.6	6.8	7.2	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.90	0.80	
Incremental Delay, d2		0.1	0.1		22.7	0.0	0.1	1.1	0.1	0.1	0.5	
Delay (s)		66.2	65.9		93.5	65.7	4.6	9.3	4.7	6.2	6.3	
Level of Service		E	E		F	E	A	A	A	A	A	
Approach Delay (s)		65.9			86.0			8.9			6.3	
Approach LOS		E			F			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

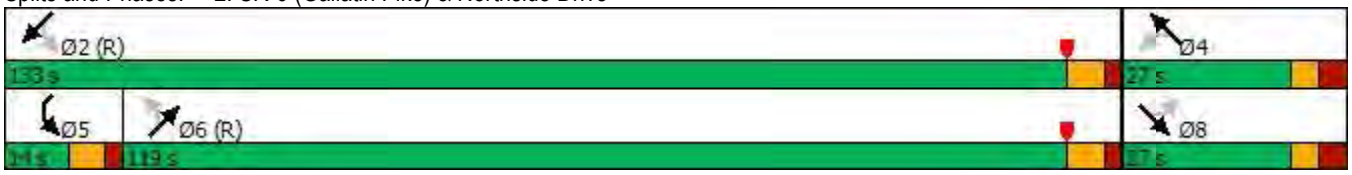
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	11	0	24	12	1	26	6	1550	22	13	1140	16
Future Volume (vph)	11	0	24	12	1	26	6	1550	22	13	1140	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.908			0.855			0.998			0.998	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1664	0	1770	1593	0	1770	3532	0	1770	3532	0
Flt Permitted		0.883					0.222			0.112		
Satd. Flow (perm)	0	1493	0	1863	1593	0	414	3532	0	209	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		68			28			2			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		4.5			18.1			12.8			17.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	0	26	13	1	28	7	1685	24	14	1239	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	13	29	0	7	1709	0	14	1256	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	27.0	27.0		27.0	27.0		119.0	119.0		14.0	133.0	
Total Split (%)	16.9%	16.9%		16.9%	16.9%		74.4%	74.4%		8.8%	83.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0		112.5	112.5		7.5	126.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		7.3		7.3	7.3		138.8	138.8		142.0	143.3	
Actuated g/C Ratio		0.05		0.05	0.05		0.87	0.87		0.89	0.90	
v/c Ratio		0.29		0.15	0.29		0.02	0.56		0.06	0.40	
Control Delay		8.0		77.3	31.5		1.3	1.6		1.9	2.2	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		8.0		77.3	31.5		1.3	1.6		1.9	2.2	
LOS		A		E	C		A	A		A	A	
Approach Delay		8.0			45.7			1.6			2.2	
Approach LOS		A			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 45 (28%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 2.5		Intersection LOS: A	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	11	0	24	12	1	26	6	1550	22	13	1140	16
Future Volume (veh/h)	11	0	24	12	1	26	6	1550	22	13	1140	16
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	12	0	26	13	1	28	7	1685	24	14	1239	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	6	39	107	2	65	401	2945	42	300	3134	43
Arrive On Green	0.04	0.00	0.04	0.04	0.04	0.04	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	278	140	907	1385	55	1538	442	3587	51	1781	3589	49
Grp Volume(v), veh/h	38	0	0	13	0	29	7	833	876	14	613	643
Grp Sat Flow(s),veh/h/ln	1325	0	0	1385	0	1593	442	1777	1861	1781	1777	1861
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.2	10.7	10.7
Cycle Q Clear(g_c), s	4.8	0.0	0.0	1.4	0.0	2.8	2.4	0.0	0.0	0.2	10.7	10.7
Prop In Lane	0.32		0.68	1.00		0.97	1.00		0.03	1.00		0.03
Lane Grp Cap(c), veh/h	86	0	0	107	0	68	401	1459	1528	300	1551	1625
V/C Ratio(X)	0.44	0.00	0.00	0.12	0.00	0.43	0.02	0.57	0.57	0.05	0.40	0.40
Avail Cap(c_a), veh/h	211	0	0	221	0	199	401	1459	1528	363	1551	1625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.6	0.0	0.0	74.0	0.0	74.7	0.0	0.0	0.0	2.0	2.0	2.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.2	0.0	1.6	0.1	1.3	1.2	0.0	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	0.5	0.0	1.2	0.0	0.5	0.5	0.1	2.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.9	0.0	0.0	74.2	0.0	76.3	0.1	1.3	1.2	2.0	2.7	2.7
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		38			42			1716			1270	
Approach Delay, s/veh		76.9			75.6			1.2			2.7	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		146.2		13.8	8.4	137.8		13.8				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		126.5		20.0	7.5	112.5		20.0				
Max Q Clear Time (g_c+I1), s		12.7		4.8	2.2	4.4		6.8				
Green Ext Time (p_c), s		6.8		0.1	0.0	12.8		0.1				

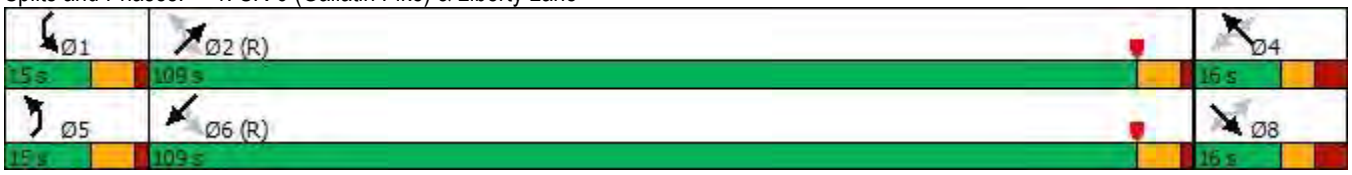
Intersection Summary												
HCM 6th Ctrl Delay			3.8									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Future Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		50	100		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.955		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1779	1583	1770	3539	1583	1770	3539	0
Flt Permitted		0.833			0.813		0.122			0.376		
Satd. Flow (perm)	0	1552	1583	0	1514	1583	227	3539	1583	700	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			70			78			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			305			925			561	
Travel Time (s)		22.2			6.9			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	0	26	20	1	10	27	724	35	7	1648	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	26	0	21	10	27	724	35	7	1650	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			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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0	24.0	10.0	24.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	15.0	109.0	109.0	15.0	109.0	
Total Split (%)	11.4%	11.4%	11.4%	11.4%	11.4%	11.4%	10.7%	77.9%	77.9%	10.7%	77.9%	
Maximum Green (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	103.0	103.0	9.0	103.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		7.6	7.6		7.6	7.6	123.9	125.3	125.3	121.2	120.9	
Actuated g/C Ratio		0.05	0.05		0.05	0.05	0.88	0.90	0.90	0.87	0.86	
v/c Ratio		0.10	0.17		0.26	0.07	0.11	0.23	0.02	0.01	0.54	
Control Delay		65.0	2.5		71.2	0.9	2.4	2.2	0.0	0.7	3.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		65.0	2.5		71.2	0.9	2.4	2.2	0.0	0.7	3.9	
LOS		E	A		E	A	A	A	A	A	A	
Approach Delay		17.2			48.5			2.2			3.9	
Approach LOS		B			D			A			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 87 (62%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 4.1	Intersection LOS: A
Intersection Capacity Utilization 70.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Future Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1770	1583		1778	1583	1770	3539	1583	1770	3539	
Flt Permitted		0.83	1.00		0.81	1.00	0.12	1.00	1.00	0.38	1.00	
Satd. Flow (perm)		1552	1583		1515	1583	227	3539	1583	701	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	0	26	20	1	10	27	724	35	7	1648	2
RTOR Reduction (vph)	0	0	25	0	0	10	0	0	6	0	0	0
Lane Group Flow (vph)	0	8	1	0	21	0	27	724	29	7	1650	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Actuated Green, G (s)		4.8	4.8		4.8	4.8	118.2	115.2	115.2	114.2	113.2	
Effective Green, g (s)		4.8	4.8		4.8	4.8	118.2	115.2	115.2	114.2	113.2	
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.84	0.82	0.82	0.82	0.81	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		53	54		51	54	224	2912	1302	579	2861	
v/s Ratio Prot							c0.00	0.20		0.00	c0.47	
v/s Ratio Perm		0.01	0.00		c0.01	0.00	0.10		0.02	0.01		
v/c Ratio		0.15	0.02		0.41	0.01	0.12	0.25	0.02	0.01	0.58	
Uniform Delay, d1		65.6	65.3		66.2	65.3	3.5	2.8	2.2	2.4	4.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.32	0.69	
Incremental Delay, d2		0.5	0.0		2.0	0.0	0.1	0.2	0.0	0.0	0.8	
Delay (s)		66.1	65.4		68.2	65.3	3.6	3.0	2.3	0.8	4.1	
Level of Service		E	E		E	E	A	A	A	A	A	
Approach Delay (s)		65.5			67.3			3.0			4.0	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

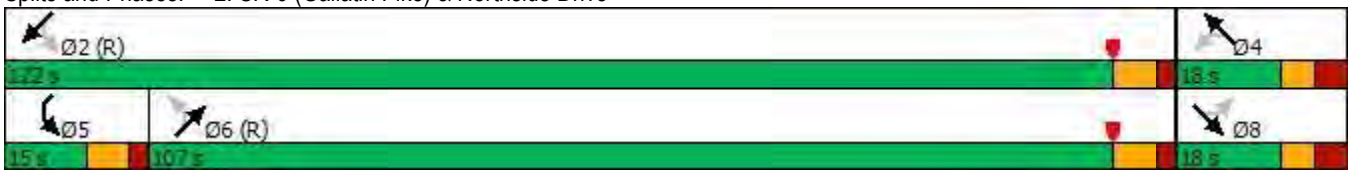
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	2	0	4	13	0	3	24	659	7	8	1531	15
Future Volume (vph)	2	0	4	13	0	3	24	659	7	8	1531	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.910			0.850			0.998			0.999	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1668	0	1770	1583	0	1770	3532	0	1770	3536	0
Flt Permitted		0.889					0.142			0.357		
Satd. Flow (perm)	0	1507	0	1863	1583	0	265	3532	0	665	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		78			360			2			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		4.5			18.1			12.8			17.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	4	14	0	3	26	716	8	9	1664	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	14	3	0	26	724	0	9	1680	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	18.0	18.0		18.0	18.0		107.0	107.0		15.0	122.0	
Total Split (%)	12.9%	12.9%		12.9%	12.9%		76.4%	76.4%		10.7%	87.1%	
Maximum Green (s)	11.0	11.0		11.0	11.0		100.5	100.5		8.5	115.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		7.2		7.2	7.2		129.3	129.3		127.7	131.6	
Actuated g/C Ratio		0.05		0.05	0.05		0.92	0.92		0.91	0.94	
v/c Ratio		0.04		0.15	0.01		0.11	0.22		0.01	0.51	
Control Delay		0.5		66.8	0.0		3.0	1.5		1.4	2.1	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		0.5		66.8	0.0		3.0	1.5		1.4	2.1	
LOS		A		E	A		A	A		A	A	
Approach Delay		0.5			55.0			1.6			2.1	
Approach LOS		A			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 79 (56%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 2.3		Intersection LOS: A	
Intersection Capacity Utilization 59.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



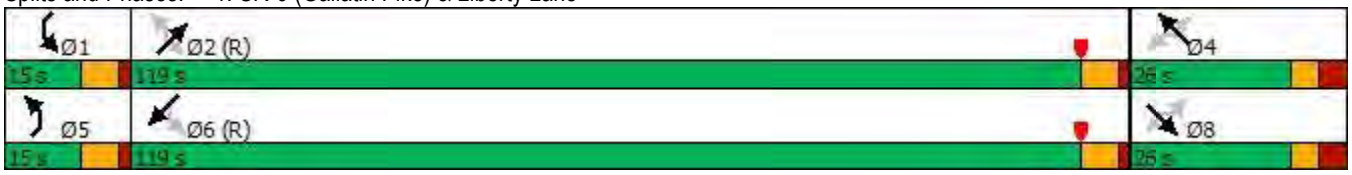
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	13	0	3	24	659	7	8	1531	15
Future Volume (veh/h)	2	0	4	13	0	3	24	659	7	8	1531	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		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	2	0	4	14	0	3	26	716	8	9	1664	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	6	31	94	0	47	277	2949	33	664	3152	30
Arrive On Green	0.03	0.00	0.03	0.03	0.00	0.03	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	326	199	1051	1412	0	1585	294	3600	40	1781	3606	35
Grp Volume(v), veh/h	6	0	0	14	0	3	26	353	371	9	819	861
Grp Sat Flow(s),veh/h/ln	1576	0	0	1412	0	1585	294	1777	1863	1781	1777	1864
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.3	0.9	0.0	0.0	0.1	15.1	15.1
Cycle Q Clear(g_c), s	0.5	0.0	0.0	1.2	0.0	0.3	8.4	0.0	0.0	0.1	15.1	15.1
Prop In Lane	0.33		0.67	1.00		1.00	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	81	0	0	94	0	47	277	1455	1526	664	1553	1629
V/C Ratio(X)	0.07	0.00	0.00	0.15	0.00	0.06	0.09	0.24	0.24	0.01	0.53	0.53
Avail Cap(c_a), veh/h	156	0	0	164	0	125	277	1455	1526	757	1553	1629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.2	0.0	0.0	66.5	0.0	66.0	0.3	0.0	0.0	1.8	2.1	2.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.2	0.7	0.4	0.4	0.0	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.5	0.0	0.1	0.1	0.2	0.2	0.0	3.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.3	0.0	0.0	66.8	0.0	66.3	0.9	0.4	0.4	1.8	3.3	3.3
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		6			17			750			1689	
Approach Delay, s/veh		66.3			66.7			0.4			3.3	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		128.9		11.1	7.7	121.2		11.1				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		115.5		11.0	8.5	100.5		11.0				
Max Q Clear Time (g_c+I1), s		17.1		3.2	2.1	10.4		2.5				
Green Ext Time (p_c), s		12.1		0.0	0.0	3.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			3.0									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Future Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		50	100		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.956			0.953		0.950			0.950		
Satd. Flow (prot)	0	1781	1583	0	1775	1583	1770	3539	1583	1770	3536	0
Flt Permitted		0.714			0.720		0.163			0.084		
Satd. Flow (perm)	0	1330	1583	0	1341	1583	304	3539	1583	156	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			61			68		1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			305			925			561	
Travel Time (s)		22.2			6.9			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	95	107	1	39	59	1849	117	26	1359	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	95	0	108	39	59	1849	117	26	1367	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			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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0	24.0	10.0	24.0	
Total Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	15.0	119.0	119.0	15.0	119.0	
Total Split (%)	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%	9.4%	74.4%	74.4%	9.4%	74.4%	
Maximum Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	9.0	113.0	113.0	9.0	113.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		16.0	16.0		16.0	16.0	127.8	124.3	124.3	125.6	121.6	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.80	0.78	0.78	0.78	0.76	
v/c Ratio		0.09	0.39		0.81	0.18	0.20	0.67	0.09	0.15	0.51	
Control Delay		65.0	15.9		108.6	7.0	4.7	11.1	2.8	4.9	7.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	
Total Delay		65.0	15.9		108.6	7.0	4.7	11.1	2.8	4.9	7.2	
LOS		E	B		F	A	A	B	A	A	A	
Approach Delay		21.4			81.7			10.4			7.1	
Approach LOS		C			F			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 39 (24%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 75.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Future Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1781	1583		1775	1583	1770	3539	1583	1770	3536	
Flt Permitted		0.71	1.00		0.72	1.00	0.16	1.00	1.00	0.08	1.00	
Satd. Flow (perm)		1331	1583		1341	1583	303	3539	1583	156	3536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	95	107	1	39	59	1849	117	26	1359	8
RTOR Reduction (vph)	0	0	86	0	0	35	0	0	16	0	0	0
Lane Group Flow (vph)	0	12	10	0	108	4	59	1849	101	26	1367	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Actuated Green, G (s)		16.0	16.0		16.0	16.0	126.5	121.9	121.9	123.5	120.4	
Effective Green, g (s)		16.0	16.0		16.0	16.0	126.5	121.9	121.9	123.5	120.4	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.79	0.76	0.76	0.77	0.75	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		133	158		134	158	281	2696	1206	151	2660	
v/s Ratio Prot							c0.01	c0.52		0.00	0.39	
v/s Ratio Perm		0.01	0.01		c0.08	0.00	0.16		0.06	0.13		
v/c Ratio		0.09	0.06		0.81	0.02	0.21	0.69	0.08	0.17	0.51	
Uniform Delay, d1		65.4	65.2		70.5	65.0	5.4	9.5	4.8	9.1	8.0	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.95	0.78	
Incremental Delay, d2		0.1	0.1		27.2	0.0	0.1	1.4	0.1	0.2	0.7	
Delay (s)		65.5	65.3		97.7	65.0	5.5	10.9	5.0	8.9	6.9	
Level of Service		E	E		F	E	A	B	A	A	A	
Approach Delay (s)		65.3			89.0			10.4			6.9	
Approach LOS		E			F			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

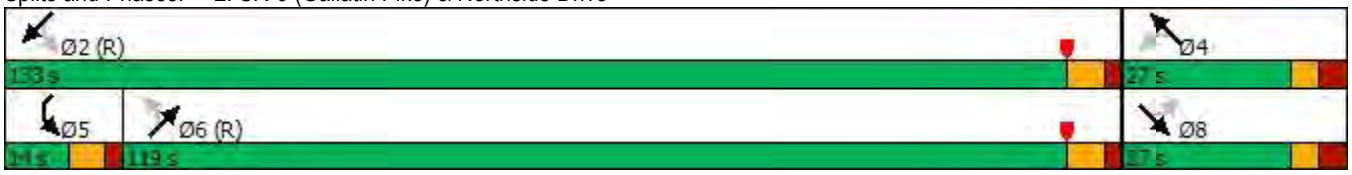
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	0	27	13	1	29	7	1712	24	14	1259	18
Future Volume (vph)	12	0	27	13	1	29	7	1712	24	14	1259	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.907			0.855			0.998			0.998	
Flt Protected		0.985		0.950			0.950			0.950		
Satd. Flow (prot)	0	1664	0	1770	1593	0	1770	3532	0	1770	3532	0
Flt Permitted		0.884		0.948			0.194			0.088		
Satd. Flow (perm)	0	1494	0	1766	1593	0	361	3532	0	164	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		68			32			2			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		4.5			18.1			12.8			17.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	0	29	14	1	32	8	1861	26	15	1368	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	14	33	0	8	1887	0	15	1388	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	27.0	27.0		27.0	27.0		119.0	119.0		14.0	133.0	
Total Split (%)	16.9%	16.9%		16.9%	16.9%		74.4%	74.4%		8.8%	83.1%	
Maximum Green (s)	20.0	20.0		20.0	20.0		112.5	112.5		7.5	126.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		7.4		7.4	7.4		138.7	138.7		141.9	143.2	
Actuated g/C Ratio		0.05		0.05	0.05		0.87	0.87		0.89	0.90	
v/c Ratio		0.32		0.17	0.32		0.03	0.62		0.08	0.44	
Control Delay		10.5		78.0	30.7		1.4	1.8		2.2	2.4	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		10.5		78.0	30.7		1.4	1.8		2.2	2.4	
LOS		B		E	C		A	A		A	A	
Approach Delay		10.5			44.8			1.8			2.4	
Approach LOS		B			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 45 (28%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 2.7		Intersection LOS: A	
Intersection Capacity Utilization 68.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	12	0	27	13	1	29	7	1712	24	14	1259	18
Future Volume (veh/h)	12	0	27	13	1	29	7	1712	24	14	1259	18
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	13	0	29	14	1	32	8	1861	26	15	1368	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	6	41	107	2	71	353	2931	41	263	3118	46
Arrive On Green	0.05	0.00	0.05	0.05	0.05	0.05	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	263	140	898	1381	48	1544	390	3588	50	1781	3585	52
Grp Volume(v), veh/h	42	0	0	14	0	33	8	920	967	15	678	710
Grp Sat Flow(s),veh/h/ln	1300	0	0	1381	0	1592	390	1777	1861	1781	1777	1861
Q Serve(g_s), s	2.2	0.0	0.0	0.0	0.0	3.2	0.1	0.0	0.0	0.2	12.9	12.9
Cycle Q Clear(g_c), s	5.4	0.0	0.0	1.6	0.0	3.2	4.5	0.0	0.0	0.2	12.9	12.9
Prop In Lane	0.31		0.69	1.00		0.97	1.00		0.03	1.00		0.03
Lane Grp Cap(c), veh/h	89	0	0	107	0	73	353	1452	1521	263	1545	1618
V/C Ratio(X)	0.47	0.00	0.00	0.13	0.00	0.45	0.02	0.63	0.64	0.06	0.44	0.44
Avail Cap(c_a), veh/h	209	0	0	217	0	199	353	1452	1521	325	1545	1618
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.4	0.0	0.0	73.6	0.0	74.4	0.1	0.0	0.0	2.0	2.2	2.2
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.2	0.0	1.6	0.1	1.5	1.4	0.0	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	0.6	0.0	1.4	0.0	0.6	0.6	0.1	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.8	0.0	0.0	73.8	0.0	76.0	0.2	1.5	1.4	2.1	3.1	3.1
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		42			47			1895			1403	
Approach Delay, s/veh		76.8			75.3			1.5			3.1	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		145.7		14.3	8.4	137.2		14.3				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		126.5		20.0	7.5	112.5		20.0				
Max Q Clear Time (g_c+I1), s		14.9		5.2	2.2	6.5		7.4				
Green Ext Time (p_c), s		8.2		0.1	0.0	16.5		0.1				

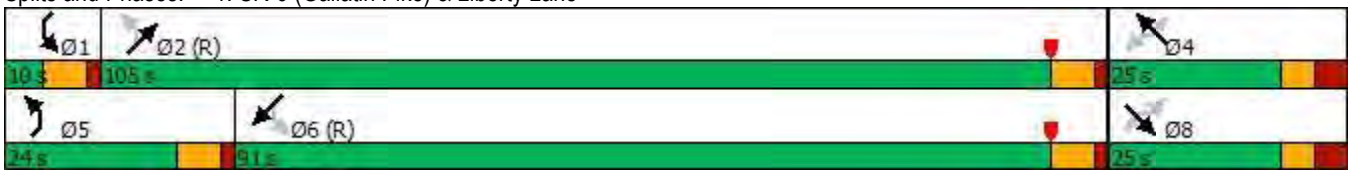
Intersection Summary												
HCM 6th Ctrl Delay			4.1									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Future Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.993				
Flt Protected		0.950			0.955		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1779	1583	1770	3514	0	1770	3539	0
Flt Permitted		0.870			0.845		0.149			0.390		
Satd. Flow (perm)	0	1621	1583	0	1574	1583	278	3514	0	726	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117			117		9				
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			314			925			561	
Travel Time (s)		22.2			7.1			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	24	17	1	9	25	655	32	5	1491	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	24	0	18	9	25	687	0	5	1493	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			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	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0		10.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	105.0		10.0	91.0	
Total Split (%)	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.1%	75.0%		7.1%	65.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	99.0		4.0	85.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		7.4	7.4		7.4	7.4	124.2	125.6		121.0	121.0	
Actuated g/C Ratio		0.05	0.05		0.05	0.05	0.89	0.90		0.86	0.86	
v/c Ratio		0.08	0.12		0.22	0.05	0.08	0.22		0.01	0.49	
Control Delay		64.7	1.3		69.5	0.5	2.1	2.1		0.6	3.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		64.7	1.3		69.5	0.5	2.1	2.1		0.6	3.5	
LOS		E	A		E	A	A	A		A	A	
Approach Delay		15.6			46.5			2.1			3.5	
Approach LOS		B			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 87 (62%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 3.7		Intersection LOS: A	
Intersection Capacity Utilization 66.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Future Volume (vph)	6	0	22	16	1	8	23	603	29	5	1372	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1770	1583		1779	1583	1770	3514		1770	3539	
Flt Permitted		0.87	1.00		0.85	1.00	0.15	1.00		0.39	1.00	
Satd. Flow (perm)		1620	1583		1575	1583	278	3514		727	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	24	17	1	9	25	655	32	5	1491	2
RTOR Reduction (vph)	0	0	23	0	0	9	0	2	0	0	0	0
Lane Group Flow (vph)	0	7	1	0	18	0	25	685	0	5	1493	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		4.6	4.6		4.6	4.6	118.6	115.6		114.2	113.4	
Effective Green, g (s)		4.6	4.6		4.6	4.6	118.6	115.6		114.2	113.4	
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.85	0.83		0.82	0.81	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		53	52		51	52	267	2901		598	2866	
v/s Ratio Prot							c0.00	0.20		0.00	c0.42	
v/s Ratio Perm		0.00	0.00		c0.01	0.00	0.08			0.01		
v/c Ratio		0.13	0.02		0.35	0.01	0.09	0.24		0.01	0.52	
Uniform Delay, d1		65.8	65.5		66.2	65.5	2.8	2.6		2.4	4.4	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		0.35	0.69	
Incremental Delay, d2		0.4	0.0		1.5	0.0	0.1	0.2		0.0	0.6	
Delay (s)		66.2	65.6		67.8	65.5	2.8	2.8		0.8	3.6	
Level of Service		E	E		E	E	A	A		A	A	
Approach Delay (s)		65.7			67.0			2.8			3.6	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

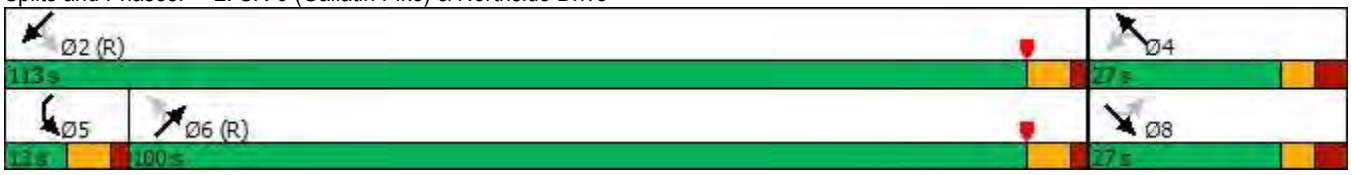
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	2	0	4	12	0	3	22	597	6	7	1386	14
Future Volume (vph)	2	0	4	12	0	3	22	597	6	7	1386	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.910			0.850			0.998			0.999	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1668	0	1770	1583	0	1770	3532	0	1770	3536	0
Flt Permitted		0.889					0.170			0.381		
Satd. Flow (perm)	0	1507	0	1863	1583	0	317	3532	0	710	3536	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								2			2	
Link Speed (mph)		25			30			45			45	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		5.3			18.1			8.5			11.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	4	13	0	3	24	649	7	8	1507	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	13	3	0	24	656	0	8	1522	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	27.0	27.0		27.0	27.0		100.0	100.0		13.0	113.0	
Total Split (%)	19.3%	19.3%		19.3%	19.3%		71.4%	71.4%		9.3%	80.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		93.5	93.5		6.5	106.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		7.2		7.2	7.2		129.3	129.3		127.7	131.6	
Actuated g/C Ratio		0.05		0.05	0.05		0.92	0.92		0.91	0.94	
v/c Ratio		0.08		0.14	0.04		0.08	0.20		0.01	0.46	
Control Delay		65.3		66.6	64.0		2.5	1.3		1.4	1.8	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		65.3		66.6	64.0		2.5	1.3		1.4	1.8	
LOS		E		E	E		A	A		A	A	
Approach Delay		65.3			66.1			1.4			1.8	
Approach LOS		E			E			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 79 (56%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 2.3		Intersection LOS: A	
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	12	0	3	22	597	6	7	1386	14
Future Volume (veh/h)	2	0	4	12	0	3	22	597	6	7	1386	14
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	2	0	4	13	0	3	24	649	7	8	1507	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	6	30	93	0	46	320	2956	32	703	3154	31
Arrive On Green	0.03	0.00	0.03	0.03	0.00	0.03	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	333	192	1049	1412	0	1585	343	3601	39	1781	3605	36
Grp Volume(v), veh/h	6	0	0	13	0	3	24	320	336	8	742	780
Grp Sat Flow(s),veh/h/ln	1574	0	0	1412	0	1585	343	1777	1863	1781	1777	1864
Q Serve(g_s), s	0.0	0.0	0.0	0.6	0.0	0.3	0.5	0.0	0.0	0.1	12.6	12.6
Cycle Q Clear(g_c), s	0.5	0.0	0.0	1.1	0.0	0.3	5.5	0.0	0.0	0.1	12.6	12.6
Prop In Lane	0.33		0.67	1.00		1.00	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	80	0	0	93	0	46	320	1458	1529	703	1554	1631
V/C Ratio(X)	0.08	0.00	0.00	0.14	0.00	0.07	0.07	0.22	0.22	0.01	0.48	0.48
Avail Cap(c_a), veh/h	253	0	0	254	0	226	320	1458	1529	772	1554	1631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.3	0.0	0.0	66.6	0.0	66.2	0.1	0.0	0.0	1.8	1.9	1.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.2	0.5	0.3	0.3	0.0	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.5	0.0	0.1	0.0	0.1	0.1	0.0	2.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.4	0.0	0.0	66.8	0.0	66.4	0.6	0.3	0.3	1.8	2.9	2.9
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		6			16			680			1530	
Approach Delay, s/veh		66.4			66.7			0.3			2.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		129.0		11.0	7.6	121.4		11.0				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		106.5		20.0	6.5	93.5		20.0				
Max Q Clear Time (g_c+I1), s		14.6		3.1	2.1	7.5		2.5				
Green Ext Time (p_c), s		7.6		0.0	0.0	2.7		0.0				

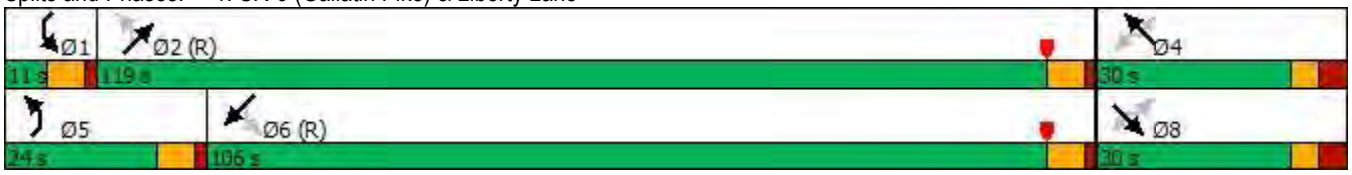
Intersection Summary												
HCM 6th Ctrl Delay			2.8									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Future Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.991			0.999	
Flt Protected		0.957			0.953		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1775	1583	1770	3507	0	1770	3536	0
Flt Permitted		0.728			0.721		0.193			0.094		
Satd. Flow (perm)	0	1356	1583	0	1343	1583	360	3507	0	175	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			102			102		10			1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			314			925			561	
Travel Time (s)		22.2			7.1			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	1	86	97	1	36	53	1674	107	24	1230	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	86	0	98	36	53	1781	0	24	1237	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			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	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0		10.0	24.0	
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	24.0	119.0		11.0	106.0	
Total Split (%)	18.8%	18.8%	18.8%	18.8%	18.8%	18.8%	15.0%	74.4%		6.9%	66.3%	
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	18.0	113.0		5.0	100.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		16.0	16.0		16.0	16.0	128.0	124.4		125.6	121.7	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.80	0.78		0.78	0.76	
v/c Ratio		0.08	0.34		0.73	0.14	0.16	0.65		0.13	0.46	
Control Delay		63.3	10.4		98.4	1.2	4.4	10.8		4.7	7.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		63.3	10.4		98.4	1.2	4.4	10.8		4.7	7.3	
LOS		E	B		F	A	A	B		A	A	
Approach Delay		16.4			72.3			10.6			7.3	
Approach LOS		B			E			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 39 (24%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 12.0		Intersection LOS: B	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Future Volume (vph)	9	1	79	89	1	33	49	1540	98	22	1132	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1782	1583		1775	1583	1770	3507		1770	3536	
Flt Permitted		0.73	1.00		0.72	1.00	0.19	1.00		0.09	1.00	
Satd. Flow (perm)		1356	1583		1343	1583	360	3507		174	3536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	1	86	97	1	36	53	1674	107	24	1230	7
RTOR Reduction (vph)	0	0	77	0	0	32	0	2	0	0	0	0
Lane Group Flow (vph)	0	11	9	0	98	4	53	1779	0	24	1237	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		16.0	16.0		16.0	16.0	126.5	122.0		123.5	120.5	
Effective Green, g (s)		16.0	16.0		16.0	16.0	126.5	122.0		123.5	120.5	
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.79	0.76		0.77	0.75	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		135	158		134	158	324	2674		164	2663	
v/s Ratio Prot							c0.00	c0.51		0.00	0.35	
v/s Ratio Perm		0.01	0.01		c0.07	0.00	0.12			0.11		
v/c Ratio		0.08	0.05		0.73	0.02	0.16	0.67		0.15	0.46	
Uniform Delay, d1		65.3	65.2		69.9	64.9	4.8	9.2		8.2	7.5	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		0.92	0.83	
Incremental Delay, d2		0.1	0.1		16.1	0.0	0.1	1.3		0.1	0.5	
Delay (s)		65.4	65.2		86.0	65.0	4.8	10.5		7.7	6.8	
Level of Service		E	E		F	E	A	B		A	A	
Approach Delay (s)		65.2			80.4			10.3			6.8	
Approach LOS		E			F			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

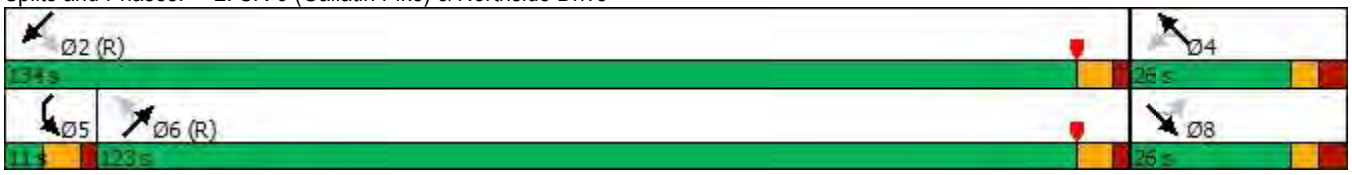
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	11	0	24	12	1	26	6	1550	22	13	1140	16
Future Volume (vph)	11	0	24	12	1	26	6	1550	22	13	1140	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.908			0.855			0.998			0.998	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1664	0	1770	1593	0	1770	3532	0	1770	3532	0
Flt Permitted		0.883		0.954			0.222			0.110		
Satd. Flow (perm)	0	1493	0	1777	1593	0	414	3532	0	205	3532	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								2			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		4.5			18.1			12.8			17.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	0	26	13	1	28	7	1685	24	14	1239	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	13	29	0	7	1709	0	14	1256	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	26.0	26.0		26.0	26.0		123.0	123.0		11.0	134.0	
Total Split (%)	16.3%	16.3%		16.3%	16.3%		76.9%	76.9%		6.9%	83.8%	
Maximum Green (s)	19.0	19.0		19.0	19.0		116.5	116.5		4.5	127.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		8.9		8.9	8.9		137.3	137.3		140.4	141.7	
Actuated g/C Ratio		0.06		0.06	0.06		0.86	0.86		0.88	0.89	
v/c Ratio		0.46		0.13	0.33		0.02	0.56		0.06	0.40	
Control Delay		90.2		73.6	81.8		1.5	1.6		2.4	2.6	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		90.2		73.6	81.8		1.5	1.6		2.4	2.6	
LOS		F		E	F		A	A		A	A	
Approach Delay		90.2			79.3			1.6			2.6	
Approach LOS		F			E			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 45 (28%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 4.2		Intersection LOS: A	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	11	0	24	12	1	26	6	1550	22	13	1140	16
Future Volume (veh/h)	11	0	24	12	1	26	6	1550	22	13	1140	16
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	12	0	26	13	1	28	7	1685	24	14	1239	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	6	39	107	2	65	401	2945	42	300	3134	43
Arrive On Green	0.04	0.00	0.04	0.04	0.04	0.04	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	278	140	907	1385	55	1538	442	3587	51	1781	3589	49
Grp Volume(v), veh/h	38	0	0	13	0	29	7	833	876	14	613	643
Grp Sat Flow(s),veh/h/ln	1325	0	0	1385	0	1593	442	1777	1861	1781	1777	1861
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.2	10.7	10.7
Cycle Q Clear(g_c), s	4.8	0.0	0.0	1.4	0.0	2.8	2.4	0.0	0.0	0.2	10.7	10.7
Prop In Lane	0.32		0.68	1.00		0.97	1.00		0.03	1.00		0.03
Lane Grp Cap(c), veh/h	86	0	0	107	0	68	401	1459	1528	300	1551	1625
V/C Ratio(X)	0.44	0.00	0.00	0.12	0.00	0.43	0.02	0.57	0.57	0.05	0.40	0.40
Avail Cap(c_a), veh/h	201	0	0	212	0	189	401	1459	1528	330	1551	1625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.72	0.72	0.72	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.6	0.0	0.0	74.0	0.0	74.7	0.0	0.0	0.0	2.0	2.0	2.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.2	0.0	1.6	0.1	1.2	1.1	0.0	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	0.5	0.0	1.2	0.0	0.5	0.5	0.1	2.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.9	0.0	0.0	74.2	0.0	76.3	0.1	1.2	1.1	2.0	2.7	2.7
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		38			42			1716			1270	
Approach Delay, s/veh		76.9			75.6			1.1			2.7	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		146.2		13.8	8.4	137.8		13.8				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		127.5		19.0	4.5	116.5		19.0				
Max Q Clear Time (g_c+I1), s		12.7		4.8	2.2	4.4		6.8				
Green Ext Time (p_c), s		6.8		0.1	0.0	12.8		0.1				

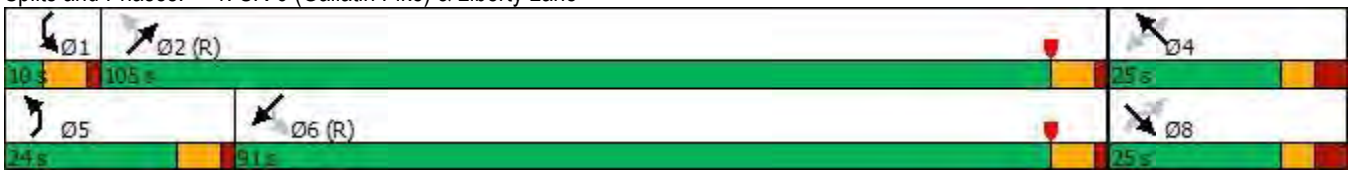
Intersection Summary												
HCM 6th Ctrl Delay			3.8									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Future Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.993				
Flt Protected		0.950			0.955		0.950			0.950		
Satd. Flow (prot)	0	1770	1583	0	1779	1583	1770	3514	0	1770	3539	0
Flt Permitted		0.833			0.813		0.121			0.364		
Satd. Flow (perm)	0	1552	1583	0	1514	1583	225	3514	0	678	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117			117		8				
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			314			925			561	
Travel Time (s)		22.2			7.1			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	0	26	20	1	10	27	724	35	7	1648	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	26	0	21	10	27	759	0	7	1650	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			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	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0		10.0	24.0	
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	105.0		10.0	91.0	
Total Split (%)	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.1%	75.0%		7.1%	65.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	99.0		4.0	85.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		7.6	7.6		7.6	7.6	124.0	125.4		120.8	120.8	
Actuated g/C Ratio		0.05	0.05		0.05	0.05	0.89	0.90		0.86	0.86	
v/c Ratio		0.10	0.13		0.26	0.05	0.11	0.24		0.01	0.54	
Control Delay		64.7	1.4		70.8	0.4	2.4	2.2		0.7	3.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		64.7	1.4		70.8	0.4	2.4	2.2		0.7	4.0	
LOS		E	A		E	A	A	A		A	A	
Approach Delay		16.3			48.1			2.2			4.0	
Approach LOS		B			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 87 (62%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 4.1		Intersection LOS: A	
Intersection Capacity Utilization 70.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Future Volume (vph)	7	0	24	18	1	9	25	666	32	6	1516	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1770	1583		1778	1583	1770	3515		1770	3539	
Flt Permitted		0.83	1.00		0.81	1.00	0.12	1.00		0.36	1.00	
Satd. Flow (perm)		1552	1583		1515	1583	226	3515		678	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	0	26	20	1	10	27	724	35	7	1648	2
RTOR Reduction (vph)	0	0	25	0	0	10	0	1	0	0	0	0
Lane Group Flow (vph)	0	8	1	0	21	0	27	758	0	7	1650	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		4.8	4.8		4.8	4.8	118.4	115.4		114.0	113.2	
Effective Green, g (s)		4.8	4.8		4.8	4.8	118.4	115.4		114.0	113.2	
Actuated g/C Ratio		0.03	0.03		0.03	0.03	0.85	0.82		0.81	0.81	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		53	54		51	54	224	2897		558	2861	
v/s Ratio Prot							c0.00	0.22		0.00	c0.47	
v/s Ratio Perm		0.01	0.00		c0.01	0.00	0.10			0.01		
v/c Ratio		0.15	0.02		0.41	0.01	0.12	0.26		0.01	0.58	
Uniform Delay, d1		65.6	65.3		66.2	65.3	3.5	2.8		2.4	4.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		0.35	0.69	
Incremental Delay, d2		0.5	0.0		2.0	0.0	0.1	0.2		0.0	0.8	
Delay (s)		66.1	65.4		68.2	65.3	3.6	3.0		0.8	4.1	
Level of Service		E	E		E	E	A	A		A	A	
Approach Delay (s)		65.5			67.3			3.0			4.1	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

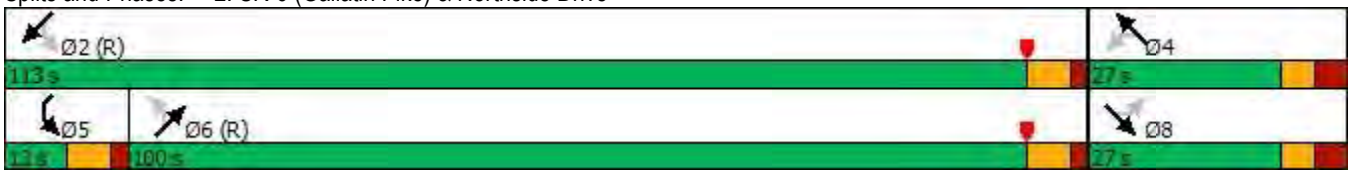
c Critical Lane Group

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	2	0	4	13	0	3	24	659	7	8	1531	15
Future Volume (vph)	2	0	4	13	0	3	24	659	7	8	1531	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.910			0.850			0.998			0.999	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1668	0	1770	1583	0	1770	3532	0	1770	3536	0
Flt Permitted		0.889					0.142			0.357		
Satd. Flow (perm)	0	1507	0	1863	1583	0	265	3532	0	665	3536	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								2			2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		4.5			18.1			12.8			17.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	4	14	0	3	26	716	8	9	1664	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	14	3	0	26	724	0	9	1680	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	27.0	27.0		27.0	27.0		100.0	100.0		13.0	113.0	
Total Split (%)	19.3%	19.3%		19.3%	19.3%		71.4%	71.4%		9.3%	80.7%	
Maximum Green (s)	20.0	20.0		20.0	20.0		93.5	93.5		6.5	106.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		7.2		7.2	7.2		129.3	129.3		127.7	131.6	
Actuated g/C Ratio		0.05		0.05	0.05		0.92	0.92		0.91	0.94	
v/c Ratio		0.08		0.15	0.04		0.11	0.22		0.01	0.51	
Control Delay		65.2		66.8	63.7		3.0	1.5		1.4	2.1	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		65.2		66.8	63.7		3.0	1.5		1.4	2.1	
LOS		E		E	E		A	A		A	A	
Approach Delay		65.2			66.2			1.6			2.1	
Approach LOS		E			E			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 79 (56%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 2.5		Intersection LOS: A	
Intersection Capacity Utilization 59.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	13	0	3	24	659	7	8	1531	15
Future Volume (veh/h)	2	0	4	13	0	3	24	659	7	8	1531	15
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	2	0	4	14	0	3	26	716	8	9	1664	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	6	31	94	0	47	277	2949	33	664	3152	30
Arrive On Green	0.03	0.00	0.03	0.03	0.00	0.03	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	326	199	1051	1412	0	1585	294	3600	40	1781	3606	35
Grp Volume(v), veh/h	6	0	0	14	0	3	26	353	371	9	819	861
Grp Sat Flow(s),veh/h/ln	1576	0	0	1412	0	1585	294	1777	1863	1781	1777	1864
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.3	0.9	0.0	0.0	0.1	15.1	15.1
Cycle Q Clear(g_c), s	0.5	0.0	0.0	1.2	0.0	0.3	8.4	0.0	0.0	0.1	15.1	15.1
Prop In Lane	0.33		0.67	1.00		1.00	1.00		0.02	1.00		0.02
Lane Grp Cap(c), veh/h	81	0	0	94	0	47	277	1455	1526	664	1553	1629
V/C Ratio(X)	0.07	0.00	0.00	0.15	0.00	0.06	0.09	0.24	0.24	0.01	0.53	0.53
Avail Cap(c_a), veh/h	253	0	0	254	0	226	277	1455	1526	732	1553	1629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.2	0.0	0.0	66.5	0.0	66.0	0.3	0.0	0.0	1.8	2.1	2.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.3	0.0	0.2	0.7	0.4	0.4	0.0	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.5	0.0	0.1	0.1	0.2	0.2	0.0	3.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.3	0.0	0.0	66.8	0.0	66.3	0.9	0.4	0.4	1.8	3.3	3.3
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		6			17			750			1689	
Approach Delay, s/veh		66.3			66.7			0.4			3.3	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		128.9		11.1	7.7	121.2		11.1				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		106.5		20.0	6.5	93.5		20.0				
Max Q Clear Time (g_c+I1), s		17.1		3.2	2.1	10.4		2.5				
Green Ext Time (p_c), s		12.1		0.0	0.0	3.8		0.0				

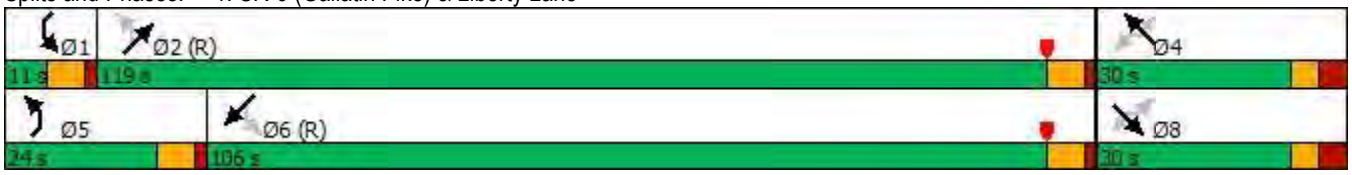
Intersection Summary												
HCM 6th Ctrl Delay			3.0									
HCM 6th LOS			A									

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Future Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		45	100		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			70			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.991			0.999	
Flt Protected		0.956			0.953		0.950			0.950		
Satd. Flow (prot)	0	1781	1583	0	1775	1583	1770	3507	0	1770	3536	0
Flt Permitted		0.722			0.720		0.161			0.067		
Satd. Flow (perm)	0	1345	1583	0	1341	1583	300	3507	0	125	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			102			102		10			1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		976			314			925			561	
Travel Time (s)		22.2			7.1			14.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	95	107	1	39	59	1849	117	26	1359	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	95	0	108	39	59	1966	0	26	1367	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			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	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8	8	4	4	4	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	24.0		10.0	24.0	
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	24.0	119.0		11.0	106.0	
Total Split (%)	18.8%	18.8%	18.8%	18.8%	18.8%	18.8%	15.0%	74.4%		6.9%	66.3%	
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0	23.0	18.0	113.0		5.0	100.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		16.9	16.9		16.9	16.9	127.2	123.5		124.6	120.6	
Actuated g/C Ratio		0.11	0.11		0.11	0.11	0.80	0.77		0.78	0.75	
v/c Ratio		0.08	0.37		0.77	0.15	0.20	0.73		0.18	0.51	
Control Delay		62.8	12.9		100.5	1.2	5.1	13.0		6.5	7.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay		62.8	12.9		100.5	1.2	5.1	13.0		6.5	7.9	
LOS		E	B		F	A	A	B		A	A	
Approach Delay		18.5			74.1			12.8			7.9	
Approach LOS		B			E			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 39 (24%), Referenced to phase 2:NETL and 6:SWTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: SR-6 (Gallatin Pike) & Liberty Lane



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Future Volume (vph)	10	1	87	98	1	36	54	1701	108	24	1250	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1781	1583		1775	1583	1770	3508		1770	3536	
Flt Permitted		0.72	1.00		0.72	1.00	0.16	1.00		0.07	1.00	
Satd. Flow (perm)		1345	1583		1341	1583	300	3508		125	3536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	95	107	1	39	59	1849	117	26	1359	8
RTOR Reduction (vph)	0	0	85	0	0	35	0	2	0	0	0	0
Lane Group Flow (vph)	0	12	10	0	108	4	59	1964	0	26	1367	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		16.9	16.9		16.9	16.9	125.8	121.1		122.4	119.4	
Effective Green, g (s)		16.9	16.9		16.9	16.9	125.8	121.1		122.4	119.4	
Actuated g/C Ratio		0.11	0.11		0.11	0.11	0.79	0.76		0.77	0.75	
Clearance Time (s)		7.0	7.0		7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		142	167		141	167	279	2655		126	2638	
v/s Ratio Prot							c0.01	c0.56		0.00	0.39	
v/s Ratio Perm		0.01	0.01		c0.08	0.00	0.16			0.15		
v/c Ratio		0.08	0.06		0.77	0.02	0.21	0.74		0.21	0.52	
Uniform Delay, d1		64.6	64.4		69.6	64.2	5.7	10.7		11.7	8.4	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.05	0.80	
Incremental Delay, d2		0.1	0.1		19.7	0.0	0.1	1.9		0.3	0.7	
Delay (s)		64.7	64.5		89.3	64.2	5.8	12.6		12.6	7.4	
Level of Service		E	E		F	E	A	B		B	A	
Approach Delay (s)		64.5			82.7			12.4			7.5	
Approach LOS		E			F			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

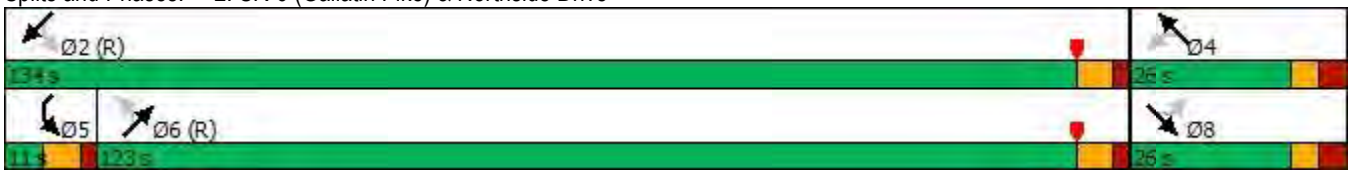
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	0	27	13	1	29	7	1712	24	14	1259	18
Future Volume (vph)	12	0	27	13	1	29	7	1712	24	14	1259	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	105		0	100		0	155		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			150			80			95		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.907			0.855			0.998			0.998	
Flt Protected		0.985		0.950			0.950			0.950		
Satd. Flow (prot)	0	1664	0	1770	1593	0	1770	3532	0	1770	3532	0
Flt Permitted		0.884		0.902			0.194			0.085		
Satd. Flow (perm)	0	1494	0	1680	1593	0	361	3532	0	158	3532	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								2			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		196			796			561			754	
Travel Time (s)		4.5			18.1			12.8			17.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	0	29	14	1	32	8	1861	26	15	1368	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	14	33	0	8	1887	0	15	1388	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			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			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)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		4.0	10.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.5	24.5		10.5	24.5	
Total Split (s)	26.0	26.0		26.0	26.0		123.0	123.0		11.0	134.0	
Total Split (%)	16.3%	16.3%		16.3%	16.3%		76.9%	76.9%		6.9%	83.8%	
Maximum Green (s)	19.0	19.0		19.0	19.0		116.5	116.5		4.5	127.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.5	4.5		4.5	4.5	
All-Red Time (s)	3.5	3.5		3.5	3.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0		7.0	7.0		6.5	6.5		6.5	6.5	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Act Effct Green (s)		9.3		9.3	9.3		136.9	136.9		140.0	141.3	
Actuated g/C Ratio		0.06		0.06	0.06		0.86	0.86		0.88	0.88	
v/c Ratio		0.49		0.14	0.36		0.03	0.62		0.08	0.44	
Control Delay		91.0		73.5	82.5		1.6	1.7		2.8	2.9	
Queue Delay		0.0		0.0	0.0		0.0	0.1		0.0	0.0	
Total Delay		91.0		73.5	82.5		1.6	1.8		2.8	3.0	
LOS		F		E	F		A	A		A	A	
Approach Delay		91.0			79.8			1.8			2.9	
Approach LOS		F			E			A			A	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 45 (28%), Referenced to phase 2:SWTL and 6:NETL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 4.4 Intersection LOS: A
Intersection Capacity Utilization 68.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: SR-6 (Gallatin Pike) & Northside Drive



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	12	0	27	13	1	29	7	1712	24	14	1259	18
Future Volume (veh/h)	12	0	27	13	1	29	7	1712	24	14	1259	18
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	13	0	29	14	1	32	8	1861	26	15	1368	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	6	41	107	2	71	353	2931	41	263	3118	46
Arrive On Green	0.05	0.00	0.05	0.05	0.05	0.05	1.00	1.00	1.00	0.01	0.87	0.87
Sat Flow, veh/h	262	140	897	1381	48	1544	390	3588	50	1781	3585	52
Grp Volume(v), veh/h	42	0	0	14	0	33	8	920	967	15	678	710
Grp Sat Flow(s),veh/h/ln	1300	0	0	1381	0	1592	390	1777	1861	1781	1777	1861
Q Serve(g_s), s	2.2	0.0	0.0	0.0	0.0	3.2	0.1	0.0	0.0	0.2	12.8	12.9
Cycle Q Clear(g_c), s	5.4	0.0	0.0	1.6	0.0	3.2	4.5	0.0	0.0	0.2	12.8	12.9
Prop In Lane	0.31		0.69	1.00		0.97	1.00		0.03	1.00		0.03
Lane Grp Cap(c), veh/h	89	0	0	107	0	73	353	1452	1521	263	1545	1619
V/C Ratio(X)	0.47	0.00	0.00	0.13	0.00	0.45	0.02	0.63	0.64	0.06	0.44	0.44
Avail Cap(c_a), veh/h	199	0	0	208	0	189	353	1452	1521	292	1545	1619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.63	0.63	0.63	1.00	1.00	1.00
Uniform Delay (d), s/veh	75.4	0.0	0.0	73.6	0.0	74.4	0.1	0.0	0.0	2.0	2.2	2.2
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.2	0.0	1.6	0.1	1.3	1.3	0.0	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	0.6	0.0	1.4	0.0	0.5	0.5	0.1	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.8	0.0	0.0	73.8	0.0	76.0	0.2	1.3	1.3	2.1	3.1	3.1
LnGrp LOS	E	A	A	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		42			47			1895			1403	
Approach Delay, s/veh		76.8			75.3			1.3			3.1	
Approach LOS		E			E			A			A	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		145.7		14.3	8.4	137.2		14.3				
Change Period (Y+Rc), s		6.5		7.0	6.5	6.5		7.0				
Max Green Setting (Gmax), s		127.5		19.0	4.5	116.5		19.0				
Max Q Clear Time (g_c+I1), s		14.9		5.2	2.2	6.5		7.4				
Green Ext Time (p_c), s		8.2		0.1	0.0	16.5		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			4.0									
HCM 6th LOS			A									

Environmental Studies Request

Project Information

Route: SR-6

Termini: (Gallatin Pike), From Liberty Lane to north of Northside Drive

County: Davidson

PIN: 132524.00

Request

Request Type: Initial Environmental Study

Project Plans: Pedestrian Road Safety Initiative (PRSI)

Date of Plans: 03/20/2023

Location: Email Attachment

Certification

Requestor: Kate Landers

Title: TESS - General NEPA Programs Office

Signature: Kate Landers

Digitally signed by Kate Landers
Date: 2023.03.21 09:56:56 -05'00'

Ecology

Environmental Study

Technical Section

Section: Ecology

Study Results

Based on the Pedestrian Road Safety Initiative dated 3/20/23, a 5/19/23 field review of the project area, and a 5/19/23 review of the TDEC Division of Natural Areas Rare Species Database, this project PIN 132524.00 is covered by the 2022 Grouped Programmatic No Effect Activities Agreement between TDOT and FHWA, the 2023 Memorandum of Agreement between TDOT, FHWA, and the TDEC Division of Natural Areas, and the 2022 Memorandum of Agreement between TDOT, FHWA, and the Tennessee Wildlife Resources Agency.

Additional Ecology work is not required for this project, provided there is no work in the water, no materials are allowed to enter any water, and there is no removal of vegetation other than what has been described. If any of the latter occur for these projects, the Ecology Section will need to be contacted for further coordination. Please contact me if you have any questions or need any additional information.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Madalyn Brown

Title: TESS, R3

Signature: Madalyn Brown

Digitally signed by Madalyn Brown
Date: 2023.05.26 14:23:51 -05'00'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
ENVIRONMENTAL TECHNICAL STUDIES OFFICE
SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

JOE GALBATO, III
INTERIM COMMISSIONER

BILL LEE
GOVERNOR

MEMORANDUM

To: K. Holly Cantrell
NEPA Projects Office

From: K. Brandon Chance
Ecology Section

Date: 31 March 2022

Subject: 2022 - Grouped Programmatic No Effect Activities Agreement

In February of 2022, the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA) instituted the Grouped Programmatic No Effect Activities (GPNEA) Agreement to help streamline State transportation (Title 23 U.S.C.) projects and activities which typically result in no effects to federally threatened/endangered (T/E) plant and animal species and/or their critical habitats in Tennessee.

This agreement supersedes the June 2017 GPNEA Agreement between TDOT, FHWA, and the United States Fish and Wildlife Service. Since the 2022 GPNEA Agreement remains mostly unchanged from the previous agreement apart from the signatories and minor edits to clarify language, any projects covered under the 2017 GPNEA will be covered under the 2022 GPNEA Agreement. No further review from our office is needed unless the project is modified to include activities which were not considered during the previous Ecology review.

If you have any questions or comments, please contact me at K.Brandon.Chance@tn.gov

GROUPED PROGRAMMATIC NO EFFECT ACTIVITIES AGREEMENT

BETWEEN

TENNESSEE DEPARTMENT OF TRANSPORTATION

AND

FEDERAL HIGHWAY ADMINISTRATION
TENNESSEE DIVISION OFFICE

February 2022

SUBJECT:

This Grouped Programmatic No Effect Activities Agreement is being instituted between the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA) to help streamline State transportation (Title 23 U.S.C.) projects and activities which typically result in no effects to threatened/endangered (T/E) plant and animal species and/or their critical habitats in Tennessee.

PURPOSE:

The Endangered Species Act (ESA) directs all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the Act. Section 7 of the Act, called "Interagency Cooperation," is the mechanism by which Federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species.

FHWA has designated TDOT as a non-federal representative pursuant to interagency cooperation under Section 7 in accordance with 50 CFR § 402.12. Under this designation, TDOT is required, with FHWA oversite, to implement FHWA's obligations under Section 7 for projects which are funded and/or executed by these agencies per Title 23 U.S.C. It is recognized that certain categories of FHWA/TDOT activities typically result in no effect to federally listed species or designated critical habitat and when the federal action agency makes a "no effect" determination, informal consultation with the USFWS is not required. This agreement defines required conditions and example activities covered pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 662(a)) and Section 7 consultation of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) that TDOT and FHWA agree will result in a "no effects" determination for federally listed species and designated critical habitat. NEPA documentation for projects covered under this agreement will include this Agreement and a statement from TDOT Ecology Staff citing this agreement, rather than written correspondence to and from the USFWS.

SCOPE:

This Consultation does not supersede the responsibilities and obligations of the TDOT, the USFWS, or the FHWA, which are mandated by the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq*.), Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.), or related regulations and agency policy. Example activities included in this Consultation have been evaluated in accordance with these statutes, regulations, and policies. FHWA and TDOT conclude that when the conditions of this agreement are satisfied, these activities will result in a "no effects" determination to T/E species or their designated critical habitats. Therefore, this agreement satisfies the requirements of both the Fish and Wildlife Coordination Act and Section 7 of the Endangered Species Act.

REQUIRED CONDITIONS FOR COVERAGE UNDER THIS PROGRAMMATIC AGREEMENT:

Both of the Following Conditions Must be Met

(1) there are no documented records or suitable habitat for federally listed plant or animal species and no designated critical habitat within the project area, and
(2) there will be no work in or disturbance to waters of the U. S., as defined by 40 C.F.R. 120.2 except work as described in examples 2 and 3 below.

Example Projects Covered Under This Programmatic Agreement Include:

1. Typical bridge repair projects confined to the structure above the waterline and not requiring disturbance of waterways, provided construction debris or other construction-related materials can be prevented from entering the waterway. The provisions of the most current "Programmatic Consultation for Addressing Cliff Swallows and Barn Swallows on Transportation Projects" regarding procedures addressing cliff swallow (*Hirundo pyrrhonota*) and barn swallow (*Hirundo rustica*) nesting sites are applicable. Activities considered exempt within this category include the following:

- Bridge deck repair
- Installation and repair of expansion joints
- Removal and resurfacing of bridge and approach roadway pavement
- Patching of substructures
- Removal, replacement, and repair of beams
- Removal and replacement of bridge deck cantilevers
- Modification of piers and abutments above the surface of the water
- Repair and replacement of bridge and approach guardrails
- Sand blasting, painting, and sealing

2. Installation of impact attenuators on instream piers, providing substrate work is not involved, and they do not affect flow downstream.

3. Bridge inspections, including the portions of the piers under the surface of the water, provided no soil or substrate is disturbed.

4. Addition of intersection turning lanes.

5. Installation, replacement, or addition of traffic control signals, traffic control appurtenances, and information signs. Included are Intelligent Transportation Systems (ITS), fog detection systems, traffic information systems, flashing lights, reflectors, striping, rumble strips and stripes, and roadway signs.

6. Turning radius improvement at intersections.

7. Removal and replacement of existing pavement, provided that all old pavement is recycled/reused or is properly disposed of in accordance with TDOT's Waste and Borrow Policy, "TDOT Standard Specifications for Road and Bridge Construction", and/or other applicable regulations.

8. Installation and repair of guardrails, cable barriers, and jersey barriers.

9. Installation of railroad signals, signs, and other improvements at crossings.

10. Maintenance of roadway ditches and catch basins. No work under this exemption can occur in or within 50 feet of features regulated as waters of the U.S. as referenced in condition 2 above.

11. Replacement of overpasses which span roadways or railways.

12. Placement of riprap adjacent to existing bridge abutments to repair/prevent scour and protect the integrity of the structure. No work or materials shall be allowed in the water.

13. Enhancement of Rest Areas (e.g., repaving, landscaping, sprinkler system installation, lighting, building replacement or additions, sidewalk refurbishing).

14. Installation of noise walls.

15. Installation, replacement, or repair of highway lighting.

16. Improvements to existing interchange ramps, including: realignment, widening, and addition of turn lanes and shoulders.

17. Removal of vegetation along roads or under bridges.

18. Any projects not involving construction, earth-moving activities, or disturbances of any kind.

19. State funded and federal-aid projects that are administered by local governments with the assistance of the TDOT Local Programs Development Office.

20. Safe Routes to School Program.

21. Items deemed eligible for Transportation Alternatives Set-Aside (or other) funding, including:

- Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.
- Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers
- Inventory, control, and removal of outdoor advertising
- Archaeological activities relating to impacts from implementation of a transportation project eligible under title 23
- Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other nonmotorized transportation users
- Construction of turnouts, overlooks, and viewing areas
- Historic preservation and rehabilitation of historic transportation facilities
- Any environmental mitigation activity, including pollution prevention and pollution abatement activities and mitigation to (1) address stormwater management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff and (2) to reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats

GENERAL PROVISIONS:

Agencies may unilaterally withdraw from this Agreement with 30 days written notice.

This Agreement will be reviewed every five years and revised as appropriate. Revisions may be requested at any time by an agency. All revisions will be made in writing and require the concurrence of each agency.

CONCURRENCE BY:

Federal Highway Administration, Tennessee Division Office

Pamela M. Kordenbrock

Date: March 2, 2022

Pamela M. Kordenbrock, Division Administrator

Tennessee Department of Transportation

Joseph Galbato, III

Joseph Galbato, 111 (Feb 22, 2022 09:08 CST)

Date: February 22, 2022

Joseph Galbato III, Interim Commissioner and Chief Financial Officer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, Tennessee 38501
(931) 528-6481

January 14, 2022

Mr. Brandon Chance
Environmental Division / Tech Studies Office
James K. Polk Building, 9th Floor
505 Deaderick Street, Nashville, TN 37243

Subject: Grouped Programmatic No Effects Activities Agreement between the Tennessee Department of Transportation and the Federal Highway Administration Tennessee Division Office.

Dear Mr. Chance:

Thank you for the opportunity to review the Grouped Programmatic No Effect Activities Agreement (Agreement) between the Tennessee Department of Transportation (TDOT) and the Federal Highway Administration (FHWA). We understand the purpose of this Agreement is to streamline State transportation (Title 23 U.S.C.) projects and activities that have no effect to threatened/endangered plant and animal species and/or their critical habitats in Tennessee.

The FHWA has designated the TDOT as a non-federal representative pursuant to interagency cooperation under Section 7 consultation of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), in accordance with 50 CFR § 402.12. Under this designation, the TDOT is permitted, with oversight of the FHWA, to address the FHWA's obligations under Section 7 of the ESA for projects which are funded and/or executed by these agencies per Title 23 U.S.C.

It is recognized by both parties to this Agreement that certain categories of FHWA/TDOT activities typically have no effects to federally listed species or designated critical habitat and that a "no effect" determination completes consultation requirements under Section 7 of the ESA. This Agreement defines the conditions that must be met for a determination of "no effect". The TDOT and the FHWA, in coordination with the U.S. Fish and Wildlife Service (Service), have agreed that a "no effect" determination is appropriate for the defined activities, when there are no documented records or suitable habitat for federally listed plant or animal species, no designated critical habitat, and no disturbance to waters of the U.S., as defined by 40 C.F.R. 120.2. NEPA documentation for projects covered under this Agreement will include a copy of

the Agreement and a reference to its application from TDOT Ecology Staff, rather than written correspondence to and from the Service.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at *john_griffith@fws.gov*.

Sincerely,

DANIEL ELBERT
Digitally signed by DANIEL ELBERT
Date: 2022.01.14 13:53:23 -06'00'

Field Supervisor

xc: Ms. Tammy Sellers, TDOT Environmental Division Assistant Director
Mr. Gary Fottrell, Environmental Program Engineer, FHWA

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
ENVIRONMENTAL TECHNICAL STUDIES OFFICE
SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

MEMORANDUM

To: NEPA Projects Office

From: Shawn Wurst
Ecology Section

Date: 28 March 2023

Subject: 2023 – TDOT, FHWA, TDEC DNA Memorandum of Agreement

In March of 2023, the Tennessee Department of Transportation (TDOT), Federal Highway Administration (FHWA), Tennessee Department of Conservation – Division of Natural Areas (TDEC DNA) instituted the updated TDOT, FHWA, TDEC DNA Memorandum of Agreement (MOA) to help streamline project reviews for projects and activities which typically result in no adverse effects to state listed plant species or their habitats in Tennessee.

This agreement supersedes the December 2022 TDOT, FHWA, TDEC DNA MOA. Since the TDOT, FHWA, TDEC DNA MOA covers a greater scope of work than the previous agreement, any projects covered under the 2022 MOA will be covered under the 2023 MOA. No further review from our office is needed unless the project is modified to include activities which were not considered during the previous Ecology review.

If you have any questions or comments, please contact me at Shawn.Wurst@tn.gov

MEMORANDUM OF AGREEMENT

BETWEEN

TENNESSEE DEPARTMENT OF TRANSPORTATION

AND

FEDERAL HIGHWAY ADMINISTRATION
TENNESSEE DIVISION OFFICE

AND

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF NATURAL AREAS

March 2023

SUBJECT:

This Memorandum of Agreement (MOA) is being instituted between the Tennessee Department of Environment and Conservation Division of Natural Areas (TDEC DNA), the Tennessee Department of Transportation (TDOT), and the Federal Highway Administration, Tennessee Division Office (FHWA) to streamline TDOT projects and activities which typically result in no adverse effects to state listed plant species or their habitats in Tennessee.

PURPOSE:

FHWA is required, pursuant to the Fish and Wildlife Coordination Act, (Title 16 United States Code (U.S.C) 662(a)) to consult with the head of the State agency exercising administration over wildlife resources if any stream or water body is "controlled or modified for any purpose whatever." "Wildlife resources" includes animals as well as "all types of aquatic and land vegetation upon which wildlife is dependent" (16 U.S.C. 666b). TDOT, on behalf of FHWA, coordinates these projects, in part, with TDEC DNA.

TDEC DNA is charged with conserving rare plant species and their habitats as well as administering a system of state natural areas within Tennessee. In this role, TDEC DNA maintains data on the location and status of rare species and natural communities within the state and maintains a list of rare plants classified as endangered, threatened, or as a species of concern. TDEC DNA provides technical

support regarding the use and interpretation of such data and provides written comments (as needed) regarding potential effects to rare plants (sometimes animals), natural communities, and conservation sites for federally funded and state funded projects.

This MOA applies to both State- and Federally funded projects and is intended to define conditions and provide example categories of projects and activities for which project-specific consultation with TDEC DNA is not required. Documentation for projects covered under this MOA will include a copy of this agreement and a statement from the TDOT Ecology staff citing the applicability of this agreement, rather than written correspondence to and from TDEC DNA. This documentation will be included in the Appendices of all applicable environmental documents (e.g., NEPA, TEER) and in the documentation for all applicable permit applications.

SCOPE:

The following conditions and example projects and activities have been evaluated and a conclusion reached by TDEC DNA, FHWA and TDOT that specific work meeting these conditions within these categories will not result in adverse effects to state listed plant species or their habitats. As a result, this MOA constitutes programmatic consultation/coordination between TDEC DNA, FHWA and TDOT.

CONDITIONS FOR COVERAGE UNDER THIS MEMORANDUM

1. Based on a review of the project study area and the TDEC Natural Heritage Database, both of the following criteria must be met:

    - TDOT ecology project review staff have determined that there are no known records of State- or Federally listed plant species within the project study area; and

    - TDOT ecology project review staff or qualified consultants have determined the project area does not contain habitat for State-listed plant species documented within four miles, or if potential habitat is present, an appropriately timed presence/absence survey has been conducted for State-listed plant species with negative results.

OR

2. TDOT ecology project review staff have determined that proposed activity is such

that it would not impact undeveloped areas or natural vegetation outside the current developed footprint. Examples of such projects are listed below as a project type covered under this MOA which can be completed without regard to proximity of known or potential occurrences of rare plant species.

A. Typical bridge repair projects confined to the structure above the waterline and not requiring disturbance of waterways, provided construction debris or other construction-related materials can be prevented from entering the waterway by implementing Best Management Practices (BMP's) or properly installed erosion controls. Activities in this category include the following:

    - Bridge deck repair (scarification, patching, replacement, etc.)
    - Installation and repair of expansion joints
    - Removal and resurfacing of bridge and approach roadway pavement
    - Patching of substructures
    - Removal, replacement, and repair of beams
    - Removal and replacement of bridge deck cantilevers
    - Modification of piers and abutments above the surface of the water
    - Repair and replacement of bridge and approach guardrails
    - Sand blasting, painting, and sealing

B. Installation of impact attenuators on bridge piers, providing substrate work is not involved, and they do not affect flow downstream

C. Bridge inspections, including the portions of the piers under the surface of the water, if no soil or substrate is disturbed

D. Addition of intersection turning lanes provided new lanes are within the developed footprint of the roadway.

E. Installation, replacement, or addition of traffic control signals or information signs. Included are Intelligent Transportation Systems (ITS), fog detection systems, traffic information systems, flashing lights, reflectors, striping, rumble

strips and stripes, signs, and sidewalks provided such work is in the current developed footprint.

F. Turning radius improvement at intersections

G. Removal and replacement of existing pavement, provided that all old pavement is properly disposed of according to current regulations.

H. Installation and repair of guardrails, cable barriers, and jersey barriers

I. Installation of railroad signals, signs, and other improvements at crossings

J. Maintenance of roadway ditches and catch basins, provided that the original size and dimensions are not increased. This category is confined to sloped ditches which only convey water for a short period during storm events. No work under this exception can occur within 50 feet of any stream.

K. Replacement of overpasses which span roadways or railways

L. Placement of riprap adjacent to existing bridge abutments to repair/prevent scour and protect the integrity of the structure. Work may not extend past the top of bank and no equipment or material is allowed in the stream channel.

M. Enhancement of Rest Areas (e.g., repaving, landscaping, sprinkler system installation, lighting, building replacement or additions, sidewalk refurbishing)

N. Addition of intersection lighting

O. Installation of noise walls

P. Removal of vegetation along roads or under bridges provided such work is within the current developed footprint

Q. Items deemed eligible for Transportation Alternatives Set-Aside (or other) funding, including:

- Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other

safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.

- Inventory, control, and removal of outdoor advertising

- Construction of turnouts, overlooks, and viewing areas provided such work is within the current developed footprint

- Historic preservation and rehabilitation of historic transportation facilities

- Any environmental mitigation activity, including pollution prevention and pollution abatement activities and mitigation to (1) address stormwater management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff and (2) to reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats

GENERAL PROVISIONS:

Any signatory agency may unilaterally withdraw from this agreement with 30 days written notice. This MOA will be reviewed every five years and revised as appropriate. Revisions may be requested at any time by any signatory agency. All revisions will be made in writing and require the concurrence of the signatory agencies.

AGREEMENT BY:

Tennessee Department of Environment and Conservation, Division of Natural Areas

Roger McCoy (Mar 1, 2023 13:33 CST)

Date: Mar 1, 2023

Roger McCoy, Director TDEC DNA

Tennessee Department of Transportation

Date: Mar 6, 2023

Howard H. Eley, Deputy Governor and Commissioner

Federal Highway Administration, Tennessee Division Office

Date: Mar 20, 2023

Pamela M. Kordenbrock, Division Administrator

MEMORANDUM OF AGREEMENT

BETWEEN

FEDERAL HIGHWAY ADMINISTRATION
TENNESSEE DIVISION OFFICE

AND

TENNESSEE DEPARTMENT OF TRANSPORTATION

AND

TENNESSEE WILDLIFE RESOURCES AGENCY

December 2022

SUBJECT:

This Memorandum of Agreement (MOA) is being instituted between the Tennessee Wildlife Resources Agency (TWRA), the Tennessee Department of Transportation (TDOT), and the Federal Highway Administration, Tennessee Division Office (FHWA) to help streamline TDOT projects and activities which typically result in no adverse effects to state listed animal species or their habitats in Tennessee.

PURPOSE:

FHWA is required, pursuant to the Fish and Wildlife Coordination Act, to consult with the head of the State agency "exercising administration over wildlife resources if any stream or water body is controlled or modified for any purpose whatever" (16 USC § 662(a)). "Wildlife resources", as defined at 16 USC § 666b, includes animals as well as "aquatic and land vegetation upon which wildlife is dependent". TDOT, on behalf of FHWA, coordinates these projects, in part, with TWRA.

The TWRA mission is to preserve, conserve, manage, protect, and enhance the fish and wildlife of the state and their habitats for the use, benefit, and enjoyment of the citizens of Tennessee and its visitors. TWRA is commissioned to uphold the Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974 (Tennessee Code Annotated (TCA) § 70-8-101 to § 70-8-112) and is charged with the management of "certain nongame wildlife to ensure their perpetuation as members of ecosystems, for scientific

purposes, and for human enjoyment" and with the protection of threatened or endangered species or subspecies within the state in a manner that maintains and, to the extent possible, expands those species' populations.

DEFINITIONS:

Terms used in this MOA, including "agency", "management", "endangered species", "threatened", and "wildlife (deemed) in need of management", are defined at TCA § 70-8-103.

APPLICABILITY AND USE:

This MOA applies to both state and federally funded projects and is intended to define conditions and provide example categories of projects and activities for which project-specific consultation with TWRA is not required. Documentation for projects covered under this MOA will include a copy of this agreement and a statement from the TDOT ecology project review staff citing the applicability of this agreement, rather than written correspondence to and from TWRA. This documentation will be included in the Appendices of all applicable environmental documents (e.g., NEPA, TEER) and in the documentation for all applicable permit applications.

SCOPE:

The following conditions and example projects and activities have been evaluated and a conclusion reached by TWRA, FHWA, and TDOT that specific work meeting these conditions within these categories will not result in adverse effects to federally listed, state deemed in need of management, state threatened, or state endangered animals or their habitats. As a result, this MOA constitutes programmatic consultation/coordination between TWRA, FHWA, and TDOT.

CONDITIONS FOR COVERAGE UNDER THIS AGREEMENT:

Based on a review of the Tennessee Department of Environment and Conservation (TDEC) Natural Heritage Database, all the following criteria must be met for projects to receive coverage under this agreement:

1. TDOT ecology project review staff have determined that there are no known records of federally listed, state deemed in need of management, state threatened, or state

endangered animals within the project study area.

2. TDOT ecology project review staff, or qualified consultants, have determined the project area does not contain habitat for federally listed, state deemed in need of management, state threatened, or state endangered animal species documented within four (4) miles of the project.

3. There will be no work in waters of the state as defined in TCA 69-3-103(45)

Although project-specific consultation is not required for all projects meeting criteria for coverage under this MOA, TDOT will notify TWRA of all projects with potential impact to public access of TWRA boat ramps. The purpose of the notification is to provide agency and public awareness of any interruption in service of a TWRA boat ramp due to project construction.

Example Projects Covered Under This Programmatic Agreement Include, but are not limited to:

1. Typical bridge repair projects confined to the structure above the waterline and not requiring disturbance of waterways, provided construction debris or other construction-related materials can be prevented from entering the waterway by implementing Best Management Practices (BMP's) (e.g., tarp and netting containment) or properly installed erosion controls. The provisions of the most current "Programmatic Consultation for Addressing Cliff Swallows and Barn Swallows on Transportation Projects" among the United States Fish and Wildlife Service Tennessee Field Office; FHWA – TN Division Office; and TDOT regarding procedures addressing cliff swallow (*Hirundo pyrrhonota*) and barn swallow (*Hirundo rustica*) nesting sites are applicable. Activities in this category include the following:

    - Installation and repair of expansion joints
    - Bridge deck repair (scarification, patching, replacement, etc.)
    - Removal and resurfacing of bridge and approach roadway pavement
    - Patching of substructures
    - Removal, replacement, and repair of beams

- Removal and replacement of bridge deck cantilevers
- Modification of piers and abutments above the surface of the water
- Repair and replacement of bridge and approach guardrails
- Sand blasting, painting, and sealing

2. Installation of impact attenuators on bridge piers, providing substrate work is not involved, and they do not affect flow downstream

3. Bridge inspections, including the portions of the piers under the surface of the water, if no soil or substrate is disturbed

4. Addition of intersection turning lanes provided new lanes are within the developed footprint of the roadway

5. Installation, replacement, or addition of traffic control signals or information signs. Included are Intelligent Transportation Systems (ITS), fog detection systems, traffic information systems, flashing lights, reflectors, striping, rumble strips and stripes, signs, and sidewalks provided such work is in the current developed footprint

6. Turning radius improvement at intersections

7. Removal and replacement of existing pavement, provided that all old pavement is properly disposed of according to current regulations

8. Installation and repair of guardrails, cable barriers, and jersey barriers

9. Installation of railroad signals, signs, and other improvements at crossings

10. Replacement of overpasses which span roadways or railways

11. Enhancement of Rest Areas (e.g., repaving, landscaping, sprinkler system installation, lighting, building replacement or additions, sidewalk refurbishing)

12. Addition of intersection lighting

13. Removal of vegetation along roads or under bridges provided such work is within the current developed footprint

14. State funded and federal-aid transportation projects that are administered by local governments with the assistance of the TDOT Local Programs Development Office which meet the above listed criteria for coverage under this MOA.

15. Items deemed eligible for Transportation Alternatives Set-Aside (or other) funding, including:

    - Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990

    - Inventory, control, and removal of outdoor advertising

    - Construction of turnouts, overlooks, and viewing areas provided such work is within the current developed footprint

    - Historic preservation and rehabilitation of historic transportation facilities

    - Any environmental mitigation activity, including pollution prevention and pollution abatement activities and mitigation to (1) address stormwater management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff and (2) to reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats

GENERAL PROVISIONS:

Any signatory agency may unilaterally withdraw from this agreement with 30 days written notice. This MOA will be reviewed every five years and revised as appropriate. Revisions may be requested at any time by any signatory agency. All revisions will be made in writing and require the concurrence of the signatory agencies.

AGREEMENT BY:

Tennessee Wildlife Resources Agency

Jason Maxedon, Executive Director

Date: 12-15-22

Tennessee Department of Transportation

Howard H. Eley, Deputy Governor and Commissioner

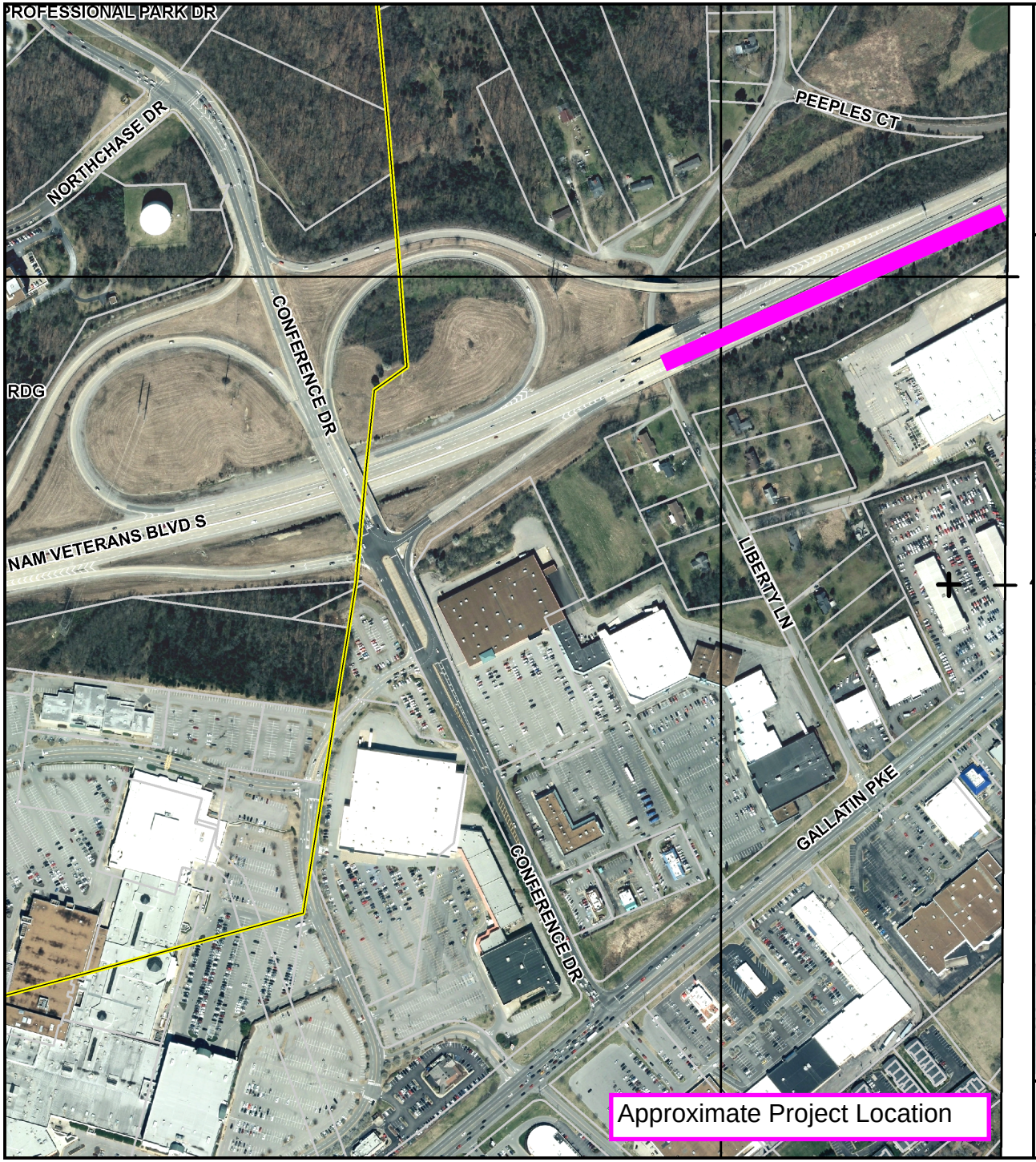
Date: Dec 19, 2022

Federal Highway Administration, Tennessee Division Office

Pamela M. Kordenbrock, Division Administrator

Date: Dec 29, 2022

Floodplain Management



N

Map Projection:
State Plane Lambert Conformal Conic, Tennessee Z
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet

0 250 500 750 1,000

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE and Incorporated Areas

PANEL 137 OF 478

FEMA

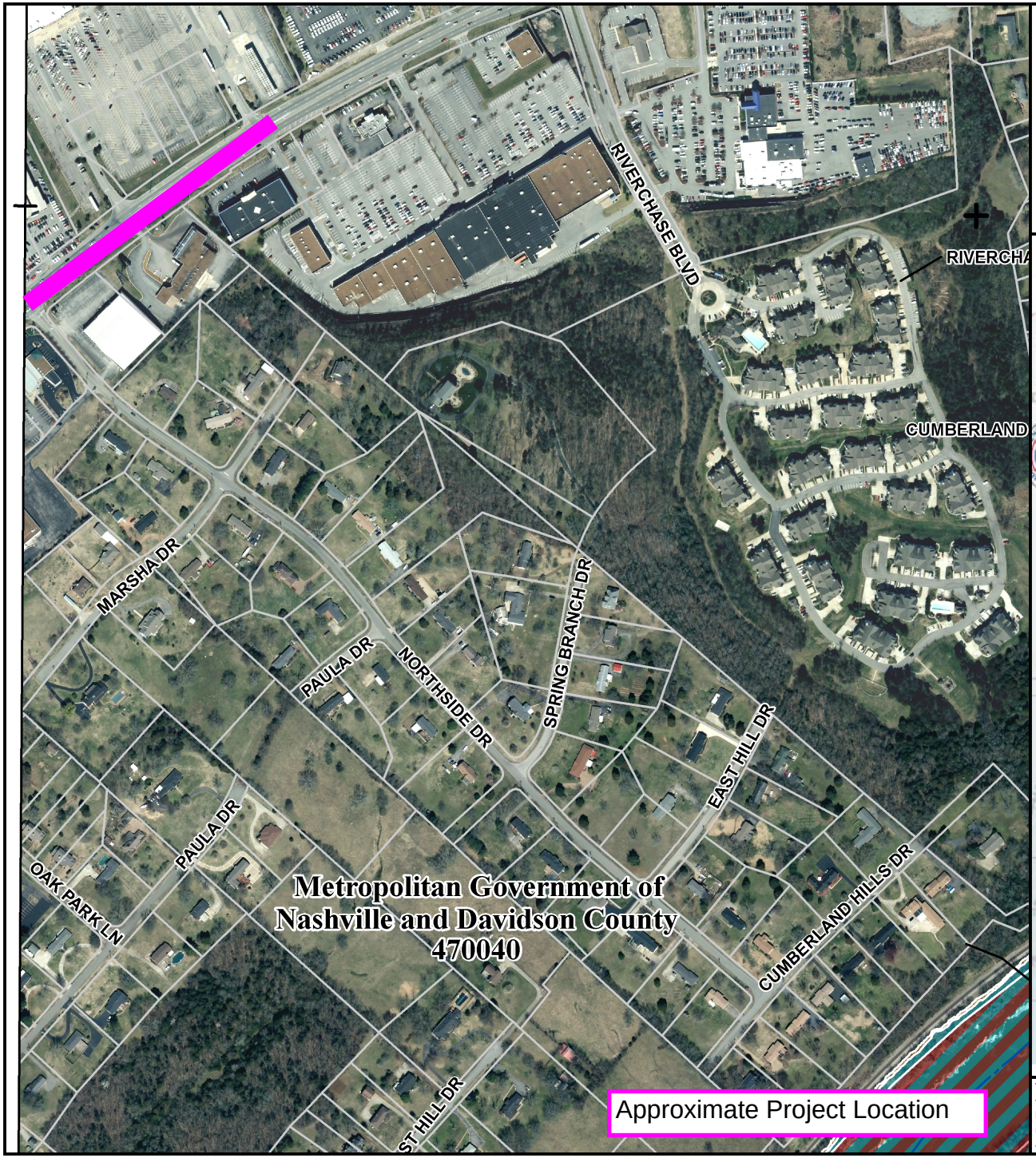
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
GOODLETTSVILLE, CITY OF	470287	0137	J
METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY	470040	0137	J

VERSION NUMBER
2.5.3.0

MAP NUMBER
47037C0137J

MAP REVISED
FEBRUARY 25, 2022



Map Projection:
State Plane Lambert Conformal Conic, Tennessee Zo
Western Hemisphere; Vertical Datum: NAVD 88

N

1 inch = 500 feet

0 250 500 750 1,000

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE and Incorporated Areas

PANEL 141 OF 478

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY	470040	0141	J

VERSION NUMBER
2.5.3.0

MAP NUMBER
47037C0141J

MAP REVISED
FEBRUARY 25, 2022

Air and Noise

Environmental Study

Technical Section

Section: Air and Noise

Study Results

AIR QUALITY

Transportation Conformity
This project is in Davidson County which is in attainment for all regulated criteria pollutants. Therefore, conformity does not apply to this project.

Mobile Source Air Toxics (MSATs)
This project qualifies as a categorical exclusion under 23 CFR 771.117 and, therefore, does not require an evaluation of MSATs per FHWA's "Interim Guidance Update on Air Toxic Analysis in NEPA Documents" dated January 2023.

NOISE

This project is Type III in accordance with the FHWA noise regulation in 23 CFR 772 and TDOT's noise policy; therefore, a noise study is not needed.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Chasity L. Stinson

Title: TESS Advanced, TDOT Environmental Division

Signature: Chasity L. Stinson

Digitally signed by Chasity L. Stinson
Date: 2023.03.23 11:28:10 -05'00'

Cultural Resources

Archaeology

Environmental Study

Technical Section

Section: Archaeology

Study Results

In a letter dated March 30, 2023 the TN SHPO concurred that no NRHP listed, eligible, or potentially eligible properties would be affected by this undertaking.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Michael Jeu

Title: Archaeologist

Signature: Michael Jeu Digitally signed by Michael Jeu Date: 2023.03.31 14:44:16 -05'00'

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

03-30-2023 15:28:49 CDT

michael jeu
TDOT
michael.jeu@tn.gov

RE: Federal Highway Administration (FHWA), Pedestrian Safety Improvements of SR-6 (Gallatin Pike), from Liberty Lane to Northside Drive, TDOT PIN 132524.00, Project#: SHPO0002845, Nashville, Davidson County, TN

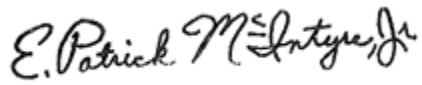
Dear Mr. Jeu:

In response to your request, we have reviewed the archaeological documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we find that no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Complete and/or updated Tennessee Site Survey Forms should be submitted to the Tennessee Division of Archaeology for all sites recorded and/or revisited during the current investigation. Please provide your Project # when submitting any additional information regarding this undertaking. Questions or comments may be directed to Jennifer Barnett, who drafted this response, at Jennifer.Barnett@tn.gov, +16156874780.

Your cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG7848751_Wu5exmtsGnKbyiXB8K19

STATE OF TENNESSEE

DEPARTMENT OF TRANSPORTATION

ENVIRONMENTAL DIVISION

SUITE 900, JAMES K. POLK BUILDING

505 DEADERICK STREET

NASHVILLE, TENNESSEE 37243-1402

(615) 741-3655

BUTCH ELEY
DEPUTY GOVERNOR &

COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

March 30, 2023

Mr. E. Patrick McIntyre, Jr.
Executive Director and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

RE: Archaeology Assessment for Pedestrian Safety Improvements of State Route 6 (Gallatin Pike), from Liberty Lane to north of Northside Drive in Northeast Nashville, Davidson County; PIN 132524.00

Dear Mr. McIntyre,

The Tennessee Department of Transportation (TDOT), with funding from the Federal Highway Administration (FHWA), proposes a Pedestrian Road Safety Initiative (PRSI) to State Route (SR) 6 (Gallatin Pike) from Liberty Lane to north of Northside Drive in Davidson County (see attached maps). No additional right-of-way (ROW) is anticipated and all work will remain in the existing, disturbed ROW.

Based on a desktop review of the project by TDOT Archaeology using project plans and Google Earth imagery, these narrow portions of the APE are disturbed by roadside drainage features, residential and roadway development, and several aboveground and underground utilities, leaving little to no potential for archaeological resources within the APE. Therefore, it is the opinion of TDOT Archaeology that no NRHP listed, eligible, or potentially eligible archaeological sites are in the APE as the project is currently planned and no further archaeological investigations are warranted.

In compliance with Section 106 of the National Historic Preservation Act (as amended) and implementing regulations 36 CFR 800, please review the enclosed information and provide me with your comments. If

any additional information is needed, please contact Michael Jeu (901) 497-7366 for archaeology, or me at (615) 741-5367. I appreciate your assistance.

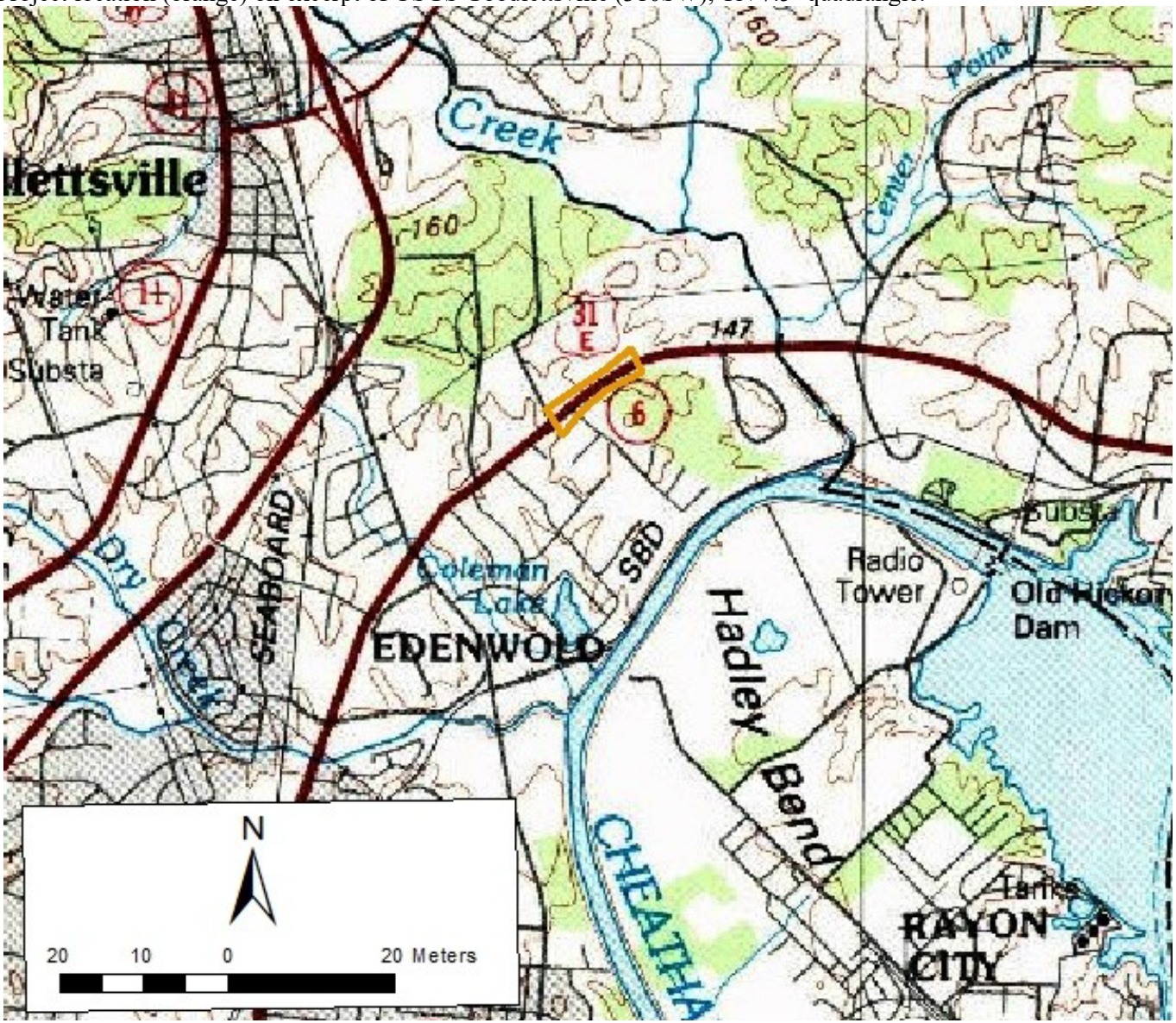
Sincerely,

Joseph D Santangelo

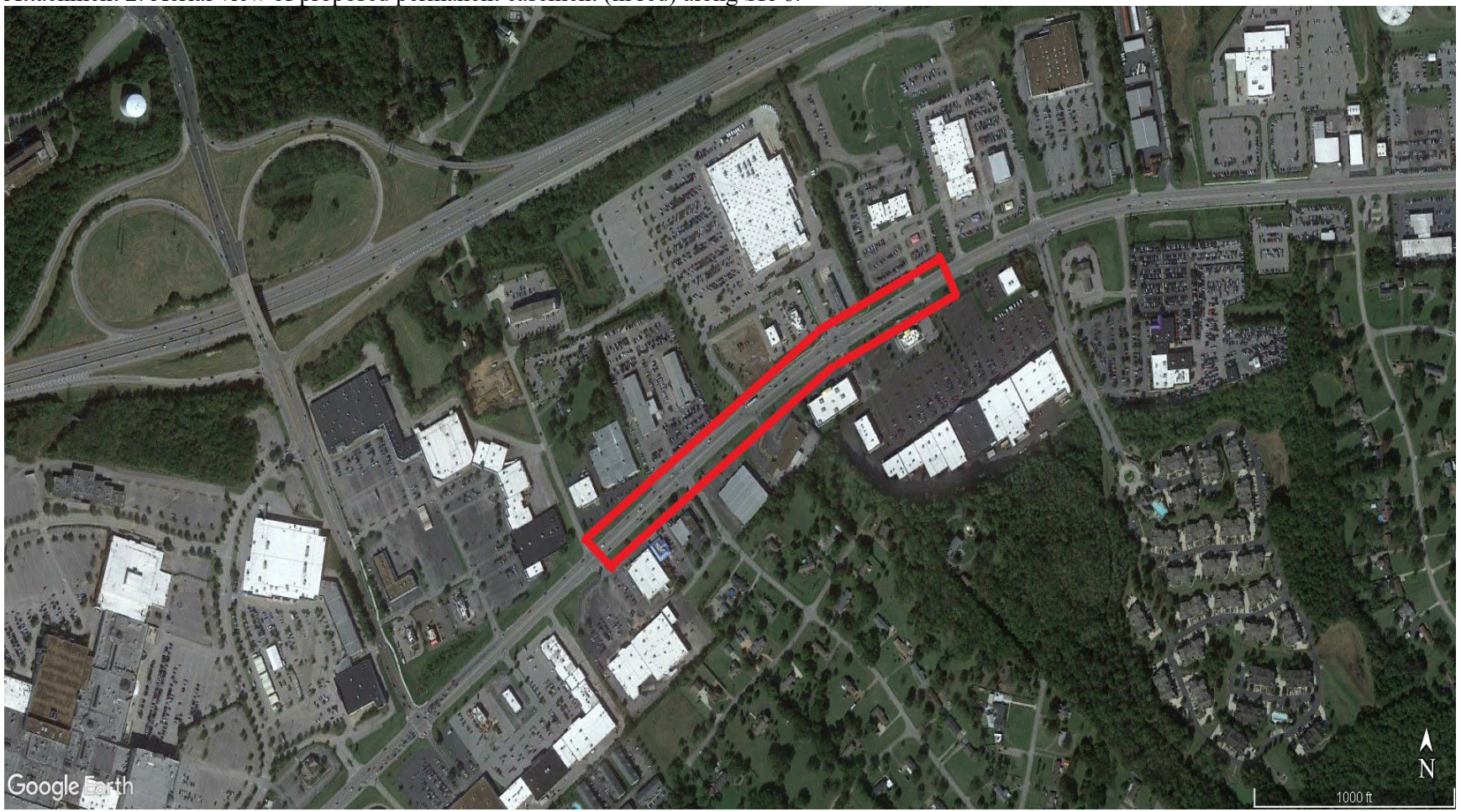
Joseph D. Santangelo
Cultural Resources Manager

JDS/kvs/ksh

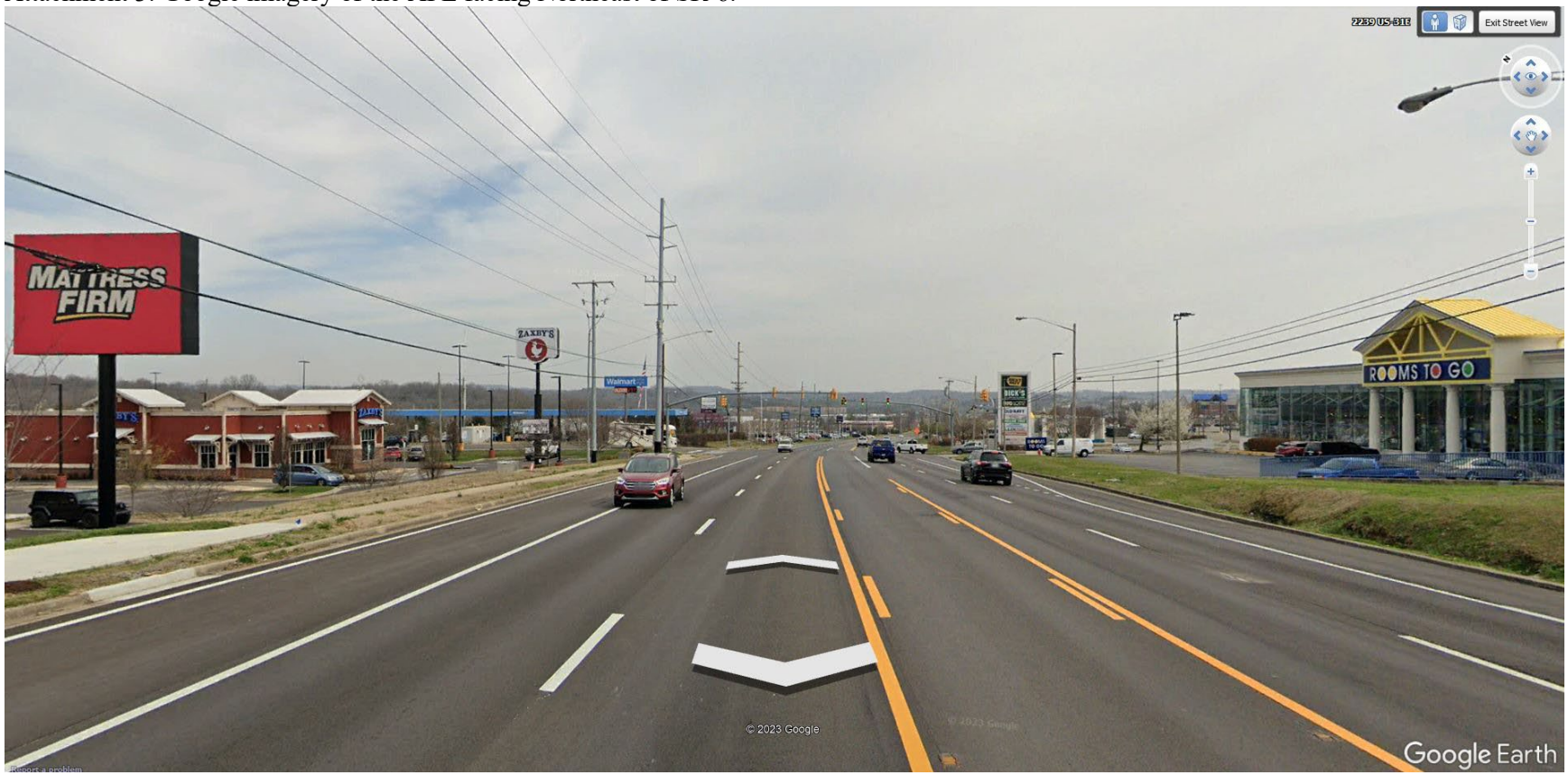
Attachment 1: Project location (orange) on excerpt of USGS Goodlettsville (310SW), TN 7.5' quadrangle.



Attachment 2: Aerial view of proposed permanent easement (in red) along SR-6.



Attachment 3: Google imagery of the APE facing Northeast of SR-6.



Attachment 4: Google imagery of the APE facing Northeast of SR-6.

Historic Preservation

Environmental Study

Technical Section

Section: Historic Preservation

Study Results

In a letter dated April 20, 2022, the Tennessee State Historic Preservation Office concurred that there are no historic properties eligible for listing in the National Register of Historic Places affected by this undertaking.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Esosa Osayamwen

Title: Embedded Historian

Signature: Esosa Osayamwen

Digitally signed by Esosa Osayamwen
Date: 2023.04.20 13:13:31 -05'00'

From:	TN Help
To:	Joseph Santangelo; Esosa Osayamen
Cc:	Kimberly Vasut-Shelby
Subject:	Pedestrian Safety Improvements of SR-6 (Gallatin Pike), from Liberty Lane to Northside Drive, TDOT PIN 132524.00 - Project # SHPO0002845
Date:	Thursday, April 20, 2023 1:07:20 PM
Attachments:	State Seal for TDEC.pngx patricksignature.pngx

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

2023-04-20 13:03:34 CDT

Joseph Santangelo
TDOT
joseph.santangelo@tn.gov

RE: Federal Highway Administration (FHWA), Architecture Review, Pedestrian Safety Improvements of SR-6 (Gallatin Pike), from Liberty Lane to Northside Drive, TDOT PIN 132524.00, Project#: SHPO0002845, Davidson County, TN

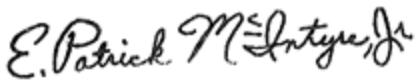
Dear Mr. Santangelo:

In response to your request, we have reviewed the documentation submitted by you regarding the architecture review for the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we find that no architectural resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Please include the Project # when submitting additional information regarding this undertaking. Questions or comments may be directed to Casey Lee, who drafted this response, at Casey.Lee@tn.gov, +16152533163.

Your cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG8037174_nYydKZcYmIcs1UuBmomT

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

ENVIRONMENTAL DIVISION SUITE 900, JAMES K. POLK
BUILDING 505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

BUTCH ELEY
COMMISSIONER

BILL LEE
GOVERNOR

March 28, 2023

Mr. E. Patrick McIntyre, Jr.
Executive Director and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243

RE: Historic/Architectural Resources Assessment on Bicycle and Pedestrian Safety Improvements on SR-6 (Gallatin Pike), from Liberty Lane to North of Northside Drive; TDOT PIN 132524.00

Dear Mr. McIntyre,

The Tennessee Department of Transportation (TDOT) proposes Bicycle and pedestrian safety improvements on SR-6 (Gallatin Pike), From Liberty Lane to north of Northside Drive in Davidson County. The project includes signage, crosswalk and curb improvements, traffic signal rebuild. The list of improvements identified include pedestrian infrastructure, such as sidewalks, a multiuse path, and crosswalks, turning radii reduction, commercial access consolidation, channelization markings and physical separation in the shoulders such as delineators, signage, and traffic signal improvements. 0.75 acres of easement is anticipated.

Based upon the results of the assessment, it is the opinion of TDOT that there are no architectural resources that are eligible for or listed in the National Register of Historic Places within the project's area of potential effects.

In compliance with Section 106 of the National Historic Preservation Act (as amended) and implementing regulations 36 CFR 800, please review the enclosed information and provide me with your comments. If any additional information is needed, please contact Esosa Osayamwen at (615) 253-2472 for architectural resources.
I appreciate your assistance.

Sincerely,

Joseph D Santangelo

Joseph D. Santangelo
Cultural Resources Manager
Environmental Division

cc: Ms. Jennifer Barnett, TDOA, w/enclosure

HISTORIC/ARCHITECTURAL ASSESSMENT ON BICYCLE AND PEDESTRIAN SAFETY IMPROVEMENTS ON SR-6 (GALLATIN PIKE), FROM LIBERTY LANE TO NORTH OF NORTHSIDE DRIVE

P I N 132524.00

Esosa Osayamwen
Tennessee Department of Transportation
505 Deaderick Street, Suite 900
Nashville, TN 37243

HISTORIC/ARCHITECTURAL ASSESSMENT ON BICYCLE AND PEDESTRIAN SAFETY IMPROVEMENTS ON SR-6 (GALLATIN PIKE), FROM LIBERTY LANE TO NORTH OF NORTHSIDE DRIVE

DAVIDSON COUNTY

P I N 132524.00

INTRODUCTION

The Tennessee Department of Transportation (TDOT) proposes Bicycle and pedestrian safety improvements on SR-6 (Gallatin Pike), From Liberty Lane to north of Northside Drive in Davidson County. The project includes signage, crosswalk and curb improvements, traffic signal rebuild. The list of improvements identified include pedestrian infrastructure, such as sidewalks, a multiuse path, and crosswalks, turning radii reduction, commercial access consolidation, channelization markings and physical separation in the shoulders such as delineators, signage, and traffic signal improvements. 0.75 acres easement is anticipated.

In compliance with Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800, Tennessee Department of Transportation (TDOT) cultural resources staff reviewed the area of potential effects (APE) to identify National Register of Historic Places (NRHP) listed or eligible historic properties that may be affected by the subject undertaking.

For the purposes of this legislation, historic significance is defined as those properties that are listed in or eligible for listing in the NRHP. Once historic resources are identified, legislation requires these agencies to determine if the proposed undertaking would affect the historic resources.

Pursuant to 36 CFR 800.4, TDOT historians conducted a high-level desktop review of the proposed project and found previous field study of project location. The previous study found the project's APE does not include resources eligible for listing in the Register of Historic Places. Based on the current defined APE, TDOT historians concur with these finding.

PROJECT DESCRIPTION

The Tennessee Department of Transportation (TDOT) proposes Bicycle and pedestrian safety improvements on SR-6 (Gallatin Pike), From Liberty Lane to north of Northside Drive in Davidson County. The project includes signage, crosswalk and curb improvements, traffic signal rebuild. The list of improvements identified include pedestrian infrastructure, such as sidewalks, a multiuse path, and crosswalks, turning radii reduction, commercial access consolidation, channelization markings and physical separation in the shoulders such as delineators, signage, and traffic signal improvements. 0.75 acres easement is anticipated.

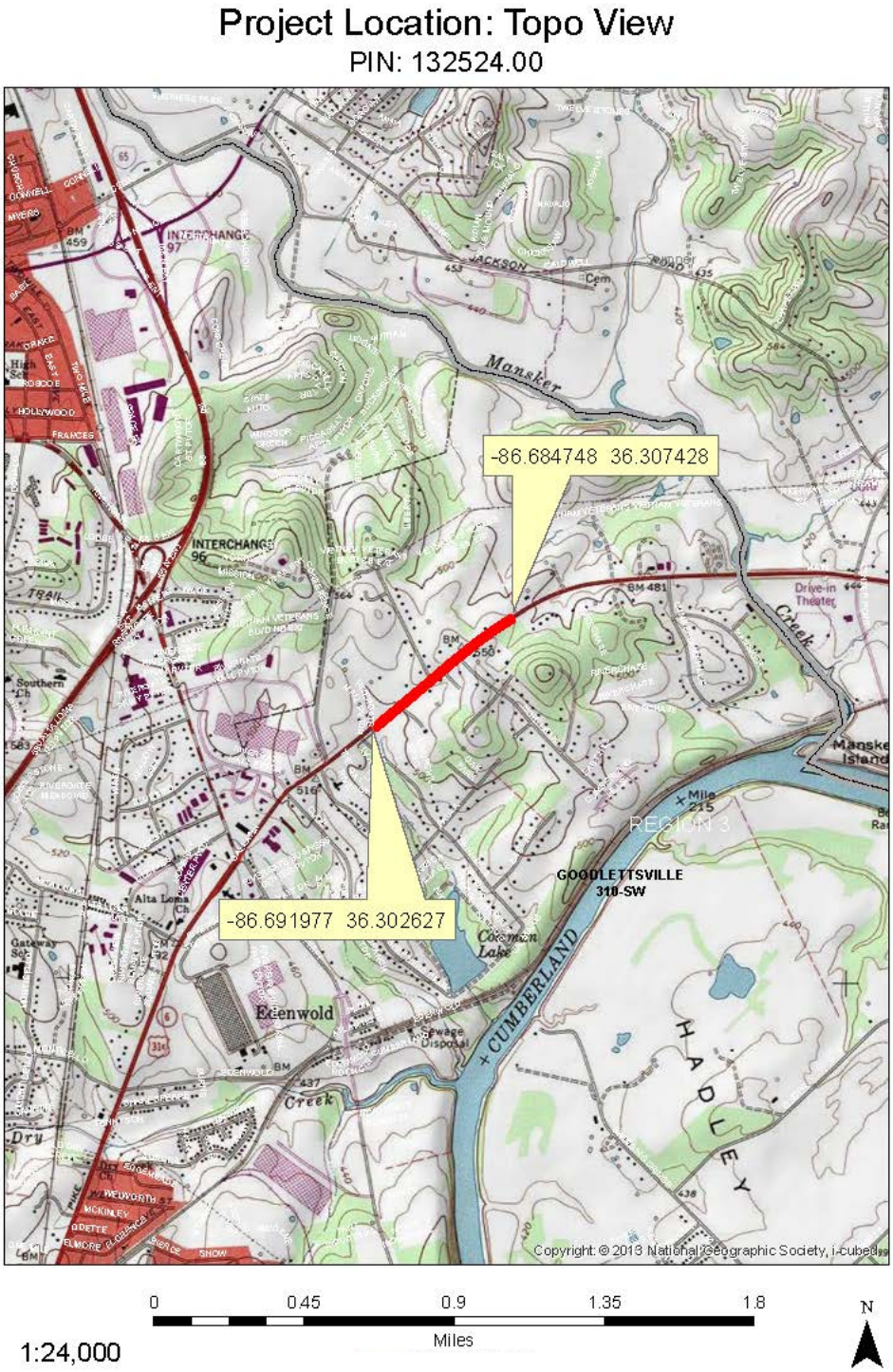


Figure 1: Project Location Map, USGS Quad Goodlettsville 310-SW

Project Location: Aerial View

PIN: 132524.00

0 0.1 0.2 0.3 0.4

Miles

1:7,000

N

Figure 2: Aerial view of proposed location in red.

Figure 15: Pedestrian Road Safety.

Figure 3: Facing west from the beginning of the project (taken April 12, 2023)

Figure 4: Facing northwest on the interaction of Gallatin Pike and Liberty Ln (taken April 12, 2023)

Figure 5: Facing east on the Gallatin Pike and passing Gallatin Pike/ Liberty Ln intersection (taken April 12, 2023)

Figure 5: Facing north on the Gallatin Pike North Walmart intersection (taken April 12, 2023)

Figure 6: Facing north passing Gallatin Pike North Walmart intersection and easement location (taken April 12, 2023)

Figure 7: Facing east on the interaction of Gallatin Pike and Liberty Ln easement location (taken April 12, 2023)

Figure 6: Facing north passing Gallatin Pike North Walmart intersection (taken April 12, 2023)

Figure 6: Facing west passing Gallatin Pike North Walmart intersection (taken April 12, 2023)

Figure 7: Facing north towards North Walmart (taken April 12, 2023)

Figure 8: Facing northwest Gallatin Pike South Walmart intersection (taken April 12, 2023)

Figure 8: Facing northwest towards Gallatin Pike South Walmart intersection (taken April 12, 2023)

Figure 9: Facing east end of project location (taken April 12, 2023)

TRIBAL PARTICIPATION

TDOT has begun the process of consultation with eight Native American tribes or representatives, asking each for information regarding the project and if they would like to participate in the Section 106 review process as a consulting party. To date, TDOT has not received any comments regarding historic resources.

Absentee-Shawnee Tribe of Indians in Oklahoma Cherokee Nation
The Chickasaw Nation
The Choctaw Nation of Oklahoma
Eastern Shawnee Tribe of Oklahoma
Jena Band of Choctaw Indians
Kialegee Tribal Town
The Muscogee (Creek) Nation
Quapaw Nation
Shawnee Tribe
Thlopthlocco Tribal Town
United Keetoowah Band of
Cherokee Indians in Oklahoma

ARCHITECTURAL/HISTORIC METHODS AND RESULTS

Federal laws require TDOT and FHWA to comply with Section 106 of the National Historic Preservation Act of 1966, as amended. This legislation requires TDOT and FHWA to identify any properties (either above ground buildings, structures, objects, or historic sites or below ground archaeological sites) of historic significance. For the purposes of this legislation, properties with historic significance are defined as those which are included in the NRHP or which are eligible for inclusion in the NRHP.

TDOT historians checked the survey records of the Tennessee Historical Commission (THC) and determined that there are no properties within the APE for the proposed excess land APE that are listed in or previously determined eligible for listing in the NRHP.

A project's APE is defined in 36 CFR 800.16 (d) as

> the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

The historic/architectural APE is defined as existing ROW, proposed ROW, and adjacent properties.

TDOT historians performed a desktop review of the APE for the proposed project which did not identify any additional older properties within the APE that warranted further consideration for National Register eligibility.

LIT/RECORDS SEARCH: 3/27/2023 — Esosa Osayamwen

FIELD STUDY: 4/12/2023 — Esosa Osayamwen

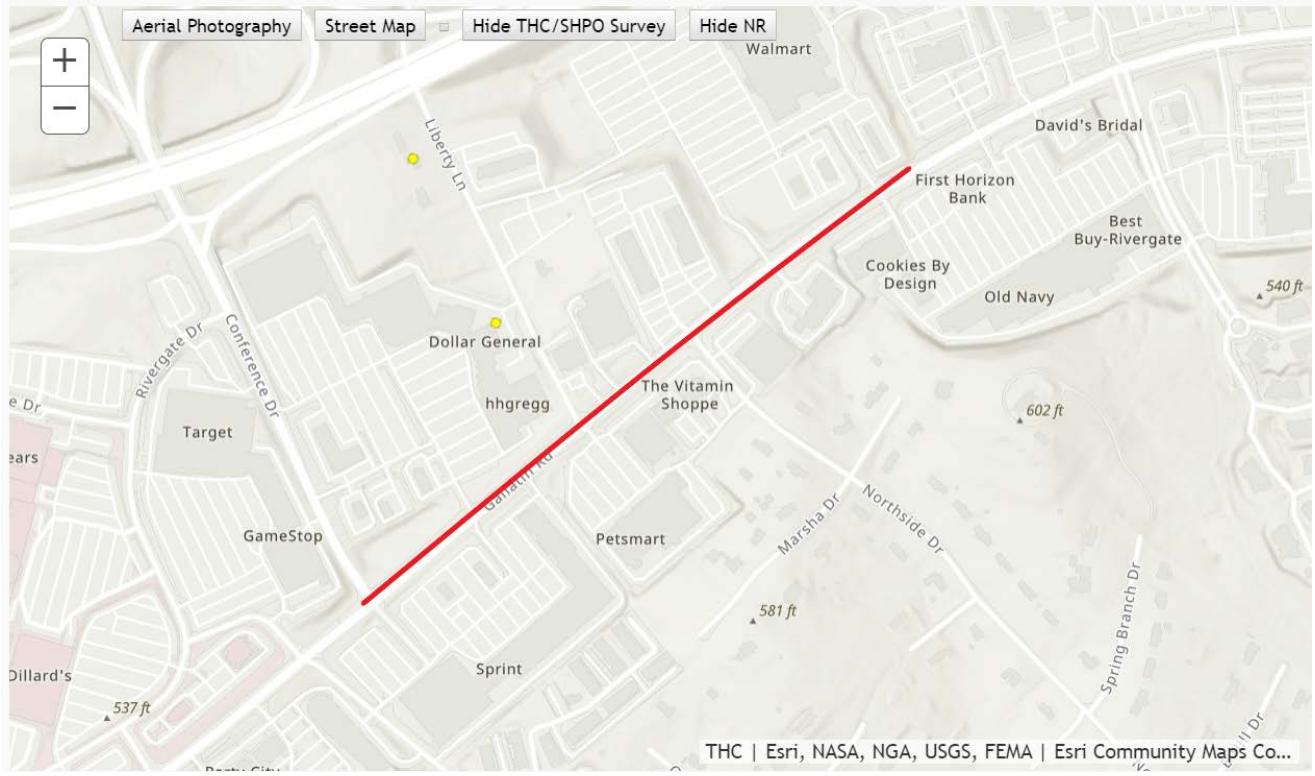


Figure 5: Aerial Imagery with SHPO survey data with proposed location red

CONCLUSION

The Tennessee Department of Transportation (TDOT) proposes Bicycle and pedestrian safety improvements on SR-6 (Gallatin Pike), From Liberty Lane to north of Northside Drive in Davidson County. The project includes signage, crosswalk and curb improvements, traffic signal rebuild. The list of improvements identified include pedestrian infrastructure, such as sidewalks, a multiuse path, and crosswalks, turning radii reduction, commercial access consolidation, channelization markings and physical separation in the shoulders such as delineators, signage, and traffic signal improvements. 0.75 acres of easement is anticipated.

It is the opinion of TDOT that there are no properties or sites within the APE that are listed in or eligible for listing in the National Register of Historic Places. Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, gives special consideration to the use of historic sites by federally assisted transportation projects. Regulations concerning TDOT's responsibilities under Section 4(f) are codified at 23 CFR 774. Due to the lack of historic resources in the APE, Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, does not apply.

Native American Consultation

Environmental Study

Technical Section

Section: Native American Coordination

Study Results

An invitation to participate in the Section 106 process was sent on April 4, 2023 to all federally recognized Native American tribes with interests in the subject county.

The Chickasaw Nation responded and accepted the invitation to be a consulting party on April 10, 2023. Reports were sent to this consulting party on May 8, 2023.

The Cherokee Nation responded and accepted the invitation to be a consulting party on April 27, 2023. Reports were sent to this consulting party on May 8, 2023.

To date, no other responses have been received. TDOT will re-initiate consultation if additional cultural resources studies are required or if archaeological materials or human remains are discovered during construction.

(Following guidance issued on April 8, 2020 by the Advisory Council on Historic Preservation (ACHP) in response to the COVID-19 outbreak, federal agencies are to remain flexible regarding federally recognized Native American tribes' Section 106 review responsibilities. The ACHP's guidance furthermore indicates that federal agencies may not foreclose on the statutory rights afforded to federally recognized Native American tribes under the National Historic Preservation Act and regulations implementing Section 106 of the Act. As several federally recognized Native American tribes with interests in Tennessee have indicated that their ability to carry out their Section 106 review responsibilities is diminished or otherwise limited, it should be expected that tribal responses for the subject project may be received subsequent to the date of this ESR and that any such response may require additional information, fieldwork, or coordination with any or all tribes and, perhaps, the SHPO and/or ACHP. An updated ESR will be provided in the event that any additional responses are received, along with updated Section 106 documentation, if any.)

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **Yes**

Type: Native American Coordination

Location: Email Attachment

Certification

Responder: John MacLeod

Title: Native American Coordination

Signature: John MacLeod

Digitally signed by John MacLeod
Date: 2023.05.08 10:04:09 -05'00'

TN TDOT Department of Transportation

Section 106 Early Coordination

PROJECT INFORMATION

PIN 132524.00

DATE	SOURCE OF FUNDING	PROJECT, PROGRAM, OR REVIEW
04/04/23	FUNDING - FEDERAL	BICYCLES AND PEDESTRIAN FACILITY

TDOT REGION	COUNTY	ROUTE TYPE	ROUTE NUMBER/NAME
REGION 3	DAVIDSON	STATE ROUTE	6

TERMINI

(Gallatin Pike), From Liberty Lane to north of Northside Drive

RIGHT-OF-WAY	ROW AMOUNT	GROUND DISTURBANCE	PROJECT LENGTH
New ROW and/or Easements	See Below	Yes	0.31 Miles

DESCRIPTION

The list of improvements identified include pedestrian infrastructure, such as sidewalks, a multiuse path and crosswalks, turning radii reduction, commercial access consolidation, channelization markings and physical separation in the shoulders such as delineators, signage, and traffic signal improvements. All improvements comply with state and local accessibility guidelines as well as the requirements set forth in the Americans with Disabilities Act (ADA) and the Public Rights-of-Way Accessibility Guidelines (PROWAG).

GEOGRAPHIC INFORMATION

Goodlettsville	310 SW	See Maps	See Maps
USGS QUAD NAME	USGS QUAD NUMBER	LONGITUDE	LATITUDE

Datum: NAD_1983_StatePlane_Tennessee_FIPS_4100_Feet

The Trail of Tears, as recorded by the NPS-NHT, is not located within 1000' of this project.

PROXIMITY TO THE TRAIL OF TEARS

*NPS-NHT = National Park Service - National Historic Trails

TRIBAL COORDINATION

THIS UNDERTAKING IS BEING COORDINATED WITH THE FOLLOWING FEDERALLY RECOGNIZED AMERICAN INDIAN TRIBES:

Absentee-Shawnee Tribe of Indians in Oklahoma
Cherokee Nation
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Kialegee Tribal Town
The Muscogee (Creek) Nation
Shawnee Tribe
Thlopthlocco Tribal Town
United Keetoowah Band of Cherokee Indians in Oklahoma
The Chickasaw Nation

Project Location: Aerial View

PIN: 132524.00

0 0.1 0.2 0.3 0.4

Miles

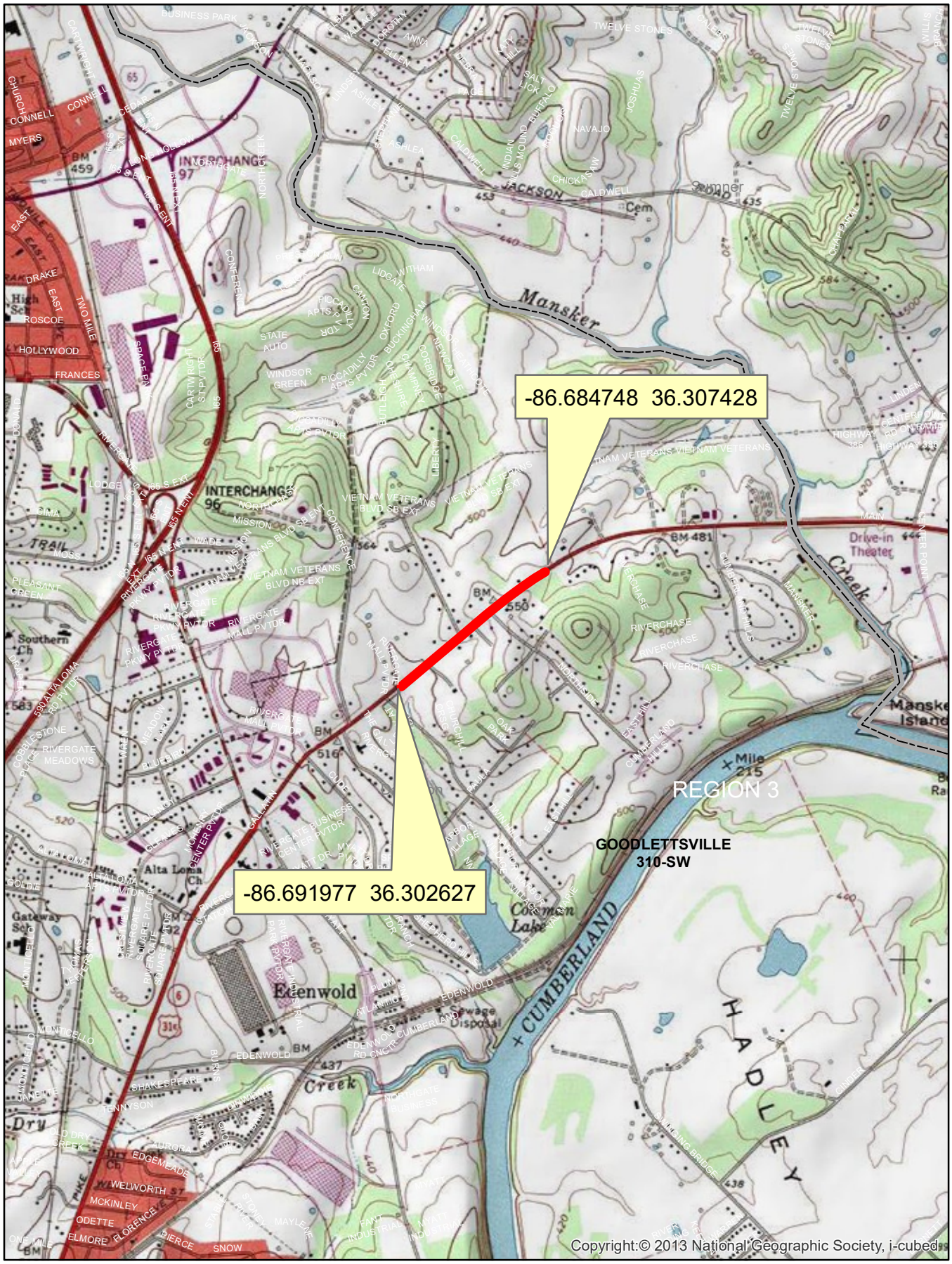
1:7,000

Trail of Tears

N

Project Location: Topo View

PIN: 132524.00



0 0.45 0.9 1.35 1.8

Miles

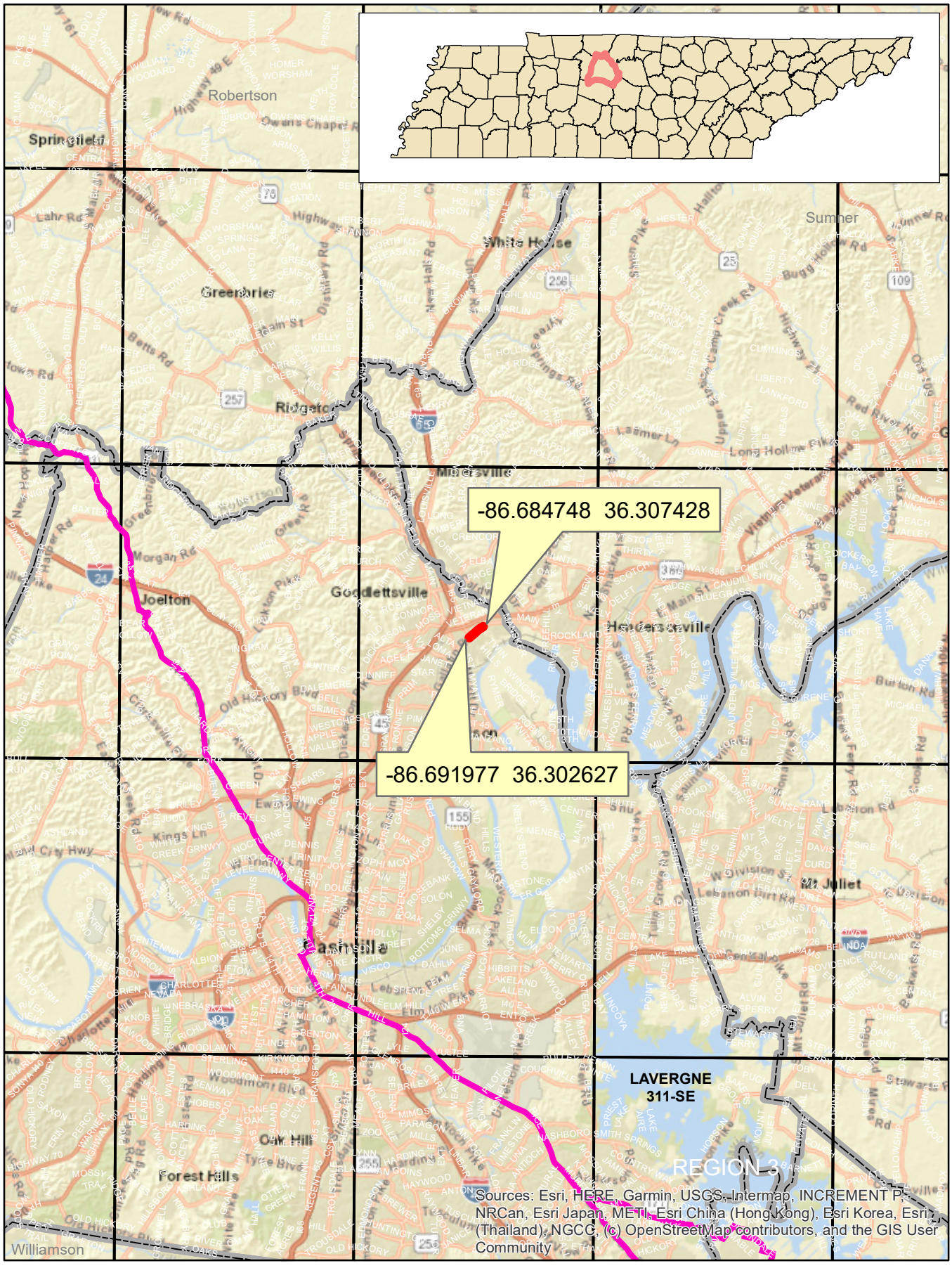
1:24,000

Trail of Tears

N

Project Location: Vicinity View

PIN: 132524.00



John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: 'Gary.Fottrell@dot.gov'
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Mr. Fottrell,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to The Chickasaw Nation and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If The Chickasaw Nation requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: awatt@ukb-nsn.gov
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Mr. Watt,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to United Keetoowah Band of Cherokee Indians in Oklahoma and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If United Keetoowah Band of Cherokee Indians in Oklahoma requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

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TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: THPO@tttown.org
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Mr. Cloud,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Thlopthlocco Tribal Town and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Thlopthlocco Tribal Town requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: tonya@shawnee-tribe.com
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Ms. Tipton,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Shawnee Tribe and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Shawnee Tribe requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: 'raebutler@mcn-nsn.gov'
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Ms. Butler,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to The Muscogee (Creek) Nation and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If The Muscogee (Creek) Nation requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: dc13.dc4@gmail.com
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Mr. Cook,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Kialegee Tribal Town and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Kialegee Tribal Town requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: thpo@estoo.net
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Mr. Barnes,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Eastern Shawnee Tribe of Oklahoma and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Eastern Shawnee Tribe of Oklahoma requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: syerka@nc-cherokee.com
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Mr. Yerka,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Eastern Band of Cherokee Indians and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Eastern Band of Cherokee Indians requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

FHWA, and TDOT working on its behalf, recognize that early identification of historic properties of religious or cultural significance and concerns about confidentiality are keys to protection of such properties. To this end, I respectfully request any comments you have on the subject undertaking and any associated reports or other project materials within thirty (30) days of receipt. We have established a dedicated email address at TDOT.TribalCoordination@tn.gov and respectfully request that all correspondence is sent to this address. Of course, you may also provide comments directly to Mr. Santangelo at Joseph.Santangelo@tn.gov, by telephone at 615-253-1454, or by letter at the physical address below:

TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: elizabeth-toombs@cherokee.org
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Ms. Toombs,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Cherokee Nation and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Cherokee Nation requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

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TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

John MacLeod

From: TDOT TribalCoordination
Sent: Tuesday, April 4, 2023 10:51 AM
To: dfrazier@astribe.com
Subject: Section 106 Early Coordination_PIN 132524.00
Attachments: S106 Early Coordination_132524.00.pdf

Dear Ms. Frazier-Smith,

On behalf of the Tennessee Division of the Federal Highway Administration, and on behalf of Joe Santangelo, Cultural Resources Manager, I am pleased to provide you with information about the subject undertaking. Attached you will find a TDOT "Section 106 Early Coordination" form containing a description of the undertaking and maps illustrating its location.

This information is provided pursuant to 36 CFR 800.4(a)(4) as part of our effort to gather information about properties located within the area of potential effects which may be of religious and cultural significance to Absentee-Shawnee Tribe of Indians in Oklahoma and which may be affected by the undertaking. Information about such properties will remain confidential pursuant to 36 CFR 800.11(c).

If Absentee-Shawnee Tribe of Indians in Oklahoma requests to participate in the Section 106 process as a consulting party, we will provide documentation regarding the findings of the identification and evaluation effort and invite you to consult on the effects of the undertaking on historic properties located within the area of potential effects. You will also be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation office, if any, and to provide input throughout the process. If you choose to not participate as a consulting party at this time, you may do so later by simply notifying me.

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TDOT Environmental Division
c/o Joe Santangelo
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243

We appreciate your time and review of this information.

Sincerely,

Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@TN.Gov

April 10, 2023

Mr. Gary Fottrell
Environmental Program Engineer
Tennessee Division
Federal Highway Administration
404 BNA Drive, Suite 508
Nashville, TN 37217

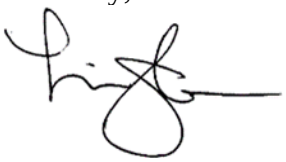
Dear Mr. Fottrell:

Thank you for the email notifications regarding the Tennessee Division of Federal Highway Administration (FHWA) initiating early coordination on the proposed projects delineated in the attached table.

We have reviewed the brief descriptions, maps and project site coordinates. The Chickasaw Nation does desire to consult on these projects under Section 106 of the National Historic Preservation Act.

We appreciate your efforts to preserve and protect significant historic properties. If you have any questions, please contact Ms. Karen Brunso, tribal historic preservation officer, at (580) 272-1106, or by email at hpo@chickasaw.net.

Sincerely,



Lisa John, Secretary
Department of Culture and Humanities

cc: Gary.Fottrell@dot.gov

Enclosure

Project Name	Location
PIN 132718.00 – Safety improvements on Sam Cooper Boulevard	Shelby County, TN
PIN 132450.36 – Safety improvements on local route 0A167 from L.M. 0.00 to L.M. 3.973	Henry County, TN
PIN 132450.36 – Safety improvements on local route 01715 from L.M. 0.244 to L.M. 5.00	Henry County, TN
PIN 132450.36 – Safety improvement on local route 05741 from L.M. 0.00 to L.M. 5.00	Henry County, TN
PIN 132571.00 – Bicycle and pedestrian facility on State Route 14	Shelby County, TN
PIN 132524.00 – Bicycle and pedestrian facility on State Route 6	Davidson County, TN
PIN 132535.00 – Bicycle and pedestrian facility on State Route 1	Davidson County, TN
PIN 132569.00 – Bicycle and pedestrian facility on State Route 1	Shelby County, TN

John MacLeod

From: John MacLeod
Sent: Monday, May 8, 2023 9:48 AM
To: Fottrell, Gary (FHWA)
Cc: TDOT.Env CulturalResources
Subject: Section 106 Consulting Coordination PIN 132524.00
Attachments: 132524.00 Historic Report.pdf; 132524.00 Archaeology Report.pdf

Greetings,

I'm sending the attached information to you on behalf of Joe Santangelo, Cultural Resources Section Manager. This information is being provided in response to your letter dated April 10, 2023 indicating that the Chickasaw Nation would like to participate in the Section 106 process as a consulting party.

If you have any questions or need additional information, please feel free to let us know at this email address. You may also contact Mr. Santangelo directly at Joseph.Santangelo@tn.gov or 615.253.1454. We appreciate your review and time.

Sincerely,
Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division – Cultural Resources
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@tn.gov

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CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948
918-453-5000 • www.cherokee.org

Chuck Hoskin Jr.
Principal Chief
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Bryan Warner
Deputy Principal Chief
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April 27, 2023

Joseph Santangelo
Tennessee Department of Transportation
Environmental Division
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243

Re: PIN 132524.00, Bicycles and Pedestrian Facility

Mr. Joseph Santangelo:

The Cherokee Nation (Nation) is in receipt of your correspondence about **PIN 132524.00**, 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 (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 Tennessee Department of Transportation (TNDOT) 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 the TNDOT conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Office 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, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

John MacLeod

From: John MacLeod
Sent: Monday, May 8, 2023 9:52 AM
To: Elizabeth Toombs
Cc: TDOT.Env CulturalResources
Subject: Section 106 Consulting Coordination PIN 132524.00
Attachments: 132524.00 Historic Report.pdf; 132524.00 Archaeology Report.pdf

Greetings,

I'm sending the attached information to you on behalf of Joe Santangelo, Cultural Resources Section Manager. This information is being provided in response to your letter dated April 27, 2023 indicating that the Cherokee Nation would like to participate in the Section 106 process as a consulting party.

If you have any questions or need additional information, please feel free to let us know at this email address. You may also contact Mr. Santangelo directly at Joseph.Santangelo@tn.gov or 615.253.1454. We appreciate your review and time.

Sincerely,
Jack MacLeod

Jack MacLeod | Native American Coordination
Environmental Division – Cultural Resources
James K. Polk Building, 9th Floor
505 Deaderick Street
Nashville, TN 37243
p. 615-770-1144
John.MacLeod@tn.gov

Hazardous Materials

Environmental Study

Technical Section

Section: Hazardous Materials

Study Results

Based on the Pedestrian Road Safety Initiative Report dated 20 March 2023, no known hazardous materials sites affect this project as it is currently planned, and no additional hazardous material studies are recommended at this time. Three fuel facilities are adjacent to the project corridor, but none appear to impact the project as shown.
1. Bob Frensley Chrysler Plymouth – 5190087, 2210 North Gallatin Road, Madison, TN 37115. This is a closed facility.
2. Regal Auto Wash – 5191232, 2239 Gallatin Road North, Madison, TN 37115. This is a closed facility.
3. Walmart Super Center No 0695 – 5191784, 2240 Gallatin Pike North, Madison, TN 37115. This is an active facility.

In the event hazardous materials or wastes are encountered within the right-of-way, notification shall be made per TDOT Standard Specifications for Road and Bridge Construction (January 1, 2021) Section 107.08.C. Disposition of hazardous materials or wastes shall be subject to all applicable regulations, including the applicable sections of the Federal Resource Conservation and Recovery Act, as amended; the Comprehensive Environmental Response, Compensation, and Liability Act, as amended; and the Tennessee Hazardous Waste Management Act of 1983, as amended. Databases reviewed include Google Earth imagery, EPA National Priorities List, EPA EnviroMapper (Envirofacts), TDEC Registered Underground Storage Tanks Public Data Viewer and Data and Reports, TDEC Division of Water Resources Public Data Viewer and Oil and Gas Wells database, TDEC Division of Remediation Sites Public Data Viewer, TDOT Integrated Bridge Information System, and others, as necessary.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Kyle Kirschenmann

Signature: Kyle Kirschenmann Digitally signed by Kyle Kirschenmann Date: 2023.03.22 09:23:11 -04'00'

Title: Environmental Manager Hazardous Materials Section

Multimodal

Environmental Study

Technical Section

Section: Multimodal

Study Results

This pedestrian safety project includes crosswalk improvements, curb ramps and other pedestrian facilities.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Masonya Osei

Title: Multimodal Planning Monitor

Signature: Masonya B. Osei

Digitally signed by Masonya B. Osei
Date: 2023.03.30 10:26:11 -05'00'

TN TDOT Department of Transportation

MULTIMODAL ACCESS POLICY

EFFECTIVE DATE:

July 31, 2015

AUTHORITY:

TCA 4-3-2303

If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

PURPOSE:

To create and implement a multimodal transportation policy that encourages safe access and mobility for users of all ages and abilities through the planning, design, construction, maintenance, and operation of new construction, reconstruction and retrofit transportation facilities that are federally or state funded. Users include, but are not limited to, motorists, transit-riders, freight-carriers, bicyclists and pedestrians.

APPLICATION:

The policy applies to Department of Transportation employees, consultants and contractors involved in the planning, design, construction, maintenance, and operation of state and federally funded projects, and local governments managing and maintaining transportation projects with funding through TDOT's Local Programs Development Office.

DEFINITIONS:

Highway:	A main road or thoroughfare, such as a street, boulevard, or parkway, available to the public for use for travel or transportation.
Multimodal:	For the purposes of this policy, multimodal is defined as the movement of people and goods on state and functionally-classified roadways. Users include, but are not limited to, motorists, transit-riders, freight-carriers, bicyclists and pedestrians, including those with disabilities.
Reconstruction:	Complete removal and replacement of the pavement structure or the addition of new continuous traffic lanes on an existing roadway.

Retrofit:	Changes to an existing highway within the general right-of-way, such as adding lanes, modifying horizontal and vertical alignments, structure rehabilitation, safety improvements, and maintenance.
Roadway:	The portion of a highway, including shoulders, that is available for vehicular, bicycle or pedestrian use.

POLICY:

The Department of Transportation recognizes the benefits of integrating multimodal facilities into the transportation system as a means to improve the mobility, access and safety of all users. The intent of this policy is to promote the inclusion of multimodal accommodations in all transportation planning and project development activities at the local, regional and statewide levels, and to develop a comprehensive, integrated, and connected multimodal transportation network. TDOT will collaborate with local government agencies and regional planning agencies through established transportation planning processes to ensure that multimodal accommodations are addressed throughout the planning, design, construction, maintenance, and operation of new construction, reconstruction and retrofit transportation facilities as outlined in TDOT's Multimodal Access Policy Implementation Plan.

TDOT is committed to the development of a transportation system that improves conditions for multimodal transportation users through the following actions:

1. Provisions for multimodal transportation shall be given full consideration in new construction, reconstruction and retrofit roadway projects through design features appropriate for the context and function of the transportation facility.
2. The planning, design and construction of new facilities shall give full consideration to likely future demand for multimodal facilities and not preclude the provision of future improvements. If all feasible roadway alternatives have been explored and suitable multimodal facilities cannot be provided within the existing or proposed right of way due to environmental constraints, an alternate route that provides continuity and enhances the safety and accessibility of multimodal travel should be considered.
3. Existing multimodal provisions on roadways shall not be made more difficult or impossible by roadway improvements or routine maintenance projects.
4. Intersections and interchanges shall be designed (where appropriate based on context) to accommodate the mobility of bicyclists and pedestrians to cross corridors as well as travel along them in a manner that is safe, accessible, and convenient.
5. While it is not the intent of resurfacing projects to expand existing facilities, opportunities to provide or enhance bicycle and pedestrian facilities shall be given full consideration during the program development stage of resurfacing projects.
6. Pedestrian facilities shall be designed and built to accommodate persons with disabilities in accordance with the access standards required by the Americans with Disabilities Act

(ADA). Sidewalks, shared use paths, street crossings (including over- and under-crossings) and other infrastructure shall be constructed so that all pedestrians, including those with disabilities, can travel independently.

7. Provisions for transit-riders, pedestrians, and bicyclists shall be included when closing roads, bridges or sidewalks for construction projects where pedestrian, bicycle, or transit traffic is documented or expected.

EXCEPTIONS:

It is TDOT's expectation that full consideration of multimodal access will be integrated in all appropriate new construction, reconstruction and retrofit infrastructure projects. However, there are conditions where it is generally inappropriate to provide multimodal facilities. Examples of these conditions include, but are not limited to:

1. Controlled access facilities where non-motorized users are prohibited from using the roadway. In this instance, a greater effort may be necessary to accommodate these users elsewhere within the same transportation corridor.
2. The cost of accommodations would be excessively disproportionate to the need and probable use. Excessively disproportionate is defined as exceeding twenty percent (20%) of the total cost of the project. The twenty percent figure should be used in an advisory rather than an absolute sense, especially in instances where the cost may be difficult to quantify. Compliance with ADA requirements may require greater than 20% of project cost to accommodate multimodal access. Costs associated with ADA requirements are NOT an exception.
3. Areas in which the population and employment densities or level of transit service around the facility, both existing and future, does not justify the incorporation of multimodal alternatives.
4. Inability to negotiate and enter into an agreement with a local government to assume the operational and maintenance responsibility of the facility.
5. Other factors where there is a demonstrated absence of need or prudence, or as requested by the Commissioner of the Department of Transportation.

Exceptions for not accommodating multimodal transportation users on State roadway projects in accordance with this policy shall be documented describing the basis and supporting data for the exception, and must be approved by TDOT's Chief Engineer and Chief of Environment and Planning or their designees.

DESIGN GUIDANCE:

The Department recognizes that a well-planned and designed transportation network is responsive to its context and meets the needs of its users. Therefore, facilities will be designed and constructed in accordance with current applicable laws and regulations, using best practices and guidance, including but not limited to the following: TDOT Standard Drawings and guidelines, American Association of State Highway and Transportation Officials (AASHTO) publications, Institute of Transportation Engineers (ITE) publications, the Manual on Uniform Traffic Control Devices (MUTCD), National Association of City Transportation Officials (NACTO) publications, the Public Rights-of-Ways Accessibility Guidelines (PROWAG), and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Signed:

PAUL DEGGES
Chief Engineer/Deputy Commissioner

TOKS OMISHAKIN
Chief of Planning/Deputy Commissioner

JOHN SCHROER
Commissioner

Correspondence

Kate Landers

From: Veda Nguyen
Sent: Tuesday, March 21, 2023 2:14 PM
To: Kate Landers
Cc: Samuel T. Patterson
Subject: RE: PRSI Planning Report Complete, PIN 132524.00, Davidson County, SR-6 (Gallatin Pike)

Kate,

It would not be permanent ROW acquisition, just easements for during construction and it would be minimal. I would conservatively estimate less than an acre and at most maybe 0.75 acres.

Thank you,

Veda L. Nguyen, P.E. | Civil Engineering Manager II
Multimodal Planning Office
James K. Polk Bldg, 12th Floor
505 Deaderick St., Nashville, TN 37243
Office No. 615-532-0421
Veda.Nguyen@tn.gov

From: Kate Landers <Kate.Landers@tn.gov>
Sent: Tuesday, March 21, 2023 1:38 PM
To: Veda Nguyen <Veda.Nguyen@tn.gov>
Cc: Samuel T. Patterson <Samuel.T.Patterson@tn.gov>
Subject: RE: PRSI Planning Report Complete, PIN 132524.00, Davidson County, SR-6 (Gallatin Pike)

Yes, thank you! Do you happen to have an estimate of the acreage?

Kate Landers | Environmental Studies Specialist
Environmental Division/ NEPA Programs Office
James K. Polk Building, 9th Floor
505 Deaderick St., Nashville, TN 37243
P: 615-253-2475
Kate.Landers@tn.gov
tn.gov/tdot
NEPA Office (tn.gov)

From: Veda Nguyen <Veda.Nguyen@tn.gov>
Sent: Tuesday, March 21, 2023 1:35 PM
To: Kate Landers <Kate.Landers@tn.gov>
Subject: RE: PRSI Planning Report Complete, PIN 132524.00, Davidson County, SR-6 (Gallatin Pike)

Hi Kate,

To be conservative, I would say ROW acquisition is anticipated for driveway modifications and construction easements. I provided an estimate to TDOT programming for a ROW cost estimate of $5,000.

Is that the information you are needing?

Thank you,

Veda L. Nguyen, P.E. | Civil Engineering Manager II
Multimodal Planning Office
James K. Polk Bldg, 12th Floor
505 Deaderick St., Nashville, TN 37243
Office No. 615-532-0421
Veda.Nguyen@tn.gov

From: Kate Landers <Kate.Landers@tn.gov>
Sent: Tuesday, March 21, 2023 1:16 PM
To: Veda Nguyen <Veda.Nguyen@tn.gov>
Cc: Daniel McDonell <Daniel.McDonell@tn.gov>; Steve Bryan <Steve.Bryan@tn.gov>; Sharon Sanders <Sharon.Sanders@tn.gov>; Samuel T. Patterson <Samuel.T.Patterson@tn.gov>
Subject: RE: PRSI Planning Report Complete, PIN 132524.00, Davidson County, SR-6 (Gallatin Pike)

Hi Vega,

Can you confirm if there will be ROW on this project? If so, can you provide a conservative estimate?

Thank you!

Kate Landers | Environmental Studies Specialist
Environmental Division/ NEPA Programs Office
James K. Polk Building, 9th Floor
505 Deaderick St., Nashville, TN 37243
P: 615-253-2475
Kate.Landers@tn.gov
tn.gov/tdot
NEPA Office (tn.gov)

From: Veda Nguyen <Veda.Nguyen@tn.gov>
Sent: Thursday, March 2, 2023 4:03 PM
To: Preston Elliott <Preston.Elliott@tn.gov>
Cc: Daniel Pallme <Daniel.Pallme@tn.gov>; Will Reid <Will.Reid@tn.gov>; Benjamin Price <Benjamin.Price@tn.gov>; Susannah Kniazewycz <Susannah.Kniazewycz@tn.gov>; Matt Meservy <Matt.Meservy@tn.gov>; Ronnie Porter <Ronnie.Porter@tn.gov>; Steve Allen <Steve.Allen@tn.gov>; Lee J. Smith <Lee.J.Smith@tn.gov>; Stacy Morrison <Stacy.Morrison@tn.gov>; Jonathan Russell <Jonathan.Russell@tn.gov>; Brian Hurst <Brian.Hurst@tn.gov>; Jim Waters

<Jim.Waters@tn.gov>; Michael Gilbert <Michael.Gilbert@tn.gov>; Shaun Armstrong <Shaun.Armstrong@tn.gov>; Brandon Darks <Brandon.Darks@tn.gov>; Terry Gladden <Terry.Gladden@tn.gov>; Greg Hamilton <Greg.Hamilton@tn.gov>; Nathan Vatter <Nathan.Vatter@tn.gov>; Steve Bryan <Steve.Bryan@tn.gov>; Michelle Nickerson <Michelle.Nickerson@tn.gov>; Shane Hester <Shane.Hester@tn.gov>; Jay Norris <Jay.Norris@tn.gov>; Jordan Burress <Jordan.Burress@tn.gov>; TDOT MultimodalPlanning <TDOT.MultimodalPlanning@tn.gov>; TDOT.Env NEPA <TDOT.Env.NEPA@tn.gov>; TDOT.Env Permits <TDOT.Env.Permits@tn.gov>; HQRailroadCoordinator <HQRailroadCoordinator@tn.gov>; TDOT ADA <TDOT.ADA@tn.gov>; Brad.Freeze@Nashville.gov; Oldham, Jason (NDOT) <Jason.Oldham@nashville.gov>; Sewell, Marty (Planning) <Marty.Sewell@nashville.gov>; Boghozian, Jon (Public Works) <Jon.Boghozian@nashville.gov>; Dearman, Anna (NDOT) <Anna.Dearman@nashville.gov>; Walker, Trey (MTA) <Trey.Walker@nashville.gov>; Cole, Justin (MTA) <Justin.Cole@nashville.gov>; Sean Pfalzer <spfalzer@gnrc.org>; Kim Vanatta <Kim.VanAtta@tn.gov>
Subject: PRSI Planning Report Complete, PIN 132524.00, Davidson County, SR-6 (Gallatin Pike)

Good Afternoon All,

The PRSI Planning Report for the subject project is complete and available in PPRM. For those without access to PPRM, the PRSI Planning Report can be downloaded from TNCloud:

https://tncloud.tn.gov/owncloud/index.php/s/0dagbwmpUvjp1oN
Password: TDOTPRSI

Please let me know if you have any questions regarding this project.

Thank you and have a great day,

Veda L. Nguyen, P.E. | Civil Engineering Manager II
Multimodal Planning Office
James K. Polk Bldg, 12th Floor
505 Deaderick St., Nashville, TN 37243
Office No. 615-532-0421
Veda.Nguyen@tn.gov

Quality Assurance Review

Project Information

Route: SR-6

Termini: (Gallatin Pike), From Liberty Lane to north of Northside Drive

County: Davidson

PIN: 132524.00

Preparer: Kate Landers

Certification

By signing below, you certify that this document has been reviewed for compliance with all applicable environmental laws, regulations and procedures. The document has been evaluated for quality, accuracy, and completeness, and that all source material has been verified, compiled and included in the attachments and technical appendices.

Reviewer:	Sam Patterson	**Signature:**	Sam Patterson Digitally signed by Sam Patterson Date: 2023.07.13 09:43:24 -05'00'
Title:	Environmental Supervisor	**Comment:**	Minor edits made. Approved.
Reviewer:	Enter Reviewer Name	**Signature:**	
Title:	Enter Reviewer Title	**Comment:**	Enter Comment
Reviewer:	Enter Reviewer Name	**Signature:**	
Title:	Enter Reviewer Title	**Comment:**	Enter Comment
Reviewer:	Enter Reviewer Name	**Signature:**	
Title:	Enter Reviewer Title	**Comment:**	Enter Comment
Reviewer:	Enter Reviewer Name	**Signature:**	
Title:	Enter Reviewer Title	**Comment:**	Enter Comment